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**PSC** ELECTRONICS  
677 PALOMAR AVENUE  
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(408) 737-1333

# C&K

The Primary Source Worldwide...

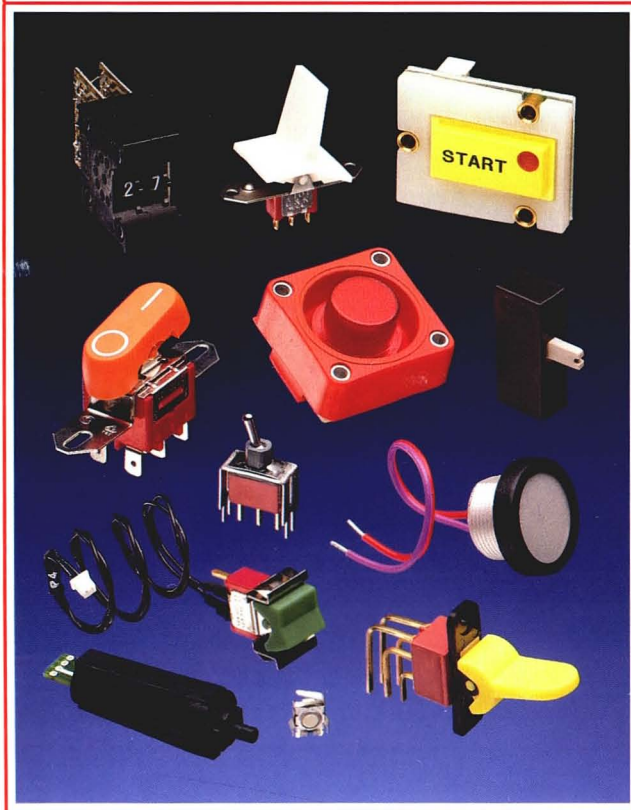
**SWITCHES — NEWTON DIVISION**



CATALOG NO. 9308



## Custom / Application Specific



C&K Components, Inc. is the leader in addressing your application specific switch requirements. Our dedicated Custom Product Development Group offers extensive CAD / CAE / CAM facilities, in-house prototyping, full run production and value-added capabilities, offering you an affordable alternative in switch design.

A wide range of technologies are available including membrane, conductive elastomer, piezo, anti-static and sealed / process compatible. In addition we can provide you with custom markings, wiring harnesses, and "smart" coded switches.

So give us a call and let us work with you to design the switch that will meet your exact design specifications.

For a complete listing of C&K switch products, return the attached card in the back of this book, or call:  
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The Primary Source Worldwide<sup>®</sup>

## *Quality Statement C&K's Commitment To Quality*

*Customer satisfaction is the basic standard by which C&K judges itself as the major supplier of electromechanical switches to the electronics industry. Consistent high quality is the foundation of our philosophy and the cornerstone of our business.*

*It is therefore our policy to:*

- \* Provide products that consistently meet or exceed the highest quality expectations of our valued customers.*
- \* Actively pursue and encourage programs that strive to ensure excellence in quality.*
- \* Instill in our employees the concept that quality is our first priority and that Best-In-Class is an achievable goal.*

*Quality is not an option at C&K. It is C&K's commitment to total customer satisfaction.*

*James E. Walsh*  
James E. Walsh  
President

*Philip R. Felton*  
Philip R. Felton  
Director of Quality

|  |      |
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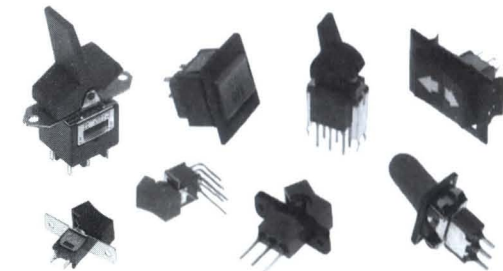
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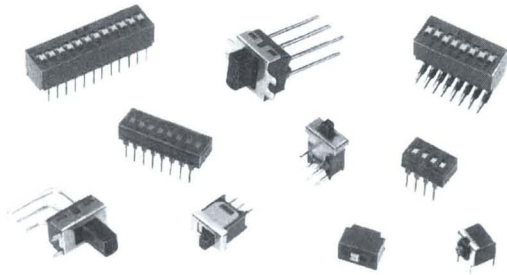
## SECTION C – ROCKER AND LEVER HANDLE SWITCHES

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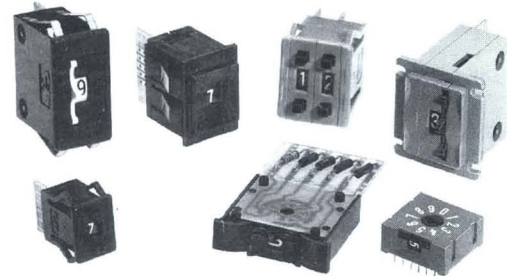
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| KS Series . . . . . Pushbutton Key Switches . . . . .                              | D-67 thru D-69 |
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## SECTION E – DIP AND SLIDE SWITCHES

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| GS Series . . . . .   | Ultra - Miniature Slide Switches . . . . . | E-9 thru E-10  |
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| 1000 Series . . . . . | Miniature Slide Switches . . . . .         | E-14 thru E-20 |



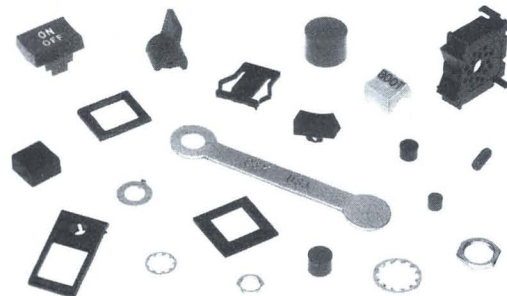
## SECTION F – CODED SWITCHES

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| <b>BP</b>   | Side Actuated DIP Switches . . . . .                               | E-7 thru E-8   | <b>S2</b>           | Subminiature Thumbwheel Switches . . . . .                  | F-15 thru F-20 |
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|             | Sealed Anti-Static Rocker & Lever Handle Switches . . . . .        | C-12 thru C-26 | <b>T</b>            | Tiny Toggle Switches . . . . .                              | B-12 thru B-17 |
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| <b>E020</b> | Sealed Snap-Acting Momentary Pushbutton Switches . . . . .         | D-23 thru D-30 | <b>TP</b>           | Tiny Pushbutton Switches . . . . .                          | D-10 thru D-16 |
| <b>EP</b>   | Sealed Surface Mount Tiny Pushbutton Switches . . . . .            | A-16 thru A-17 | <b>TS</b>           | Tiny Slide Switches . . . . .                               | E-11 thru E-13 |
|             | Sealed Tiny Pushbutton Switches . . . . .                          | D-4 thru D-9   | <b>UD</b>           | Sealed Ultra-Miniature Surface Mount DIP Switches . . . . . | A-2            |
| <b>ET</b>   | Sealed Surface Mount Tiny Toggle Switches . . . . .                | A-14 thru A-15 | <b>1000</b>         | Miniature Slide Switches . . . . .                          | E-14 thru E-20 |
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| <b>KS</b>   | Pushbutton Key Switches . . . . .                                  | D-67 thru D-69 | <b>8500</b>         | Subminiature Pushbutton Switches . . . . .                  | D-59 thru D-62 |
| <b>KT</b>   | Sealed Surface Mount Miniature Key Switches . . . . .              | A-18 thru A-20 | <b>8600</b>         | Microminiature Pushbutton Switches . . . . .                | D-57 thru D-58 |
|             | Sealed Miniature Key Switches . . . . .                            | D-63 thru D-64 | <b>9000</b>         | Power Toggle Switches . . . . .                             | B-47 thru B-52 |
| <b>LD</b>   | Sealed Low Profile Surface Mount DIP Switches . . . . .            | A-3 thru A-4   |                     | Power Rocker & Lever Handle Switches . . . . .              | C-54 thru C-60 |
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|                              | SF/SR    | F-21 thru F-31                   |                                 | GS       | A-11 thru A-13<br>E-9 thru E-10                 |
|                              | 3        | F-32 thru F-44                   |                                 | GT       | A-5 thru A-7<br>B-2 thru B-5                    |
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|                              | BP       | E-7 thru E-8                     |                                 | TS       | E-7 thru E-8                                    |
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| <b>Power Switches</b>        |          |                                  |                                 | KT       | A-18 thru A-20                                  |
|                              | 9000     | B-47 thru B-52<br>C-54 thru C-60 |                                 | LD       | A-3 thru A-4                                    |
| <b>Pushbutton Switches</b>   |          |                                  |                                 | UD       | A-2   |
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|                              | EP       | A-16 thru A-17<br>D-4 thru D-9   |                                 | 3        | F-32 thru F-44                                  |
|                              | GP       | A-8 thru A-10<br>D-2 thru D-3    |                                 | 3M       | F-2 thru F-4                                    |
|                              | KA       | D-65 thru D-66                   | <b>Tiny Switches</b>            | EP       | A-16 thru A-17<br>D-4 thru D-9                  |
|                              | KP       | D-70 thru D-73                   |                                 | ET       | A-14 thru A-15<br>B-6 thru B-11<br>C-2 thru C-6 |
|                              | KS       | D-67 thru D-69                   |                                 | T        | B-12 thru B-17<br>C-7 thru C-11                 |
|                              | KT       | A-18 thru A-20<br>D-63 thru D-64 |                                 | TP       | D-10 thru D-16                                  |
|                              | TP       | D-10 thru D-16                   |                                 | TS       | E-11 thru E-13                                  |
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|                              | 8060     | D-47 thru D-56                   |                                 | ET       | A-14 thru A-15<br>B-6 thru B-11                 |
|                              | 8500     | D-59 thru D-62                   |                                 | GT       | A-5 thru A-7<br>B-2 thru B-5                    |
|                              | 8600     | D-57 thru D-58                   |                                 | T        | B-12 thru B-17<br>B-30 thru B-46                |
| <b>Pushwheel Switches</b>    |          |                                  |                                 | 7000 & U | B-30 thru B-46                                  |
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|                              | 3U       | F-5 thru F-9                     |                                 | GP       | A-8 thru A-10<br>D-2 thru D-3                   |
| <b>Rocker Switches</b>       |          |                                  |                                 | GS       | A-11 thru A-13<br>E-9 thru E-10                 |
|                              | E        | C-12 thru C-26                   |                                 | GT       | A-5 thru A-7<br>B-2 thru B-5                    |
|                              | ET       | C-2 thru C-6                     |                                 | UD       | A-2   |
|                              | T        | C-7 thru C-11                    |                                 |          |   |
|                              | 5000 & L | C-49 thru C-53                   |                                 |          |   |
|                              | 7000 & U | C-27 thru C-48                   |                                 |          |   |
|                              | 9000     | C-54 thru C-60                   |                                 |          |   |
| <b>Rotary Switches</b>       | M        | G-2 thru G-6                     |                                 |          |   |
| <b>Sealed Switches</b>       |          |                                  |                                 |          |   |
|                              | E        | B-18 thru B-29<br>C-12 thru C-26 |                                 |          |   |
|                              | E010     | D-17 thru D-22                   |                                 |          |   |
|                              | E020     | D-23 thru D-30                   |                                 |          |   |
|                              | EP       | A-16 thru A-17<br>D-4 thru D-9   |                                 |          |   |



WELCOME to C&K's newest NEWTON DIVISION SWITCH CATALOG. C&K manufactures the most complete line of miniature, subminiature and ultra-miniature toggle, rocker, leverhandle, pushbutton, illuminated, slide, rotary, coded, DIP, membrane, sealed/process compatible and surface mounted switches. We are *THE PRIMARY SOURCE WORLDWIDE* for switches with unmatched quality and consistently superior performance.

Millions of switch models and option combinations can be ordered from this catalog. Each switch section has either a selection of complete switch part numbers, or a listing of option choices easily combined to build a part number (BUILD-A-SWITCH). Complete HOW TO ORDER information is provided in each switch section, and our Sales Engineers are always ready to assist you with special needs.

Dimensions, operating characteristics, specifications and materials shown in this catalog are subject to change without notice.

## AGENCY APPROVALS

Most C&K switch series offer models that are suitable for power switching, and are available with approvals by one or more of the following listing agencies:

|                      |            |   |
|----------------------|------------|---|
| <b>UL</b> . . . . .  | FILE NO.:  | E42363. Recognized under the component program of Underwriters Laboratories Inc.                  |
| <b>CSA</b> . . . . . | FILE NOS.: | LR29210 (Newton, MA—USA)<br>LR49546 (Clayton, NC—USA)<br>LR47724 (England)<br>LR47725 (Hong Kong) |
| <b>VDE</b> . . . . . | FILE NO.:  | 8869-4401   |
| <b>SEV</b> . . . . . | FILE NO.:  | 81.1162.01  |
| <b>SEMKO</b> . . . . | FILE NO.:  | 43-63118/1-6  |

Some switches are supplied with agency approvals automatically when ordered with the appropriate contact materials (for example: E Series, 8500 Series). In some series, switches have agency approvals only when specific model numbers are selected (example: 7000 Series, 8020 Series). Otherwise, no approvals appear on the switches. See the appropriate switch section for specific ratings, agency approvals and other specifications. Also see CONTACT MATERIAL & APPLICATION RECOMMENDATIONS, page X.

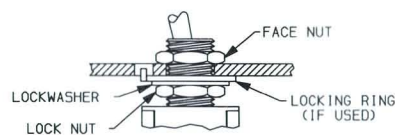
At C&K, we are continuously upgrading our agency certifications, and adding new models and options. Consult the factory with your needs if the approval that you require does not appear.

Note: G and L contact materials are electrically equivalent to B, Q, K and M contact materials and can be used where either dry circuit\* or power conditions are encountered. However, when the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. G or L contact material should be specified where UL approval is required on a switch used in a dry circuit application.

\* Dry circuit = conditions where no arcing occurs during switching, i.e. 0.4 VA max. @ 20 V AC or DC max.

## PANEL MOUNT ASSEMBLY

TYPICAL ASSEMBLY WITH LOCKING RING



To avoid damaging front of panel, always tighten assembly with back-of-panel lock nut.  
**Please Note:** It is recommended that lock nut always be used with non-flanged bushings.  
K-K18 ACTUATORS: Over tightening mounting nut may cause actuator to bind.





## LED INFORMATION

SWITCHES WITH LED SUPPLIED: J85, J86, J95, J96 OPTIONS:

Rectangular LED's are supplied on 8020 Series pushbutton switches with J85 and J95 options, and 8060 Series pushbutton switches with J86 and J96 options. These LED's are factory installed and are not replaceable. The following specifications apply:

| COLOR  | TYP. INTENSITY | TYP. FORWARD VOLTAGE | TYP. FORWARD CURRENT | MAX. RATINGS AT 25°C AMBIENT TEMPERATURE |                            |                   |
|--------|----------------|----------------------|----------------------|--|----------------------------|-------------------|
|        |                |                      |                      | FORWARD VOLTAGE                          | CONTINUOUS FORWARD CURRENT | POWER DISSIPATION |
| Green  | 2.5 mcd        | 2.1V                 | 20 mA                | 2.5V                                     | 50 mA                      | 100 mW            |
| Red*   | 0.5 mcd        |                      |                      |  |                            |                   |
| Yellow | 3.0 mcd        |                      |                      |  |                            |                   |

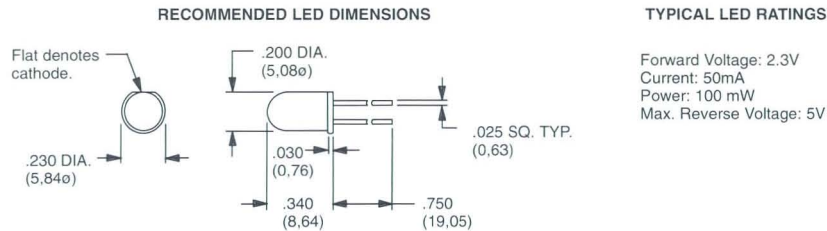
Process information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

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

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

SWITCHES NOT SUPPLIED WITH LED: J52, J62, J82, J84, J92 OPTIONS:

LED's are not supplied with J52, J62, J82, J84 and J92 options, see 7000 Series Rocker and Lever Handle Switches, 8020, 8060, 8600 and TP Series Pushbutton Switches. LED snaps into switch frame surrounding actuator, and is wired externally. See recommended dimensions and ratings below.



## SEALED/PROCESS COMPATIBLE SWITCHES

C&K has responded to the industry by developing a large family of sealed, washable, process compatible switches that are able to withstand today's most common machine soldering and cleaning processes. These switches are available in miniature, subminiature and the newest ultra-miniature package sizes, and include both thru-hole and surface mount terminal styles. They withstand the temperatures associated with the latest vapor phase and infrared reflow techniques. Flux and aqueous or solvent cleaning solutions are not allowed to enter the contacts during cleaning, therefore the switches can be installed on P.C. boards along with other components. No special handling is required.

High temperature housing materials, epoxy terminal sealing and ultrasonically welded assemblies are employed, along with actuator o-ring seals (disposable splashproof boots or tape seal on some models). Every production lot of C&K sealed switches is audited to meet the 85°C Flourinert\* 60 second immersion test. Other manufacturers claim to build sealed products, C&K delivers—time after time! A complete listing of C&K Sealed/Process Compatible Switches is given below.

| Surface Mount Models | Page | Thru-Hole Models                    | Page       |
|----------------------|------|-------------------------------------|------------|
| UD Series .....      | A-2  | GT Series .....                     | B-2        |
| LD Series .....      | A-3  | ET Series .....                     | B-6, C-2   |
| GT Series .....      | A-5  | E Series .....                      | B-18, C-12 |
| GP Series .....      | A-8  | GP Series .....                     | D-2        |
| ET Series .....      | A-14 | EP Series .....                     | D-4        |
| EP Series .....      | A-16 | E010 Series .....                   | D-17       |
| KT Series .....      | A-18 | E020 Series .....                   | D-23       |
|                      |      | KT Series .....                     | D-63       |
|                      |      | KA Series .....                     | D-65       |
|                      |      | LD Series .....                     | E-2        |
|                      |      | BD Series (Unsealed—washable) ..... | E-4        |

\* "Flourinert" is a registered trademark of 3M Co.



## UNSEALED SWITCHES—SOLDERING AND CLEANING

Many manually actuated switches are **not** totally sealed components. Most manufacturing and field problems experienced by users of unsealed miniature switches are caused by contamination of the internal switch contacts during assembly, i.e., **during soldering and cleaning processes**. Switches may become intermittent, especially in low power applications, and these intermittencies may become apparent during factory testing or later in the field. These failures may not be immediately recognized as a process problem, but are assumed to be a product deficiency. Care during soldering and cleaning can prevent most process contamination problems encountered.

Contamination can occur in both hand soldering and machine soldering processes. Hand soldering and cleaning are acceptable with properly trained personnel, small diameter solder (.030—.040 in.) and low wattage soldering irons (25-40 watts max.). Do not immerse or spray the unsealed areas of the switches with cleaners during flux removal.

Most C&K switches have epoxy terminal sealing standard, and are compatible with 'bottom-wash' PC board cleaning methods. Other techniques such as vapor phase and infrared reflow are recommended for sealed/process compatible switches only. These products have the required temperature and contamination resistance.

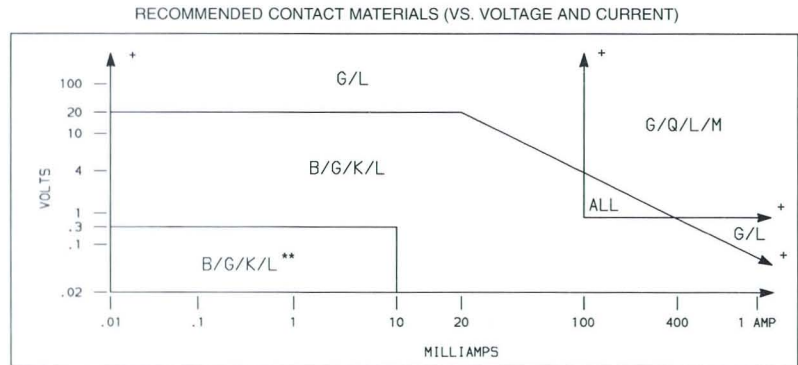
## CONTACT MATERIAL & APPLICATION RECOMMENDATIONS

Most C&K switches offer three contact material options: gold, silver, and gold over silver. Switch terminal plating may be gold, silver, or tin-lead. See desired switch section for availability of specific options. Also see AGENCY APPROVALS, page VIII. Figures. 1 & 2 below provide contact material vs. rating recommendations. For special requirements or assistance, consult factory.

| CONTACT MATERIAL | CHARACTERISTICS   |
|------------------|---|
| B and K          | LOW LEVEL OR DRY CIRCUIT RATED: 0.4 VA max. @ 20 V AC or DC max. Contact material: gold.  |
| Q and M          | POWER RATED: Ratings from 100mA to 10 AMPS @ 125 V AC are available. See switch sections for applicable ratings and available agency approvals. Contact mat'l = silver.   |
| G and L          | POWER OR LOW LEVEL / DRY CIRCUIT RATED: Electrically equivalent to B, Q, K and M contact materials and can be used where either low level / dry circuit* or power conditions are encountered. However, when the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. G or L contact material should be specified where agency approvals are required on a switch used in a dry circuit application. Contact mat'l = gold over silver. |

\* Dry Circuit = conditions where no arcing occurs during switching, i.e. 0.4 VA max. @ 20 V AC or DC max.

Fig. 1



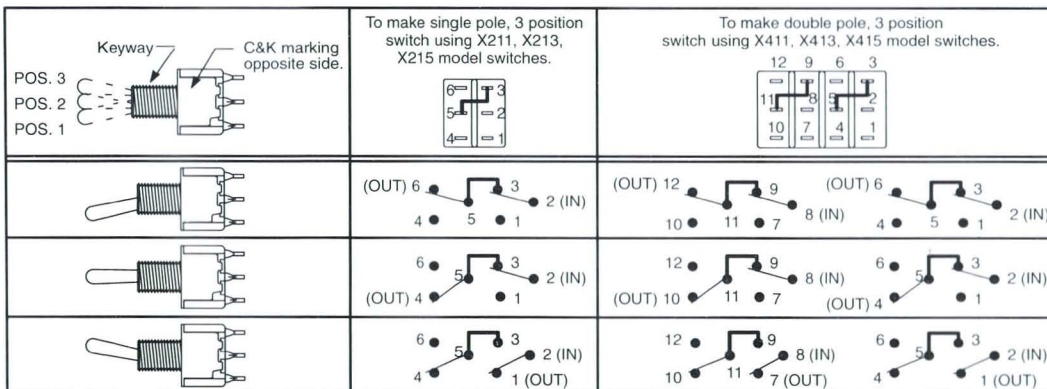
\* To maximum switch rating.

\*\* For high reliability at these low levels, extra gold plating recommended, consult factory.

Fig. 2

## WIRING FOR 3-WAY SWITCHES

3-Position toggle and rocker switches with ON-ON-ON switch functions may be externally wired for '3-way' function. See wiring diagram and schematics, below. Note that jumpers are added by customer.



These switch series have one or more models that may be wired to achieve SP3T or DP3T functions:

5000 and L Series  
7000 and U Series  
E Series  
ET Series  
T Series

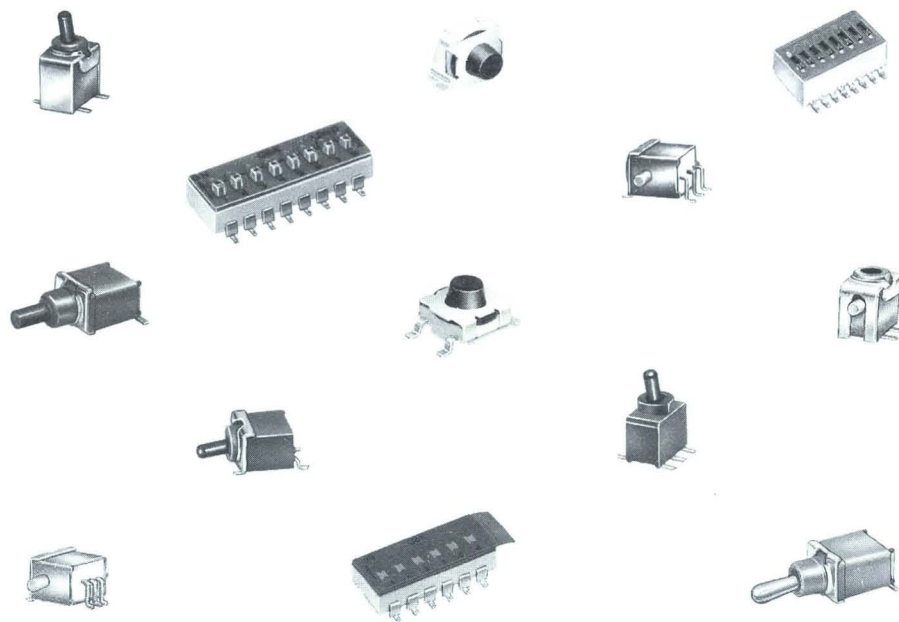
NOTICE: C&K switches shown in this catalog are not designed to be used as safety switches. C&K assumes no liability resulting from misapplication of its products.

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## SECTION A

### SURFACE MOUNTED SWITCHES

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|           |  |                |
|-----------|--|----------------|
| UD Series | Sealed Ultra-Miniature Surface Mount DIP Switches        | A-2            |
| LD Series | Sealed Low Profile Surface Mount DIP Switches            | A-3 thru A-4   |
| GT Series | Sealed Ultra-Miniature Surface Mount Toggle Switches     | A-5 thru A-7   |
| GP Series | Sealed Ultra-Miniature Surface Mount Pushbutton Switches | A-8 thru A-10  |
| GS Series | Ultra-Miniature Surface Mount Slide Switches             | A-11 thru A-13 |
| ET Series | Sealed Surface Mount Tiny Toggle Switches                | A-14 thru A-15 |
| EP Series | Sealed Surface Mount Tiny Pushbutton Switches            | A-16 thru A-17 |
| KT Series | Sealed Surface Mount Miniature Key Switches              | A-18 thru A-20 |

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\*Process sealed—withstands soldering and cleaning processes.




NOTE: Reflective aluminum tape seal omitted for clarity.

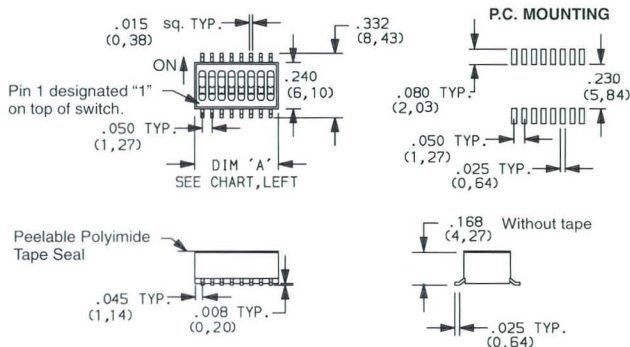
- **ULTRA-MINIATURE DESIGN**—.050 IN. TERMINAL SPACING
- **MODELS AVAILABLE**—SPST—2, 4, 6, 8 POSITIONS
- **TIN-LEAD ALLOY COATS ALL SIDES AND ENDS OF TERMINALS FOR JOINT INTEGRITY**
- **DESIGNED FOR SURFACE MOUNTING**—HIGH TEMPERATURE MATERIALS (UL94V-0)
- **PROCESS COMPATIBLE**—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—REMOVABLE REFLECTIVE POLYIMIDE TOP TAPE SEAL STD.
- **REDUNDANT GOLD PLATED CONTACTS ENSURE RELIABLE SWITCHING**
- **RECESSED SLIDE ACTUATORS AND POSITIVE DETENT**—PREVENT ACCIDENTAL ACTUATION

| PART NO.        | NO. POS. | DIM. 'A'     |
|-----------------|----------|--------------|
| <b>UD02H0SK</b> | 2        | .140 (3,56)  |
| <b>UD04H0SK</b> | 4        | .240 (6,10)  |
| <b>UD06H0SK</b> | 6        | .340 (8,64)  |
| <b>UD08H0SK</b> | 8        | .440 (11,18) |

Schematic



SPST



Part No. Shown: UD08H0SK

## HOW TO ORDER

Complete part numbers for UD SERIES SEALED ULTRA-MINIATURE SURFACE MOUNT DIP SWITCHES are shown above. All switches supplied in 'OFF' position on embossed antistatic tape and reels per EIA 481-2. Rigid dispensing tubes also available, consult factory.

## SPECIFICATIONS

**SWITCH FUNCTION:** SPST—2, 4, 6, & 8 positions.  
**CONTACT RATING:** 0.4 VA max. @ 20 V AC or DC max.  
**MECHANICAL & ELECTRICAL LIFE:** 2,000 make-and-break cycles at full load, each circuit.  
**CONTACT RESISTANCE:** Below 50 milliohms typ. initial @ 2–4 V DC, 100 mA.  
**INSULATION RESISTANCE:** 10<sup>9</sup> ohms min.  
**DIELECTRIC STRENGTH:** 500 V RMS min. @ sea level between adjacent terminals.  
**STORAGE & OPERATING TEMPERATURE:** -40°C to 85°C.  
**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
**PACKAGING:** Switches supplied on embossed antistatic tape and reels per EIA 481-2. Tape and cover strip are conductive for use near statically sensitive components. Switch position 1 denotes pin no. 1. All switch actuators in 'OFF' position standard.

## MATERIALS

**CASE & COVER:** Glass filled LCP (UL 94V-0).  
**ACTUATOR:** Glass filled 4/6 nylon (UL 94V-0).  
**CONTACTS:** Copper alloy, with gold plate over nickel plate.  
**TERMINALS:** Copper alloy, with tin-lead alloy over nickel plate. Tin-lead coats all sides and ends of terminals. All terminals insert molded.  
**TAPE SEAL:** Polyimide, with reflective aluminum.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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

\*Process sealed—withstands soldering and cleaning processes.



NOTE: transparent tape shown for clarity. Reflective aluminum tape is opaque.

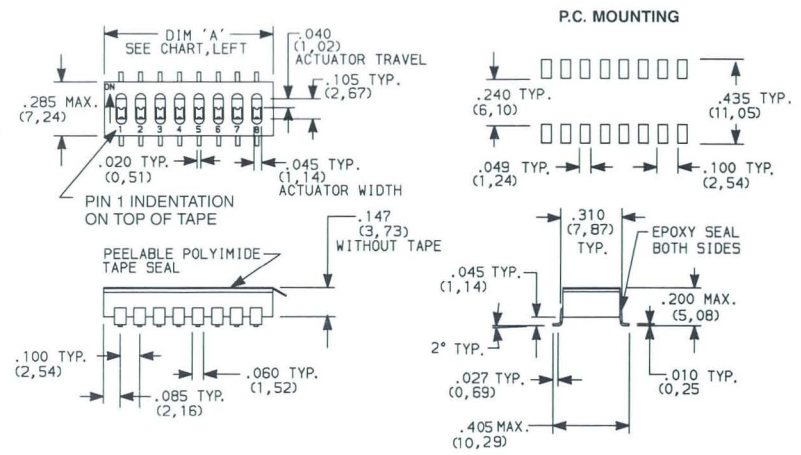
- **LOW PROFILE DESIGN—SPST—4, 5, 6, 7, 8, 10 POSITIONS**
- **BIFURCATED GOLD PLATED CONTACTS—NO LUBRICANTS REQUIRED**
- **PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—REMOVABLE REFLECTIVE POLYIMIDE TOP TAPE SEAL STD.**
- **RECESSED SLIDE ACTUATORS AND POSITIVE DETENT—PREVENT ACCIDENTAL ACTUATION**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS**
- **DESIGNED FOR SURFACE MOUNTING—HIGH TEMPERATURE MATERIALS (UL 94V-0)**

### SEALED—WITH TOP TAPE

| PART NO.        | NO. POS. | DIM. 'A'      |
|-----------------|----------|---------------|
| <b>LD04H0SK</b> | 4        | .470 (11,94)  |
| <b>LD05H0SK</b> | 5        | .570 (14,48)  |
| <b>LD06H0SK</b> | 6        | .670 (17,02)  |
| <b>LD07H0SK</b> | 7        | .770 (19,56)  |
| <b>LD08H0SK</b> | 8        | .870 (22,10)  |
| <b>LD10H0SK</b> | 10       | 1.070 (27,18) |

Schematic

SPST



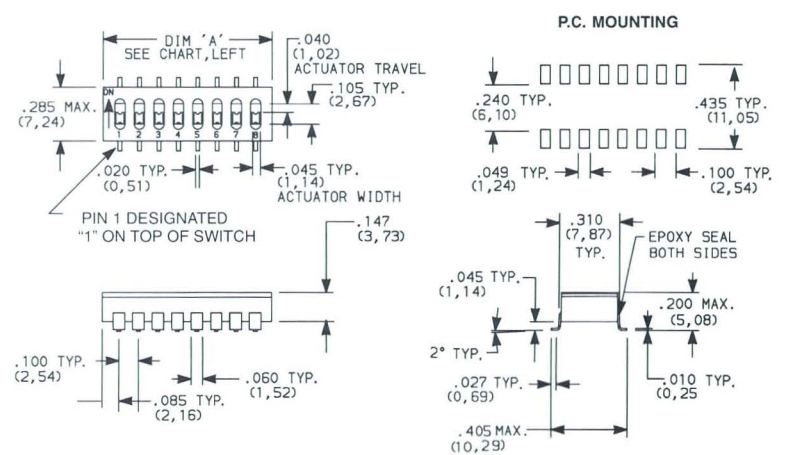
Part No. Shown: LD08H0SK

### UNSEALED—NO TAPE

| PART NO.         | NO. POS. | DIM. 'A'      |
|------------------|----------|---------------|
| <b>LD04H0SKD</b> | 4        | .470 (11,94)  |
| <b>LD05H0SKD</b> | 5        | .570 (14,48)  |
| <b>LD06H0SKD</b> | 6        | .670 (17,02)  |
| <b>LD07H0SKD</b> | 7        | .770 (19,56)  |
| <b>LD08H0SKD</b> | 8        | .870 (22,10)  |
| <b>LD10H0SKD</b> | 10       | 1.070 (27,18) |

Schematic

SPST



Part No. Shown: LD08H0SKD

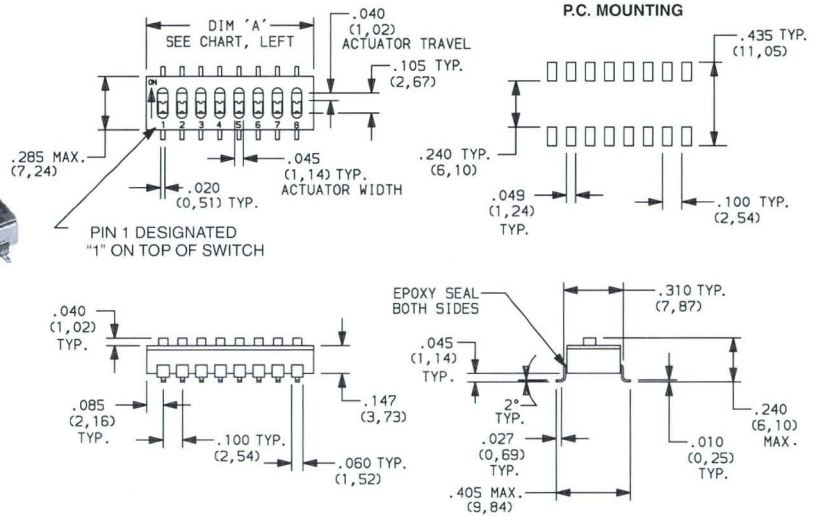
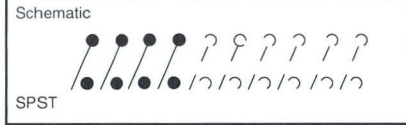


\*Process sealed—withstands soldering and cleaning processes.

## UNSEALED—NO TAPE—EXTENDED ACTUATORS

| PART NO.  | NO. POS. | DIM. 'A'      |
|-----------|----------|---------------|
| LD04H1SKD | 4        | .470 (11,94)  |
| LD05H1SKD | 5        | .570 (14,48)  |
| LD06H1SKD | 6        | .670 (17,02)  |
| LD07H1SKD | 7        | .770 (19,56)  |
| LD08H1SKD | 8        | .870 (22,10)  |
| LD10H1SKD | 10       | 1.070 (27,18) |

**NEW**



Part No. Shown: LD08H1SKD

### HOW TO ORDER

Complete part numbers for LD SERIES SEALED LOW PROFILE SURFACE MOUNT DIP SWITCHES are shown above and on page A-3. All switches supplied in 'OFF' position in rigid dispensing tubes. Tape and reel packaging per EIA 481-2/-3 also available, consult factory. LD Series thru-hole PC mount models also available—see catalog section E, pages E-2 and E-3. Rigid plastic splash-resistant cover available for 8 position models with flush actuators, see catalog section H.

### SPECIFICATIONS

- SWITCH FUNCTION: SPST—4, 5, 6, 7, 8, & 10 positions.
- CONTACT RATING:
  - Carry: 100 mA max. @ 50 V DC.
  - Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.
- MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles at full load, each circuit.
- CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2–4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.
- CAPACITANCE: 5 pF max. between adjacent terminals.
- STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).
- PACKAGING: Switches supplied in rigid dispensing tubes. Indentation on top of tape denotes pin no. 1. With tape removed, switch position no. 1 denotes pin no. 1. All switch actuators in 'OFF' position standard. Tape and reel packaging per EIA 481-2/-3 also available, consult factory.

### MATERIALS

- CASE & COVER: Glass filled LCP (UL 94V-0).
- ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
- CONTACTS: Copper alloy, with gold plate over nickel plate.
- TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.
- TAPE SEAL: Polyimide, with reflective aluminum. Also available unsealed, without top tape.
- TERMINAL SEAL: Epoxy. All terminals insert molded.

NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

\*Process sealed—withstands soldering and cleaning processes.



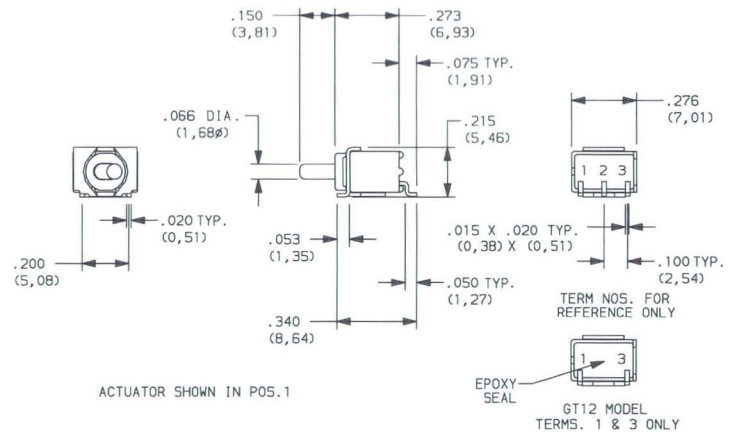
- THREE SURFACE MOUNT TERMINAL STYLES— .100 IN. TERMINAL SPACING
- PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- NEW TWO POLE MODEL—SAME SIZE AS SINGLE POLE SWITCH
- AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT

### SP MODELS WITH SA SURFACE MOUNT TERMINALS

| PART NO.         | SWITCH FUNCTION |        |        |
|------------------|-----------------|--------|--------|
|                  | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MSAKE</b> | ON              | NONE   | ON     |
| <b>GT13MSAKE</b> | ON              | OFF    | ON     |
| Conn. Terms.     | 2-3             | OPEN   | 2-1    |
| Schematic        |                 |        |        |
| SPDT             |                 |        |        |
| <b>GT12MSAKE</b> | OFF             | NONE   | ON     |
| Conn. Terms.     | OPEN            | N/A    | 3-1    |
| Schematic        |                 |        |        |
| SPST             |                 |        |        |



SPST and SPDT

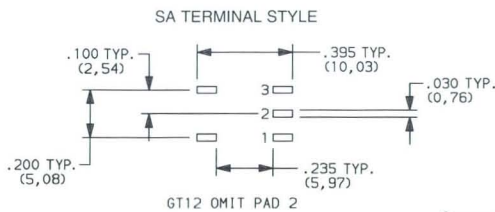
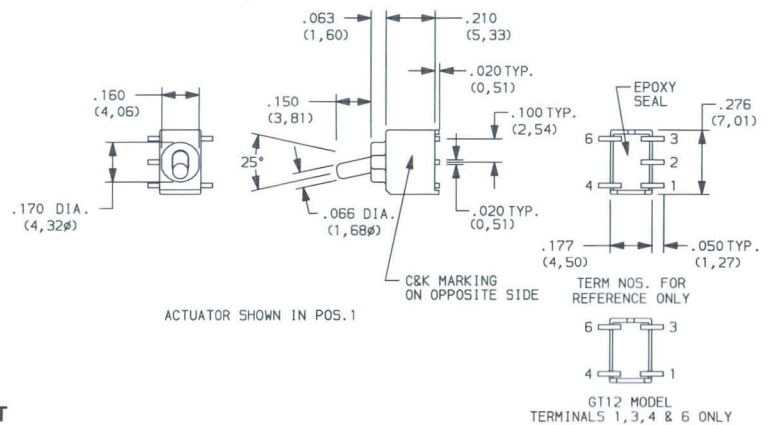


### SP MODELS WITH SC SURFACE MOUNT TERMINALS

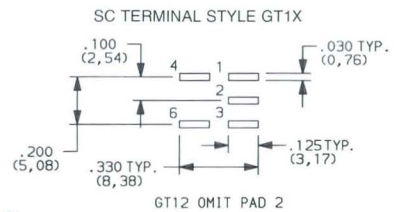
| PART NO.                         | SWITCH FUNCTION |        |        |
|----------------------------------|-----------------|--------|--------|
|                                  | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MSCKE</b>                 | ON              | NONE   | ON     |
| <b>GT13MSCKE</b>                 | ON              | OFF    | ON     |
| Conn. Terms.                     | 2-3             | OPEN   | 2-1    |
| Schematic                        |                 |        |        |
| SPDT                             |                 |        |        |
| Note: Pins 4 and 6 not connected |                 |        |        |
| <b>GT12MSCKE</b>                 | OFF             | NONE   | ON     |
| Conn. Terms.                     | OPEN            | N/A    | 3-1    |
| Schematic                        |                 |        |        |
| SPST                             |                 |        |        |
| Note: Pins 4 and 6 not connected |                 |        |        |



SPST and SPDT



### P.C. MOUNTING



Suggested mounting patterns, see CAUTION page A-7.



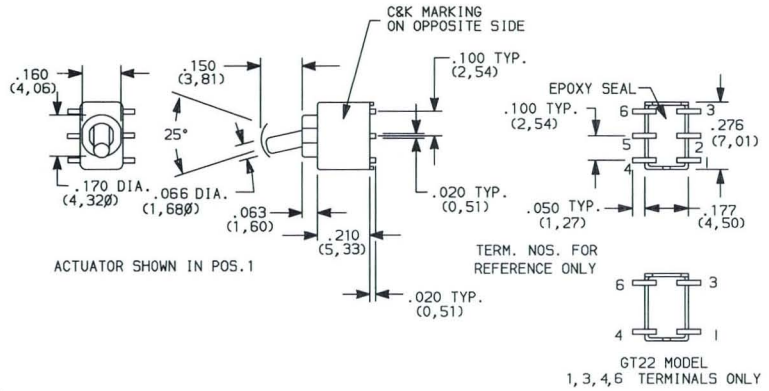
\*Process sealed—withstands soldering and cleaning processes.

A

| PART NO.                             | SWITCH FUNCTION |        |          |
|--------------------------------------|-----------------|--------|----------|
|                                      | POS. 1          | POS. 2 | POS. 3   |
| <b>GT21MSCKE</b><br><b>GT23MSCKE</b> | ON              | NONE   | ON       |
| Conn. Terms.                         | 2-3, 5-6        | OPEN   | 2-1, 5-4 |
| Schematic                            |                 |        |          |
| DPDT                                 |                 |        |          |
| <b>GT22MSCKE</b>                     | OFF             | NONE   | ON       |
| Conn. Terms.                         | OPEN            | N/A    | 3-1, 6-4 |
| Schematic                            |                 |        |          |
| DPST                                 |                 |        |          |



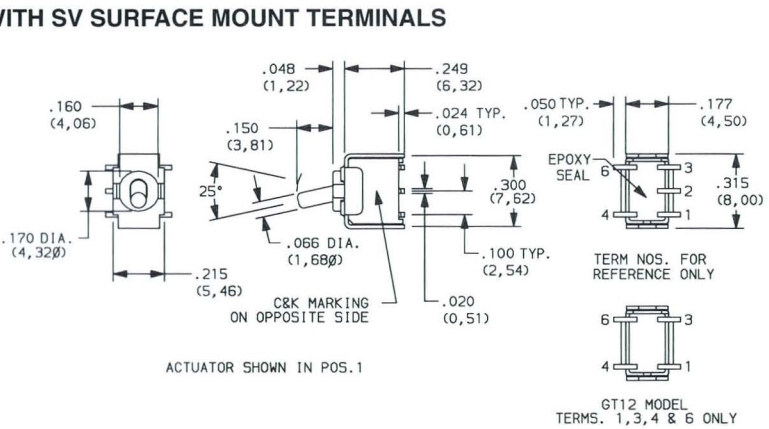
DPST and DPDT



| PART NO.                             | SWITCH FUNCTION |        |        |
|--------------------------------------|-----------------|--------|--------|
|                                      | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MSVKE</b><br><b>GT13MSVKE</b> | ON              | NONE   | ON     |
| Conn. Terms.                         | 2-3             | OPEN   | 2-1    |
| Schematic                            |                 |        |        |
| SPDT                                 |                 |        |        |
| Note: Pins 4 and 6 not connected     |                 |        |        |
| <b>GT12MSVKE</b>                     | OFF             | NONE   | ON     |
| Conn. Terms.                         | OPEN            | N/A    | 3-1    |
| Schematic                            |                 |        |        |
| SPST                                 |                 |        |        |
| Note: Pins 4 and 6 not connected     |                 |        |        |



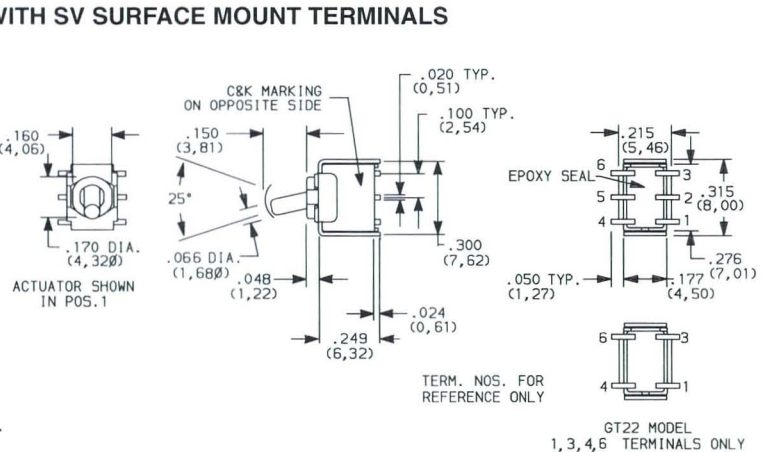
SPST and SPDT



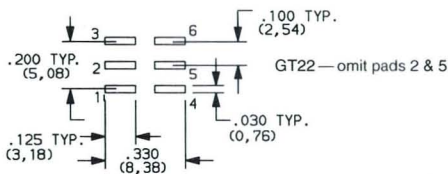
| PART NO.                             | SWITCH FUNCTION |        |         |
|--------------------------------------|-----------------|--------|---------|
|                                      | POS. 1          | POS. 2 | POS. 3  |
| <b>GT21MSVKE</b><br><b>GT23MSVKE</b> | ON              | NONE   | ON      |
| Conn. Terms.                         | 2-3,5-6         | OPEN   | 2-1,5-4 |
| Schematic                            |                 |        |         |
| DPDT                                 |                 |        |         |
| <b>GT22MSVKE</b>                     | OFF             | NONE   | ON      |
| Conn. Terms.                         | OPEN            | N/A    | 3-1,6-4 |
| Schematic                            |                 |        |         |
| DPST                                 |                 |        |         |



DPST and DPDT



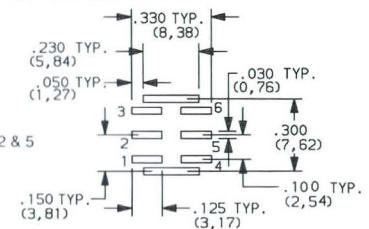
SC TERMINAL STYLE GT2X



P.C. MOUNTING

GT11, GT13 models—omit pad 5  
GT12, GT22 models—omit pads 2 & 5

SV TERMINAL STYLE



Suggested mounting patterns, see CAUTION page A-7.





## HOW TO ORDER

Complete part numbers for GT SERIES SEALED ULTRA-MINIATURE TOGGLE SWITCHES are shown on pages A-5 and A-6. Switches available on embossed antistatic tape and reels, per EIA 481-3, consult factory. GT Series thru-hole PC mount models also available—see catalog section B, pages B-2 thru B-5.

## SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2–4 V DC, 100 mA.  
INSULATION RESISTANCE:  $10^9$  ohms min.  
DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.  
OPERATING TEMPERATURE: -30°C to 85°C.  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481-3. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

## MATERIALS

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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



\*Process sealed—withstands soldering and cleaning processes.



- FIVE SURFACE MOUNT TERMINAL STYLES— .050 AND .100 IN. TERMINAL SPACING
- PROCESS COMPATIBLE— WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- SPST AND SPDT MOMENTARY MODELS AVAILABLE
- AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT

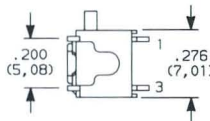
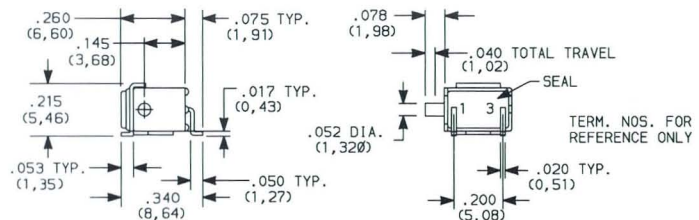
### SP MODELS WITH SA SURFACE MOUNT TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GP11MSAKE</b> | OFF             | MOM.   |
| Conn. Terms.     | OPEN            | 1-3    |
| Schematic        |                 |        |
| SPST             |                 |        |
| <b>GP12MSAKE</b> | ON              | MOM.   |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |

MOM.=MOMENTARY



SPST and SPDT



GP12 MODEL TERMINALS 1, 2, & 3

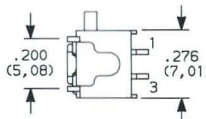
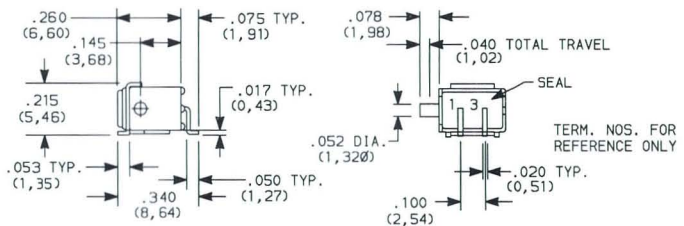
### SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GP11MSA1KE</b> | OFF             | MOM.   |
| Conn. Terms.      | OPEN            | 1-3    |
| Schematic         |                 |        |
| SPST              |                 |        |
| <b>GP12MSA1KE</b> | ON              | MOM.   |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |

MOM.=MOMENTARY

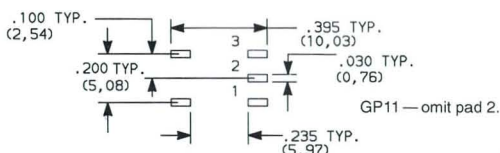


SPST and SPDT



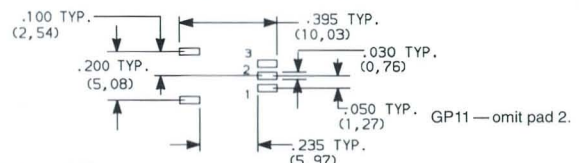
GP12 MODEL TERMINALS 1, 2, & 3

### SA TERMINAL STYLE



### P.C. MOUNTING

### SA1 TERMINAL STYLE



Suggested mounting patterns, see CAUTION page A-10.

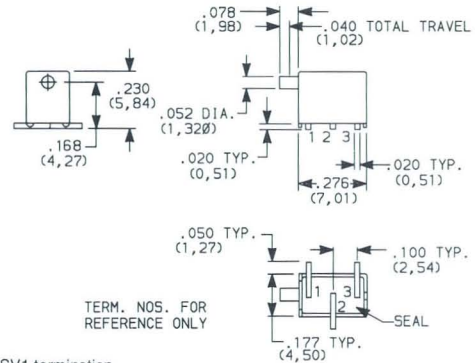


\*Process sealed—withstands soldering and cleaning processes.

### SP MODEL WITH SC SURFACE MOUNT TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GP12MSCKE</b> | ON              | MOM.   |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |

MOM.=MOMENTARY



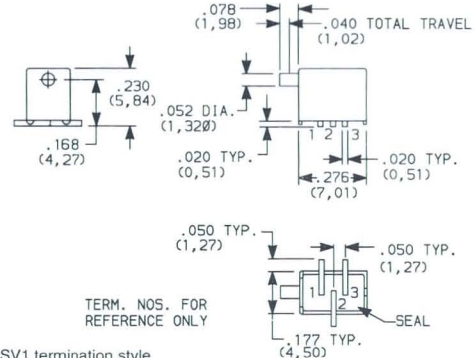
SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

### SP MODEL WITH SC1 SURFACE MOUNT TERMINALS

| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GP12MSC1KE</b> | ON              | MOM.   |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |

MOM.=MOMENTARY



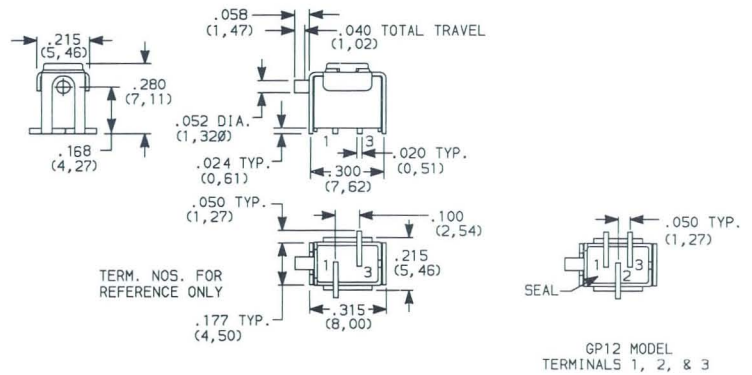
SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

### SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GP11MSV1KE</b> | OFF             | MOM.   |
| Conn. Terms.      | OPEN            | 1-3    |
| Schematic         |                 |        |
| SPST              |                 |        |
| <b>GP12MSV1KE</b> | ON              | MOM.   |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |

MOM.=MOMENTARY

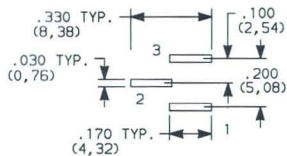


SPST and SPDT

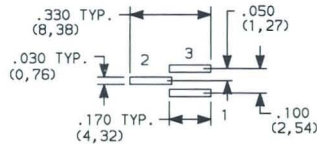
GP12 MODEL TERMINALS 1, 2, & 3

### P.C. MOUNTING

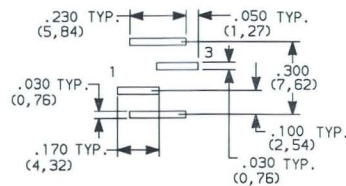
#### SC TERMINAL STYLE



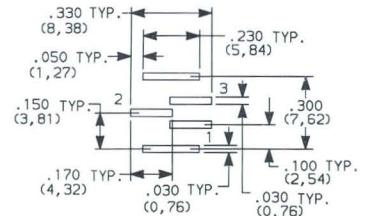
#### SC1 TERMINAL STYLE



#### SV1 TERMINAL STYLE GP11



#### SV1 TERMINAL STYLE GP12



Suggested mounting patterns, see CAUTION page A-10.



## HOW TO ORDER

Complete part numbers for GP SERIES SEALED ULTRA-MINIATURE SURFACE MOUNT PUSHBUTTON SWITCHES are shown on pages A-8 and A-9. Switches available on embossed antistatic tape and reels per EIA 481-3, consult factory. GP Series thru-hole PC mount models also available—see catalog section D, pages D-2 and D-3.

## SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2–4 V DC, 100 mA.  
INSULATION RESISTANCE:  $10^9$  ohms min.  
DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.  
OPERATING TEMPERATURE:  $-30^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481-3. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

## MATERIALS

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

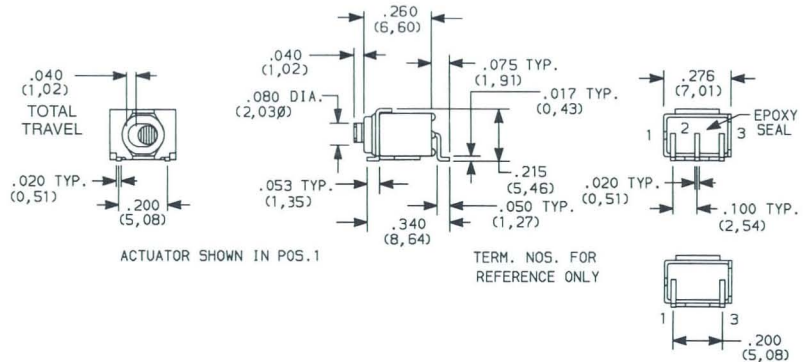
**CAUTION:** PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder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



- FIVE SURFACE MOUNT TERMINAL STYLES— .050 AND .100 IN. TERMINAL SPACING
- PROCESS COMPATIBLE— WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING PROCESSES— HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SPLASHPROOF CONSTRUCTION— INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- SPST AND SPDT MODELS AVAILABLE
- AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT

### SP MODELS WITH SA SURFACE MOUNT TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GS01MSAKE</b> | ON              | ON     |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |
| <b>GS02MSAKE</b> | OFF             | ON     |
| Conn. Terms.     | OPEN            | 3-1    |
| Schematic        |                 |        |
| SPST             |                 |        |

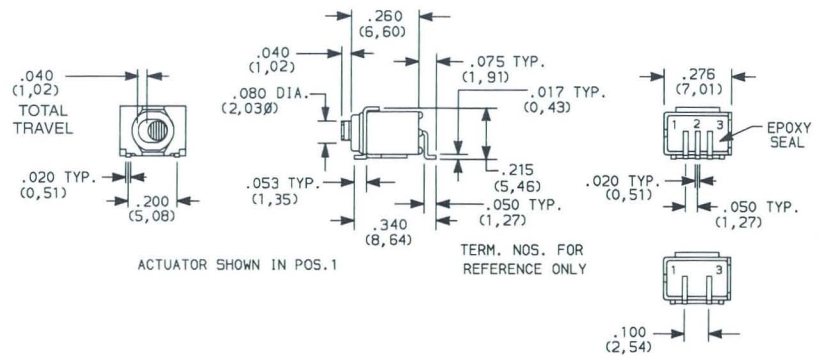


SPST and SPDT

GS02 MODELS 1 & 3 TERMINALS ONLY

### SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

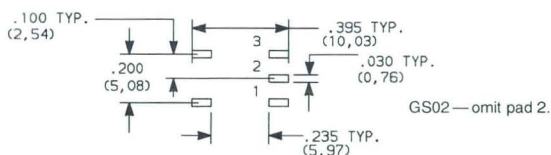
| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GS01MSA1KE</b> | ON              | ON     |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |
| <b>GS02MSA1KE</b> | OFF             | ON     |
| Conn. Terms.      | OPEN            | 3-1    |
| Schematic         |                 |        |
| SPST              |                 |        |



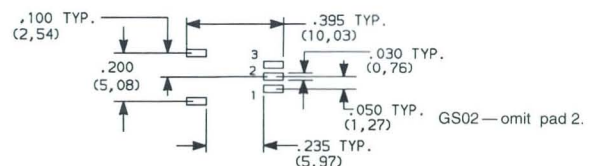
SPST and SPDT

GS02 MODELS 1 & 3 TERMINALS ONLY

### SA TERMINAL STYLE



### P.C. MOUNTING



Suggested mounting patterns, see CAUTION page A-13.

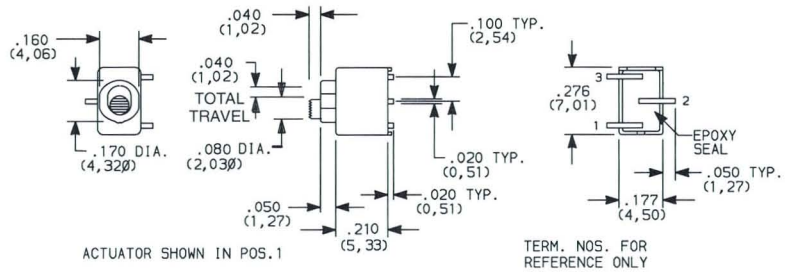
A

## SP MODEL WITH SC SURFACE MOUNT TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GS01MSCKE</b> | ON              | ON     |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |



SPDT



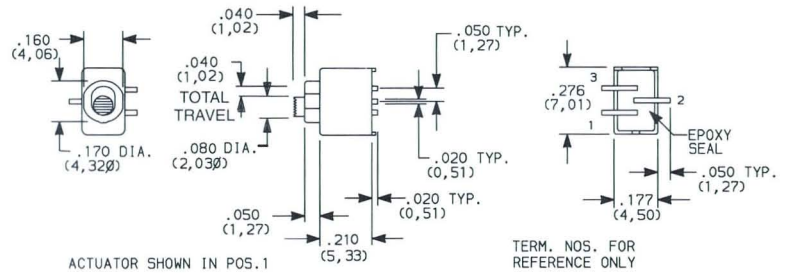
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

## SP MODEL WITH SC1 SURFACE MOUNT TERMINALS

| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GS01MSC1KE</b> | ON              | ON     |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |



SPDT



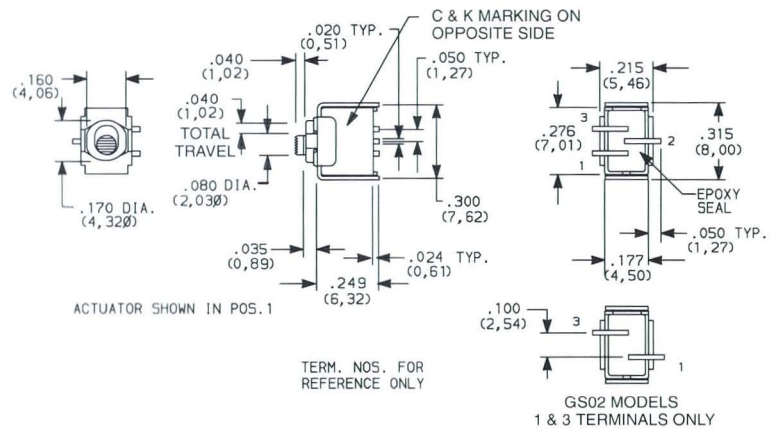
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

## SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

| PART NO.          | SWITCH FUNCTION |        |
|-------------------|-----------------|--------|
|                   | POS. 1          | POS. 2 |
| <b>GS01MSV1KE</b> | ON              | ON     |
| Conn. Terms.      | 2-1             | 2-3    |
| Schematic         |                 |        |
| SPDT              |                 |        |
| <b>GS02MSV1KE</b> | OFF             | ON     |
| Conn. Terms.      | OPEN            | 3-1    |
| Schematic         |                 |        |
| SPST              |                 |        |

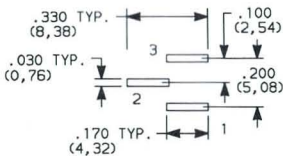


SPST and SPDT

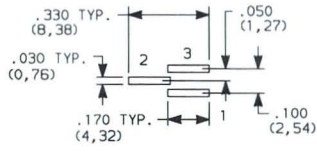


## P.C. MOUNTING

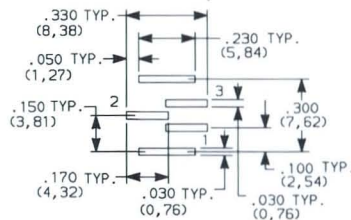
### SC TERMINAL STYLE



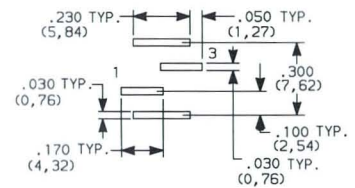
### SC1 TERMINAL STYLE



### SV1 TERMINAL STYLE GS01



### SV1 TERMINAL STYLE GS02



Suggested mounting patterns, see CAUTION page A-13

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**HOW TO ORDER**

Complete part numbers for GS SERIES ULTRA-MINIATURE SURFACE MOUNT SLIDE SWITCHES are shown on pages A-11 and A-12. Switches available on embossed antistatic tape and reels per EIA 481-3, consult factory. GS Series thru-hole PC mount models also available—see catalog section E, pages E-9 and E-10.

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**SPECIFICATIONS**

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2–4 V DC, 100 mA.  
INSULATION RESISTANCE:  $10^9$  ohms min.  
DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.  
OPERATING TEMPERATURE: -30°C to 85°C.  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481-3. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

**MATERIALS**

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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

\*Process sealed—withstands soldering and cleaning processes.

A



- NEW—ANTISTATIC PLASTIC ACTUATOR—9000 V DC STATIC RESISTANCE
- TAPE AND REEL PACKAGING STANDARD FOR AUTOMATED PLACEMENT
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, WELDED HOUSING AND EPOXY TERMINAL SEAL STANDARD

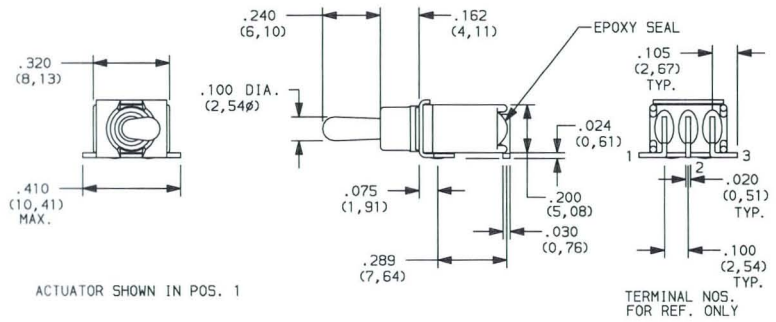
### ANTISTATIC—WITH PLASTIC M3 ACTUATOR—SURFACE MOUNT

| PART NO.            | SWITCH FUNCTION |        |        |
|---------------------|-----------------|--------|--------|
|                     | POS. 1          | POS. 2 | POS. 3 |
|                     |                 |        |        |
| <b>ET01M3D1SAKE</b> | ON              | NONE   | ON     |
| <b>ET03M3D1SAKE</b> | ON              | OFF    | ON     |
| <b>ET05M3D1SAKE</b> | MOM.            | OFF    | MOM.   |
| <b>ET07M3D1SAKE</b> | ON              | OFF    | MOM.   |
| <b>ET08M3D1SAKE</b> | ON              | NONE   | MOM.   |
| Conn. Terms.        | 2-3             | OPEN   | 2-1    |
| Schematic           |                 |        |        |
| SPDT                |                 |        |        |

MOM. = MOMENTARY



SPDT



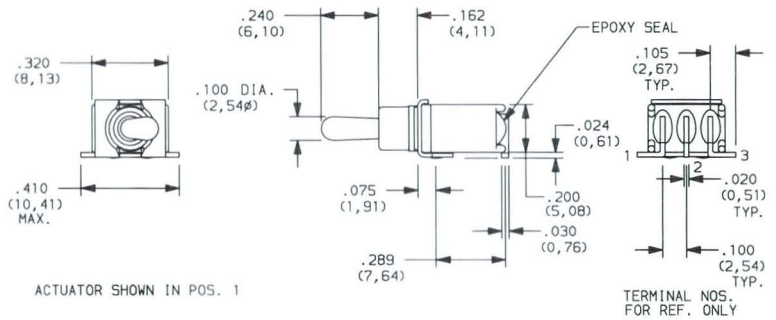
### WITH CHROME PLATED BRASS M ACTUATOR—SURFACE MOUNT

| PART NO.           | SWITCH FUNCTION |        |        |
|--------------------|-----------------|--------|--------|
|                    | POS. 1          | POS. 2 | POS. 3 |
|                    |                 |        |        |
| <b>ET01MD1SAKE</b> | ON              | NONE   | ON     |
| <b>ET03MD1SAKE</b> | ON              | OFF    | ON     |
| <b>ET05MD1SAKE</b> | MOM.            | OFF    | MOM.   |
| <b>ET07MD1SAKE</b> | ON              | OFF    | MOM.   |
| <b>ET08MD1SAKE</b> | ON              | NONE   | MOM.   |
| Conn. Terms.       | 2-3             | OPEN   | 2-1    |
| Schematic          |                 |        |        |
| SPDT               |                 |        |        |

MOM. = MOMENTARY



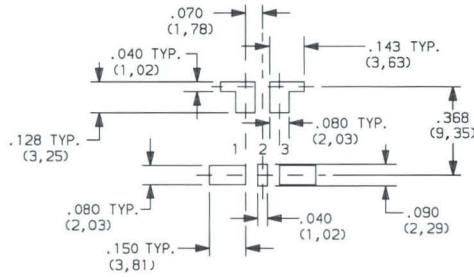
SPDT





**P.C. MOUNTING**

Suggested mounting pattern,  
see CAUTION page A-15.



**HOW TO ORDER**

Complete part numbers for ET SERIES SEALED SURFACE MOUNT TINY TOGGLE SWITCHES are shown on page A-14. Switches available on embossed antistatic tape and reels per EIA 481-3. ET Series thru-hole PC mount models also available — see catalog section B, pages B-6 thru B-11.

**SPECIFICATIONS**

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
- MECHANICAL & ELECTRICAL LIFE: 60,000 make-and-break cycles at full load on ET01 model. All other models, 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2–4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- STATIC RESISTANCE (M3 actuator only): 9000 V DC min @ sea level, actuator to terms.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).
- PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481-3. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

**MATERIALS**

- CASE & BUSHING: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).
- ACTUATOR: M3 antistatic actuator: Nylon 4/6, black standard, (UL 94V-0). M actuator: Brass, chrome plated. Internal o-ring seal standard with all actuators.
- SWITCH SUPPORT: Brass, tin plated.
- CONTACTS: Copper alloy, with gold plate over nickel plate.
- TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.
- TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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



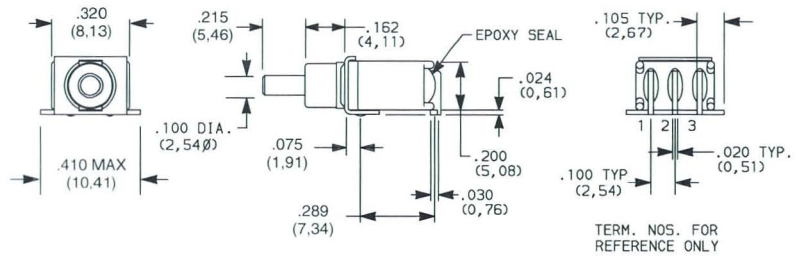
\*Process sealed—withstands soldering and cleaning processes.



- **PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY**
- **SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, WELDED HOUSING AND EPOXY TERMINAL SEAL STANDARD**
- **TAPE AND REEL PACKAGING STANDARD FOR AUTOMATED PLACEMENT**

### SP MODELS WITH EXTENDED ACTUATOR

| PART NO.           | SWITCH FUNCTION |        |
|--------------------|-----------------|--------|
|                    | POS. 1          | POS. 2 |
| <b>EP11SD1SAKE</b> | OFF             | MOM.   |
| Conn. Terms.       | OPEN            | 1-3    |
| Schematic          |                 |        |
| SPST               |                 |        |
| <b>EP12SD1SAKE</b> | ON              | MOM.   |
| Conn. Terms.       | 2-1             | 2-3    |
| Schematic          |                 |        |
| SPDT               |                 |        |



SPST AND SPDT

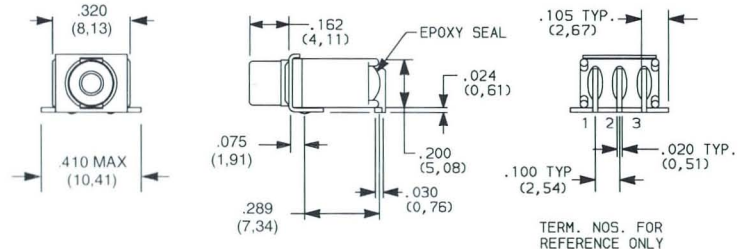
EP11 model—omit term. 2

MOM. = MOMENTARY

### SP MODELS WITH FLUSH ACTUATOR

| PART NO.            | SWITCH FUNCTION |        |
|---------------------|-----------------|--------|
|                     | POS. 1          | POS. 2 |
| <b>EP11FPD1SAKE</b> | OFF             | MOM.   |
| Conn. Terms.        | OPEN            | 1-3    |
| Schematic           |                 |        |
| SPST                |                 |        |
| <b>EP12FPD1SAKE</b> | ON              | MOM.   |
| Conn. Terms.        | 2-1             | 2-3    |
| Schematic           |                 |        |
| SPDT                |                 |        |

NEW

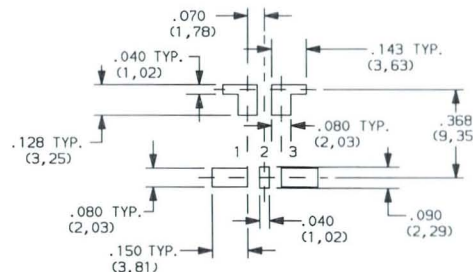


SPST AND SPDT

EP11 model—omit term. 2

MOM. = MOMENTARY

### P.C. MOUNTING



Suggested mounting pattern, see CAUTION page A-17.

EP11 model—omit pad 2



**HOW TO ORDER**

Complete part numbers for EP SERIES SEALED SURFACE MOUNT TINY PUSHBUTTON SWITCHES are shown on page A-16. Switches available on embossed antistatic tape and reels per EIA 481-3. EP Series thru-hole PC mount models also available—see catalog section D, pages D-4 thru D-9.

**SPECIFICATIONS**

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2–4 V DC, 100 mA.  
INSULATION RESISTANCE:  $10^9$  ohms min.  
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.  
OPERATING TEMPERATURE: -30°C to 85°C.  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481-3. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

**MATERIALS**

CASE & BUSHING: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).  
ACTUATOR: LCP (UL 94V-0), with standard internal o-ring seal.  
SWITCH SUPPORT: Brass, tin plated.  
CONTACTS: Copper alloy, with gold plate over nickel plate.  
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.  
TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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

\*Process sealed—withstands soldering and cleaning processes.

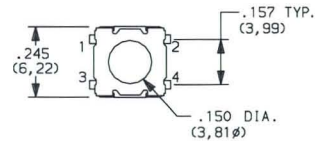
A



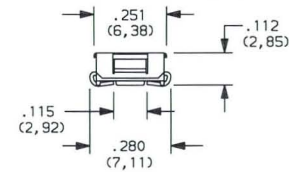
- **ULTRA-MINIATURE LOW PROFILE DESIGN—APPROX. .250 IN. (6 mm) SQ.—THREE SURFACE MOUNT TERMINAL STYLES**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY**
- **TAPE AND REEL PACKAGING STANDARD FOR AUTOMATED PLACEMENT**
- **PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)**
- **SEALED CONSTRUCTION—INTERNAL SILICONE RUBBER ACTUATOR SEAL AND INSERT MOLDED TERMINALS STANDARD**

### WITH J SURFACE MOUNT TERMINALS

| PART NO.        | ACTUATOR HEIGHT | SWITCH FUNCTION |         |
|-----------------|-----------------|-----------------|---------|
|                 |                 | POS. 1          | POS. 2  |
| <b>KT11B0JM</b> | FLUSH           | OFF             | MOM.    |
| <b>KT11B1JM</b> | .025 (0,64)     | OFF             | MOM.    |
| <b>KT11B2JM</b> | .088 (2,24)     | OFF             | MOM.    |
| <b>KT11P2JM</b> | .093 (2,36)     | OFF             | MOM.    |
| <b>KT11P3JM</b> | .044 (1,12)     | OFF             | MOM.    |
| <b>KT11P4JM</b> | .156 (3,96)     | OFF             | MOM.    |
| Conn. Terms     |                 | OPEN            | 1,2-3,4 |
| Schematic       |                 |                 |         |
| SPST            |                 |                 |         |



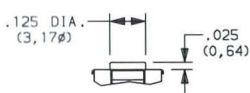
WITH B0 ACTUATOR



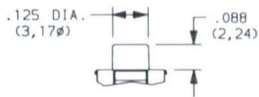
.030 TYP. (0,76)

Part No. Shown: KT11B0JM

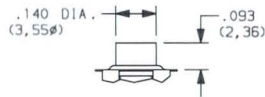
MOM. = MOMENTARY



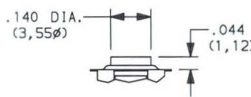
WITH B1 SILICONE RUBBER ACTUATOR



WITH B2 SILICONE RUBBER ACTUATOR

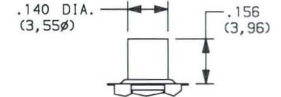


WITH P2 HARD PLASTIC ACTUATOR



**NEW**

WITH P3 HARD PLASTIC ACTUATOR



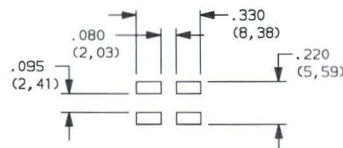
**NEW**

WITH P4 HARD PLASTIC ACTUATOR

### P.C. MOUNTING

#### J TERMINAL STYLE

Suggested mounting patterns, see CAUTION page A-20.

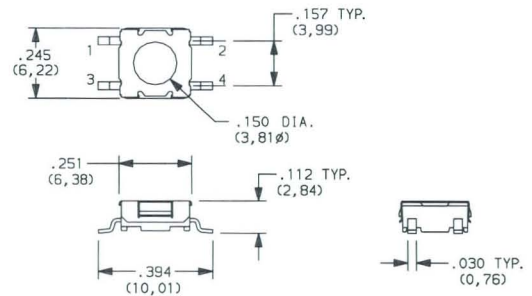


\*Process sealed—withstands soldering and cleaning processes.

## WITH S SURFACE MOUNT TERMINALS

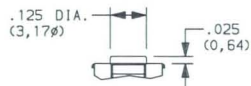
| PART NO.        | ACTUATOR HEIGHT | SWITCH FUNCTION |         |
|-----------------|-----------------|-----------------|---------|
|                 |                 | POS. 1          | POS. 2  |
| <b>KT11B0SM</b> | FLUSH           | OFF             | MOM.    |
| <b>KT11B1SM</b> | .025 (0,64)     | OFF             | MOM.    |
| <b>KT11B2SM</b> | .088 (2,24)     | OFF             | MOM.    |
| <b>KT11P2SM</b> | .093 (2,36)     | OFF             | MOM.    |
| <b>KT11P3SM</b> | .044 (1,12)     | OFF             | MOM.    |
| <b>KT11P4SM</b> | .156 (3,96)     | OFF             | MOM.    |
| Conn. Terms     |                 | OPEN            | 1,2-3,4 |
| Schematic       |                 |                 |         |
| SPST            |                 |                 |         |

MOM. = MOMENTARY

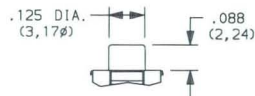


WITH B0 ACTUATOR

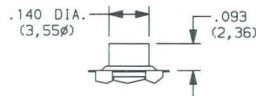
Part No. Shown: KT11B0SM



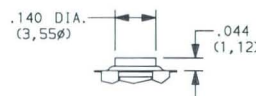
WITH B1 SILICONE RUBBER ACTUATOR



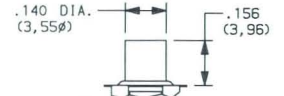
WITH B2 SILICONE RUBBER ACTUATOR



WITH P2 HARD PLASTIC ACTUATOR



**NEW** WITH P3 HARD PLASTIC ACTUATOR



**NEW** WITH P4 HARD PLASTIC ACTUATOR

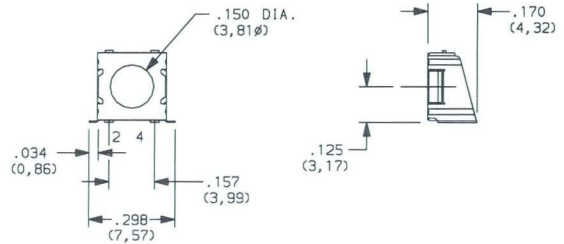
## WITH SA RIGHT ANGLE SURFACE MOUNT TERMINALS

| PART NO.         | ACTUATOR HEIGHT | SWITCH FUNCTION |         |
|------------------|-----------------|-----------------|---------|
|                  |                 | POS. 1          | POS. 2  |
| <b>KT11B0SAM</b> | FLUSH           | OFF             | MOM.    |
| <b>KT11B1SAM</b> | .025 (0,64)     | OFF             | MOM.    |
| <b>KT11B2SAM</b> | .088 (2,24)     | OFF             | MOM.    |
| Conn. Terms      |                 | OPEN            | 1,2-3,4 |
| Schematic        |                 |                 |         |
| SPST             |                 |                 |         |

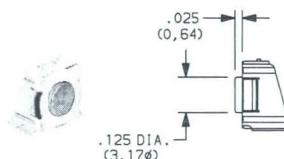
MOM. = MOMENTARY



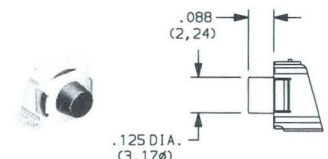
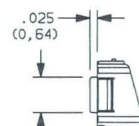
WITH B0 ACTUATOR



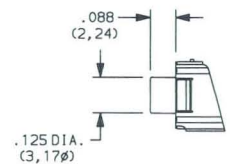
Part No. Shown: KT11B0SAM



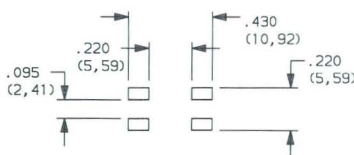
WITH B1 SILICONE RUBBER ACTUATOR



WITH B2 SILICONE RUBBER ACTUATOR

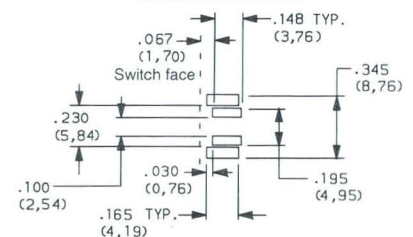


### S TERMINAL STYLE



### P.C. MOUNTING

### SA TERMINAL STYLE



Suggested mounting patterns, see CAUTION page A-20.



## HOW TO ORDER

Complete part numbers for KT SERIES SEALED SURFACE MOUNT MINIATURE KEY SWITCHES are shown on pages A-18 and A-19. Switches supplied in rigid dispensing tubes or on embossed antistatic tape and reels per EIA 481-1.

## SPECIFICATIONS

CONTACT RATING: 1.0 VA max. @ 50 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 100,000 make-and-break cycles at full load.

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

INSULATION RESISTANCE:  $10^9$  ohms min.

DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.

OPERATING TEMPERATURE:  $-40^{\circ}\text{C}$  to  $90^{\circ}\text{C}$ .

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

PACKAGING: Switches supplied in rigid dispensing tubes or on embossed antistatic tape and reels per EIA 481-1. Tape and cover strip are conductive for use near statically sensitive components. Consult factory.

## MATERIALS

BASE: LCP (UL 94V-0).

ACTUATOR: B0, B1, B2 actuators: Silicone rubber.  
P2, P3, P4 actuators: 4/6 nylon.

SEAL: Silicone rubber.

HOUSING: Stainless steel.

SWITCH SUPPORT: Stainless steel, tin plated.

MOVABLE CONTACT: Stainless steel, silver plated.

STATIONARY CONTACTS: Copper alloy, silver plated.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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

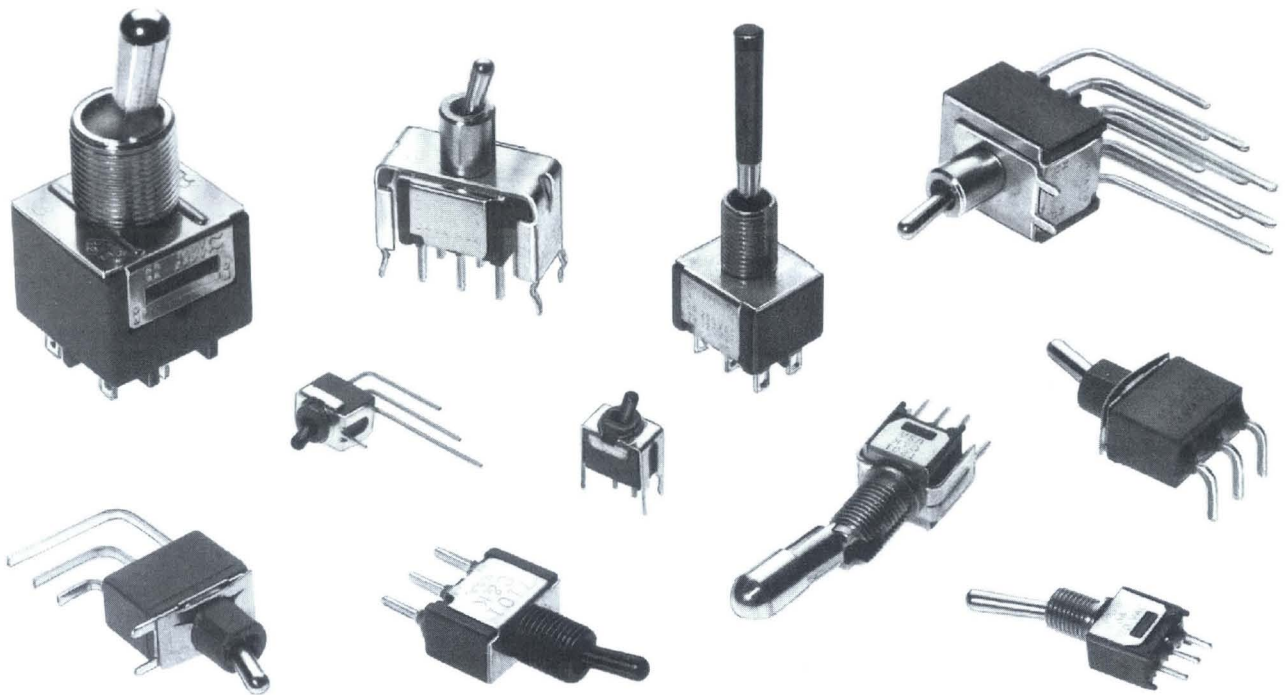
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## SECTION B

### TOGGLE SWITCHES

---

B



|             |  |                |
|-------------|--|----------------|
| GT Series   | Sealed Ultra-Miniature Toggle Switches | B-2 thru B-5   |
| ET Series   | Sealed Tiny Toggle Switches            | B-6 thru B-11  |
| T Series    | Tiny Toggle Switches                   | B-12 thru B-17 |
| E Series    | Sealed Toggle Switches                 | B-18 thru B-29 |
| 7000 Series | Toggle Switches                        | B-30 thru B-46 |
| 9000 Series | Power Toggle Switches                  | B-47 thru B-52 |

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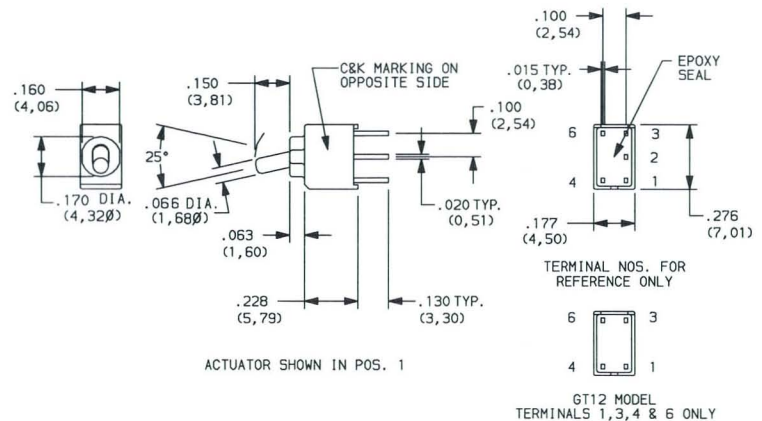
\*Process sealed—withstands soldering and cleaning processes.



- FOUR P.C. TERMINAL STYLES—.100 IN. TERMINAL SPACING
- NEW TWO POLE MODEL—SAME SIZE AS SINGLE POLE SWITCH
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS
- PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)

### SP MODELS WITH C TERMINALS

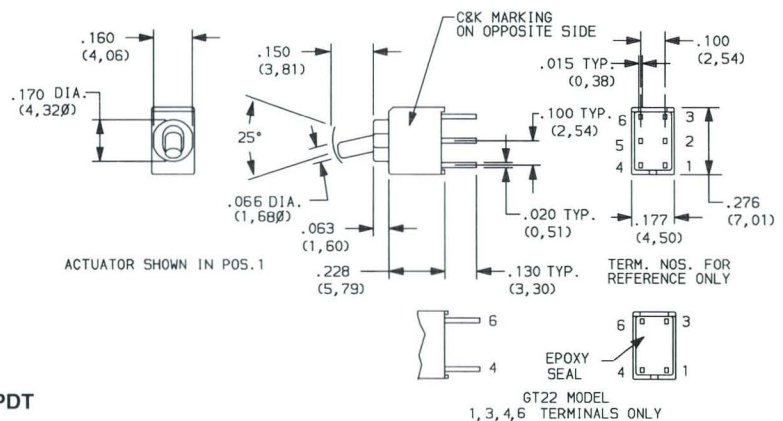
| PART NO.                           | SWITCH FUNCTION                         |        |        |
|------------------------------------|---|--------|--------|
|                                    | POS. 1                                  | POS. 2 | POS. 3 |
| <b>GT11MCKE</b><br><b>GT13MCKE</b> | ON                                      | NONE   | ON     |
|                                    | ON                                      | OFF    | ON     |
| Conn. Terms.                       | 2-3                                     | OPEN   | 2-1    |
| Schematic                          |   |        |        |
| SPDT                               | <p>Note: Pins 4 and 6 not connected</p> |        |        |
| <b>GT12MCKE</b>                    | OFF                                     | NONE   | ON     |
| Conn. Terms.                       | OPEN                                    | N/A    | 3-1    |
| Schematic                          |   |        |        |
| SPST                               | <p>Note: Pins 4 and 6 not connected</p> |        |        |



SPST and SPDT

### DP MODELS WITH C TERMINALS

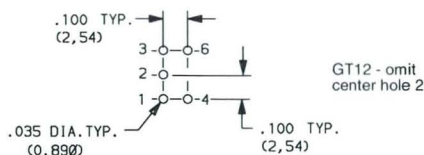
| PART NO.                           | SWITCH FUNCTION                         |        |          |
|------------------------------------|---|--------|----------|
|                                    | POS. 1                                  | POS. 2 | POS. 3   |
| <b>GT21MCKE</b><br><b>GT23MCKE</b> | ON                                      | NONE   | ON       |
|                                    | ON                                      | OFF    | ON       |
| Conn. Terms.                       | 2-3, 5-6                                | OPEN   | 2-1, 5-4 |
| Schematic                          |   |        |          |
| DPDT                               | <p>Note: Pins 4 and 6 not connected</p> |        |          |
| <b>GT22MCKE</b>                    | OFF                                     | NONE   | ON       |
| Conn. Terms.                       | OPEN                                    | N/A    | 3-1, 6-4 |
| Schematic                          |   |        |          |
| DPST                               | <p>Note: Pins 4 and 6 not connected</p> |        |          |



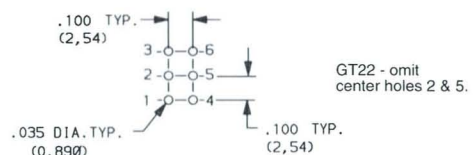
DPST and DPDT

### P.C. MOUNTING

C TERMINAL STYLE GT1X



C TERMINAL STYLE GT2X

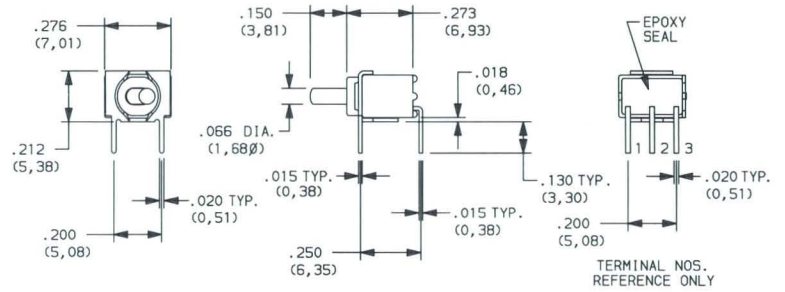




\*Process sealed—withstands soldering and cleaning processes.

## SP MODELS WITH A TERMINALS

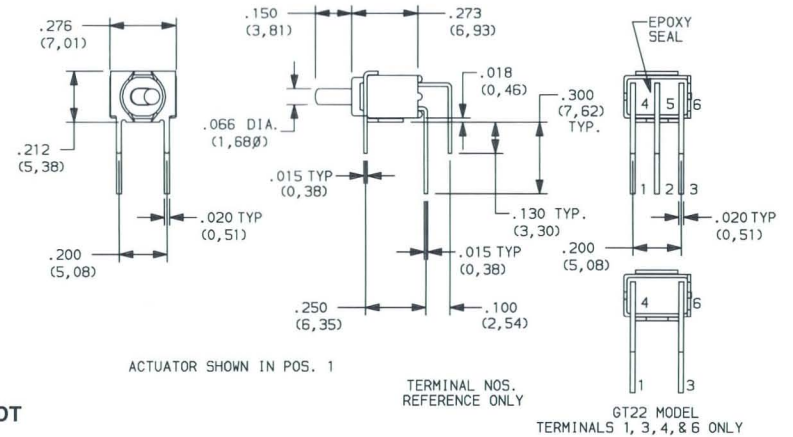
| PART NO.        | SWITCH FUNCTION |        |        |
|-----------------|-----------------|--------|--------|
|                 | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MAKE</b> | ON              | NONE   | ON     |
| <b>GT13MAKE</b> | ON              | OFF    | ON     |
| Conn. Terms.    | 2-3             | OPEN   | 2-1    |
| Schematic       |                 |        |        |
| SPDT            |                 |        |        |
| <b>GT12MAKE</b> | OFF             | NONE   | ON     |
| Conn. Terms.    | OPEN            | N/A    | 3-1    |
| Schematic       |                 |        |        |
| SPST            |                 |        |        |



## SPST and SPDT

## DP MODELS WITH A TERMINALS

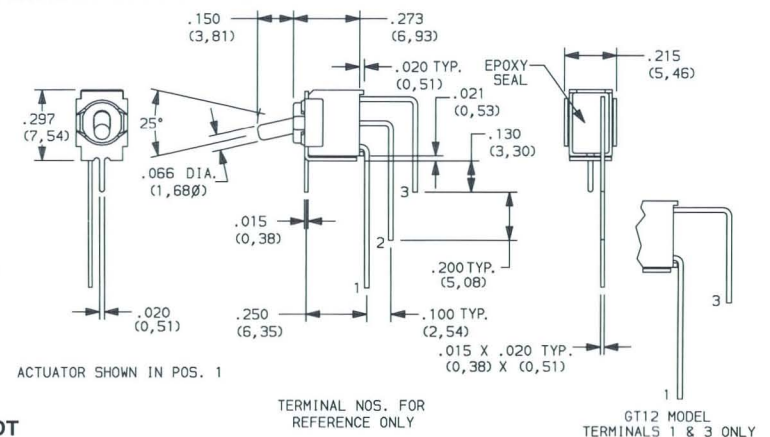
| PART NO.        | SWITCH FUNCTION |        |          |
|-----------------|-----------------|--------|----------|
|                 | POS. 1          | POS. 2 | POS. 3   |
| <b>GT21MAKE</b> | ON              | NONE   | ON       |
| <b>GT23MAKE</b> | ON              | OFF    | ON       |
| Conn. Terms.    | 2-3, 5-6        | OPEN   | 2-1, 5-4 |
| Schematic       |                 |        |          |
| DPDT            |                 |        |          |
| <b>GT22MAKE</b> | OFF             | NONE   | ON       |
| Conn. Terms.    | OPEN            | N/A    | 3-1, 6-4 |
| Schematic       |                 |        |          |
| DPST            |                 |        |          |



## DPST and DPDT

## SP MODELS WITH AV TERMINALS

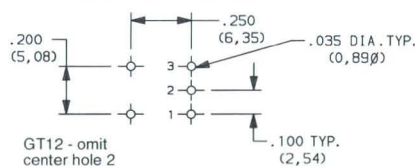
| PART NO.         | SWITCH FUNCTION |        |        |
|------------------|-----------------|--------|--------|
|                  | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MAVKE</b> | ON              | NONE   | ON     |
| <b>GT13MAVKE</b> | ON              | OFF    | ON     |
| Conn. Terms.     | 2-3             | OPEN   | 2-1    |
| Schematic        |                 |        |        |
| SPDT             |                 |        |        |
| <b>GT12MAVKE</b> | OFF             | NONE   | ON     |
| Conn. Terms.     | OPEN            | N/A    | 3-1    |
| Schematic        |                 |        |        |
| SPST             |                 |        |        |



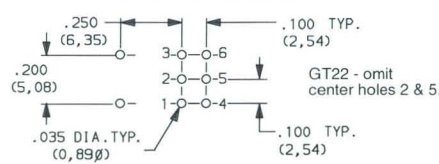
## SPST and SPDT

## P.C. MOUNTING

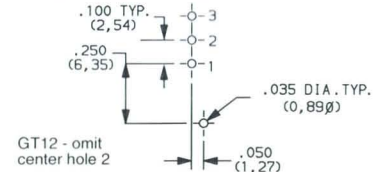
### A TERMINAL STYLE GT1X



### A TERMINAL STYLE GT2X



### AV TERMINAL STYLE GT1X

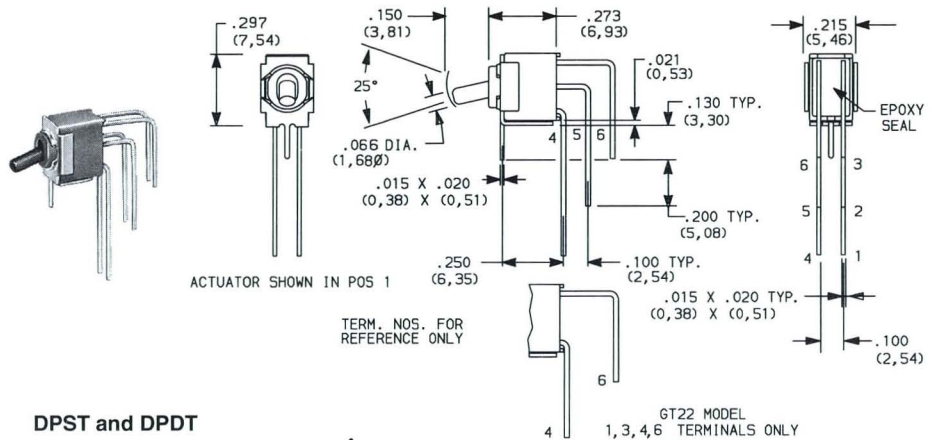


\*Process sealed—withstands soldering and cleaning processes.

B

| PART NO.                             | SWITCH FUNCTION |        |          |
|--------------------------------------|-----------------|--------|----------|
|                                      | POS. 1          | POS. 2 | POS. 3   |
| <b>GT21MAVKE</b><br><b>GT23MAVKE</b> | ON              | NONE   | ON       |
| Conn. Terms.                         | 2-3, 5-6        | OPEN   | 2-1, 5-4 |
| Schematic                            |                 |        |          |
| DPDT                                 |                 |        |          |
| <b>GT22MAVKE</b>                     | OFF             | NONE   | ON       |
| Conn. Terms.                         | OPEN            | N/A    | 3-1, 6-4 |
| Schematic                            |                 |        |          |
| DPST                                 |                 |        |          |

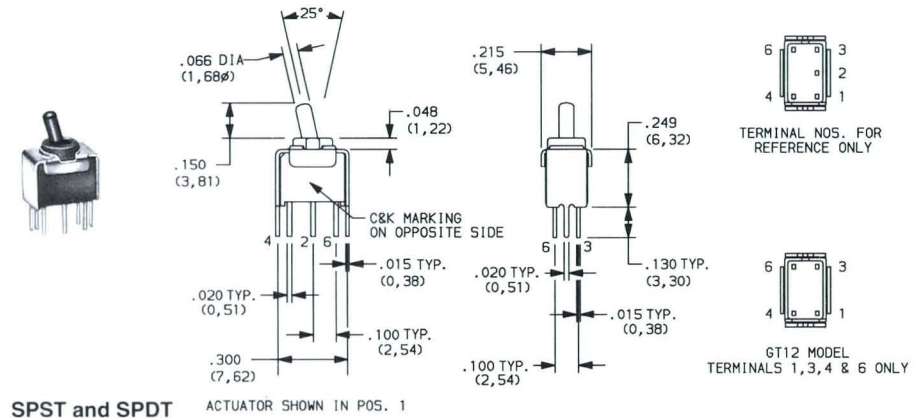
### DP MODELS WITH AV TERMINALS



DPST and DPDT

### SP MODELS WITH V3 TERMINALS

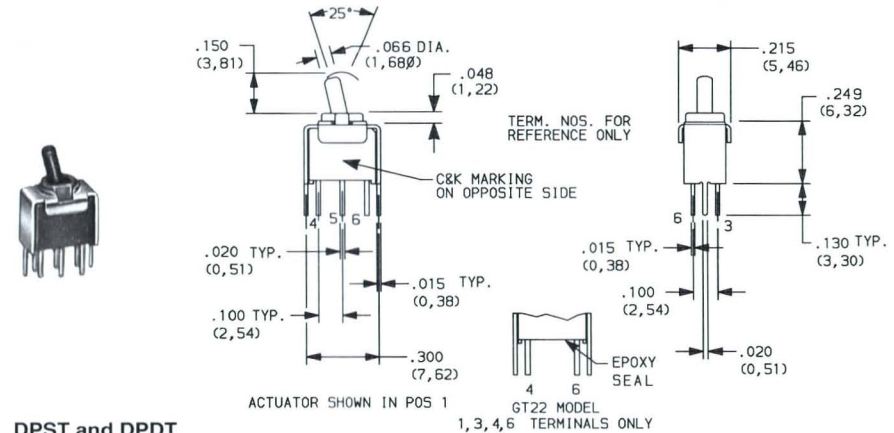
| PART NO.                             | SWITCH FUNCTION |        |        |
|--------------------------------------|-----------------|--------|--------|
|                                      | POS. 1          | POS. 2 | POS. 3 |
| <b>GT11MV3KE</b><br><b>GT13MV3KE</b> | ON              | NONE   | ON     |
| Conn. Terms.                         | 2-3             | OPEN   | 2-1    |
| Schematic                            |                 |        |        |
| SPDT                                 |                 |        |        |
| Note: Pins 4 and 6 not connected     |                 |        |        |
| <b>GT12MV3KE</b>                     | OFF             | NONE   | ON     |
| Conn. Terms.                         | OPEN            | N/A    | 3-1    |
| Schematic                            |                 |        |        |
| SPST                                 |                 |        |        |
| Note: Pins 4 and 6 not connected     |                 |        |        |



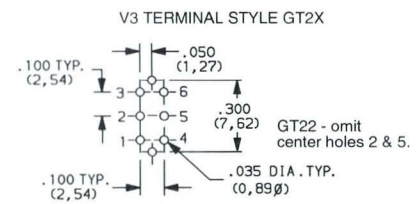
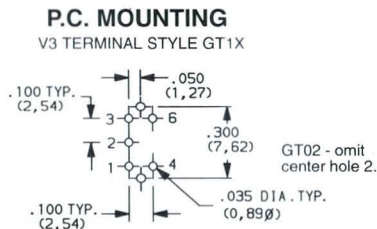
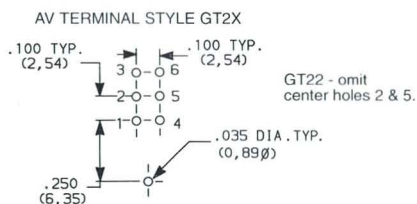
SPST and SPDT

### DP MODELS WITH V3 TERMINALS

| PART NO.                             | SWITCH FUNCTION |        |          |
|--------------------------------------|-----------------|--------|----------|
|                                      | POS. 1          | POS. 2 | POS. 3   |
| <b>GT21MV3KE</b><br><b>GT23MV3KE</b> | ON              | NONE   | ON       |
| Conn. Terms.                         | 2-3, 5-6        | OPEN   | 2-1, 5-4 |
| Schematic                            |                 |        |          |
| DPDT                                 |                 |        |          |
| <b>GT22MV3KE</b>                     | OFF             | NONE   | ON       |
| Conn. Terms.                         | OPEN            | N/A    | 3-1, 6-4 |
| Schematic                            |                 |        |          |
| DPST                                 |                 |        |          |



DPST and DPDT



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**HOW TO ORDER**

Complete part numbers for GT SERIES SEALED ULTRA-MINIATURE TOGGLE SWITCHES are shown on pages B-2 thru B-4. GT Series surface mount models also available—see catalog section A, pages A-5 thru A-7.

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**SPECIFICATIONS**

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.  
INSULATION RESISTANCE: 10<sup>9</sup> ohms min.  
DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.  
OPERATING TEMPERATURE: -30°C to 85°C.  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

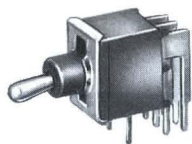
**MATERIALS**

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



\*Process sealed—withstands soldering and cleaning processes.

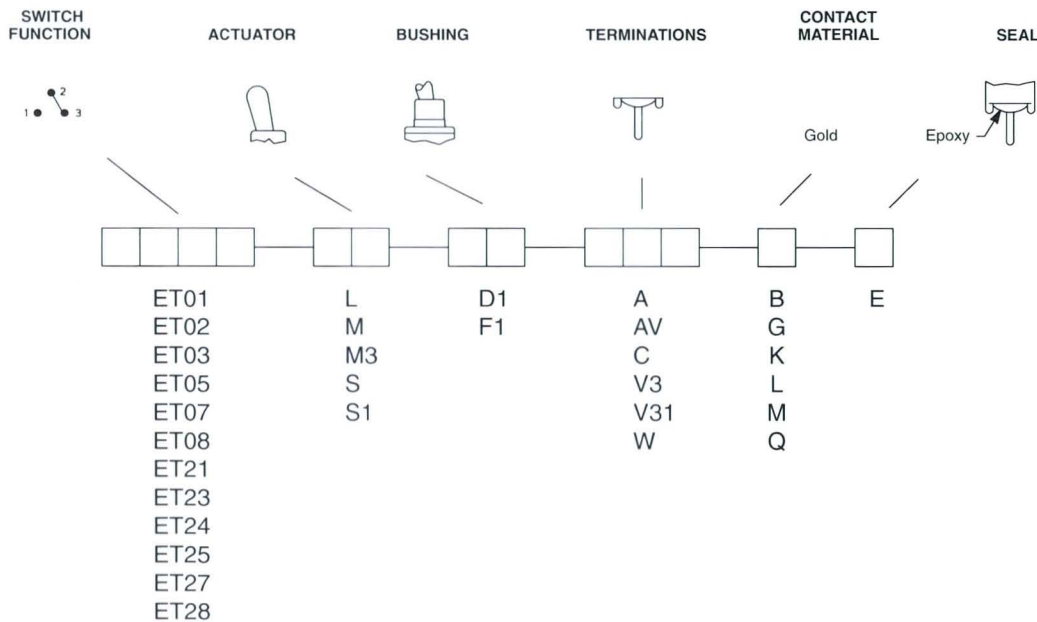


B

 models available, see page B-7.

**Easy Build-A-Switch:**

Below is a complete listing of available options for ET SERIES SEALED TINY TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-7; all available options are shown and described on pages B-7 thru B-11. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-11. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. ET Series surface mount models also available—see catalog section A, pages A-14 and A-15.

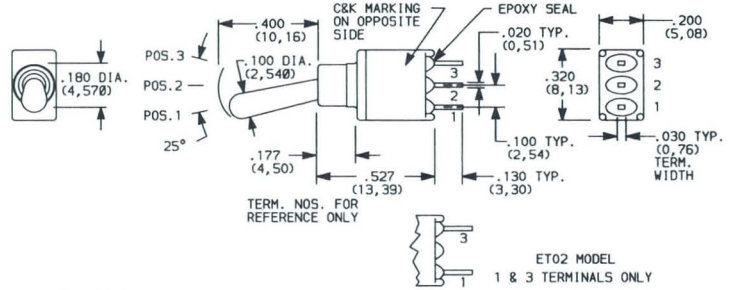




SWITCHES WITH STANDARD OPTIONS



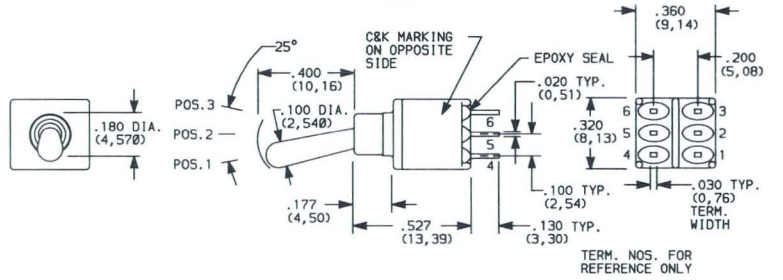
SPST and SPDT



Part No. Shown: ET01SD1CBE



DPDT



Part No. Shown: ET21SD1CBE

SWITCH FUNCTION

| NO. POLES | MODEL† NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |         |         | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|---------|---------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2  | POS. 3  |           |
| SP        | ET01       | ON              | NONE   | ON     |                     |         |         |           |
|           | ET03       | ON              | OFF    | ON     |                     |         |         |           |
|           | ET05       | MOM.            | OFF    | MOM.   | 2-3                 | OPEN    | 2-1     |           |
|           | ET07       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | ET08       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | ET02       | OFF             | NONE   | ON     | OPEN                | N/A     | 3-1     |           |
| DP        | ET21       | ON              | NONE   | ON     |                     |         |         |           |
|           | ET23       | ON              | OFF    | ON     |                     |         |         |           |
|           | ET25       | MOM.            | OFF    | MOM.   | 2-3,5-6             | OPEN    | 2-1,5-4 |           |
|           | ET27       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | ET28       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | ET24**     | ON              | ON     | ON     | 2-3,5-6             | 2-3,5-4 | 2-1,5-4 |           |

MOM. = MOMENTARY

† All models with all options (except M3 actuator) when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

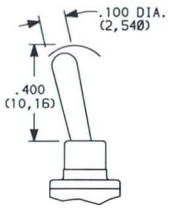
\*\* Wiring for 3-way switch, see page X.

\*Process sealed—withstands soldering and cleaning processes.

## ACTUATOR

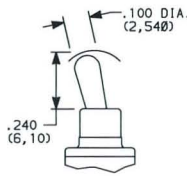
All actuators except M3: finish, chrome.

**S**



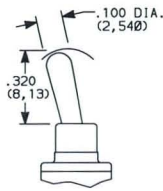
Standard with C or W terminations.

**M**

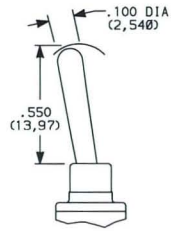


Standard with A, AV, V3, V31 terminations.

**L**

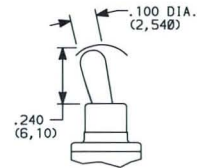


**S1**



**M3**

ESD RESISTANT INSULATING TOGGLE



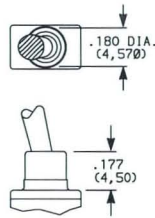
Material: Nylon 4/6 (UL 94V-0), black standard. Static resistance: 9,000 V DC min. @ sea level, actuator to terminals. Available with all ET0X models. Not available with F1 conductive bushing option. Not UL approved.

## BUSHING

**D1** (STD.)

**F1** ESD RESISTANT CONDUCTIVE BUSHING

**NEW**

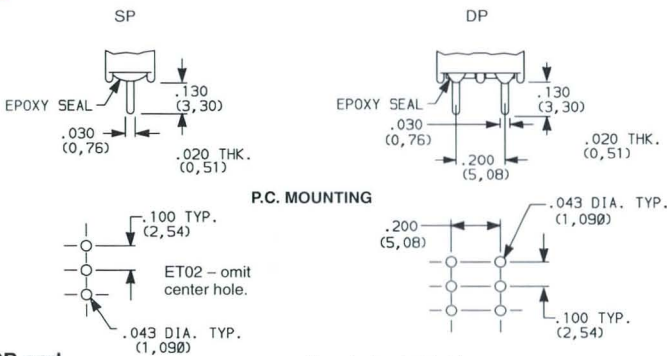


Internal actuator o-ring seal std.

F1 conductive bushing option is impregnated with carbon fibers; dissipates electrostatic discharge (ESD) up to 20,000 V from actuator to ground. Available with all metal actuator options and A, AV, V3, and V31 termination options. Note: ESD protection depends on proper grounding of switch support bracket.

## TERMINATIONS

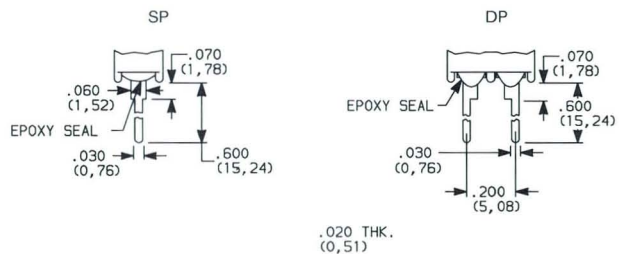
**C**



**SP and DP**

B contact material std. Not available with F1 conductive bushing.

**W** WIRE WRAP



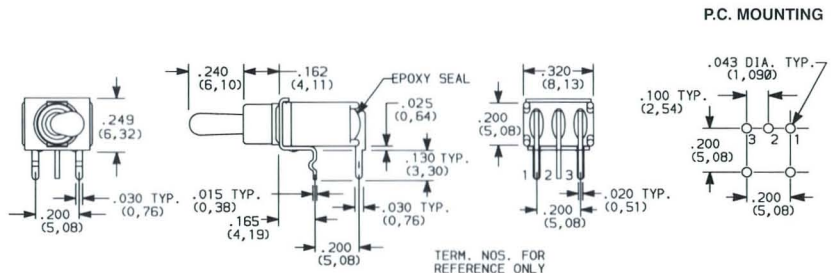
**SP and DP**

B contact material std. Not available with F1 conductive bushing.

**A**



**SPDT**



Actuator shown in pos. 1. B contact material std. Not available with ET02 model.

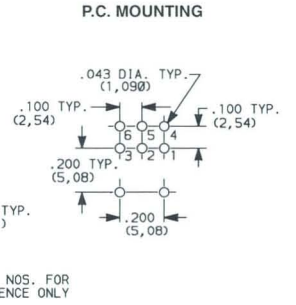
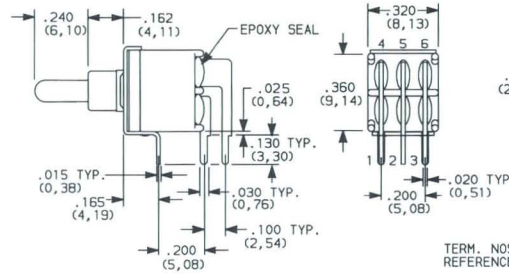
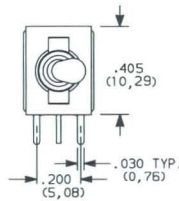
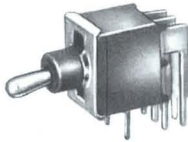
Part No. Shown: ET01MD1ABE



\*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

A

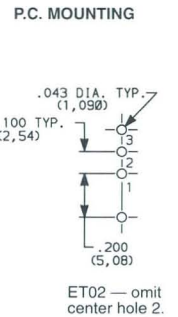
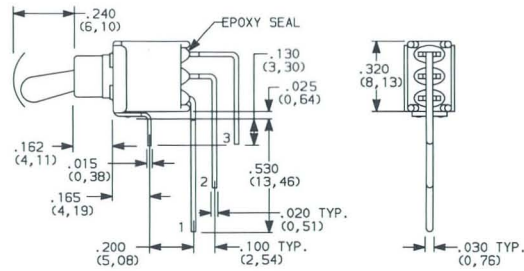


DPDT

Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET21MD1ABE

AV

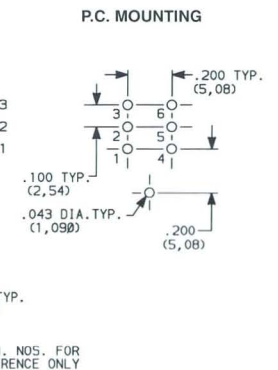
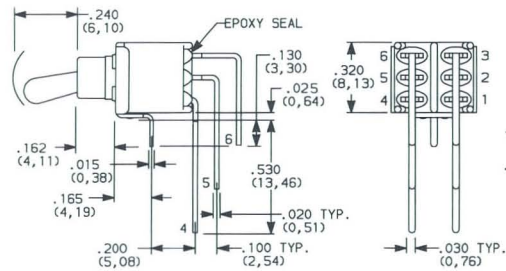
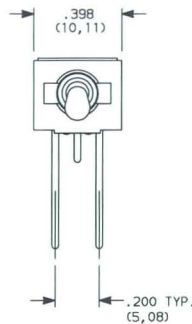
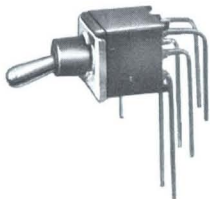


SPST and SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET01MD1AVBE

AV



DPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

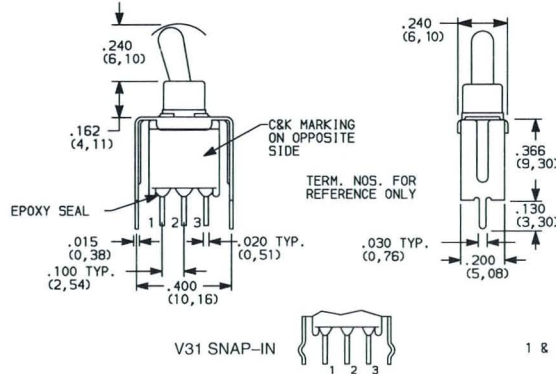
Part No. Shown: ET21MD1AVBE



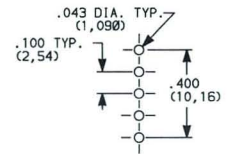
\*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

V3  
V31 SNAP-IN **NEW**



P.C. MOUNTING



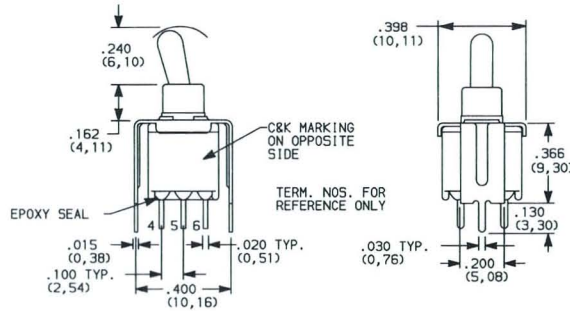
ET02 — omit center hole.

SPST and SPDT

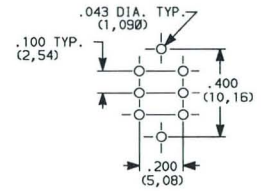
Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET01MD1V3BE

V3



P.C. MOUNTING



DPDT

Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET21MD1V3BE

CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | ETX1 MODELS: 3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.   |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | ETX1 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>2 AMPS @ 120 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |

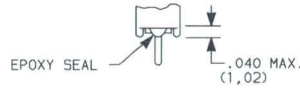
CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models with all options (except M3 actuator) when ordered with G, L, M or Q contact material. See pages B-7 and VIII.

B contact material standard with all terminations.



**SEAL** **E** (STD.)**HOW TO ORDER**

All available ET SERIES SEALED TINY TOGGLE SWITCH options are listed on page B-6, and are described on pages B-7 thru B-11. Switches with standard options are shown on page B-7. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.  models available, see page B-7. ET Series surface mount models also available—see catalog section A, pages A-14 and A-15.

**SPECIFICATIONS**

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
(B contact material).

ELECTRICAL LIFE: ETX1 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.

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

INSULATION RESISTANCE:  $10^9$  ohms min.

ELECTROSTATIC DISCHARGE (ESD) RESISTANT OPTIONS:  
M3 insulating actuator only—9,000 V DC min. @ sea level, actuator to terminals.

F1 conductive bushing only—Dissipates up to 20,000 V DC from actuator to ground.

Note: M3 actuator and F1 bushing options are not recommended for use together.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

**MATERIALS**

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0). F1 conductive bushing option is impregnated with carbon fibers.

ACTUATOR: M3 antistatic actuator—nylon 4/6, black standard (UL94V-0). All other actuators—brass, chrome plated. Internal o-ring seal standard with all actuators.

SWITCH SUPPORT: Brass, tin plated.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).

TERMINAL SEAL: Epoxy.

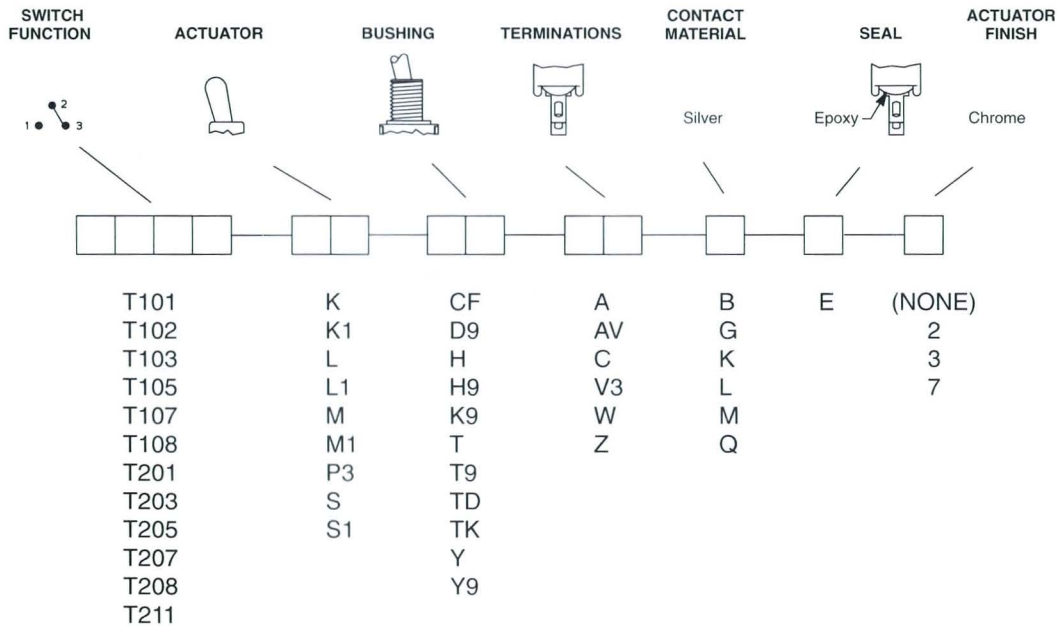
**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



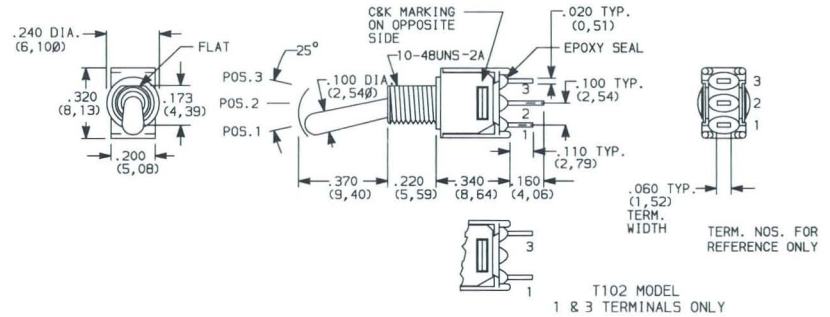
models available, see page B-13.

## Easy Build-A-Switch:

Below is a complete listing of available options for T SERIES TINY TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-13; all available options are shown and described on pages B-13 thru B-17. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-17. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

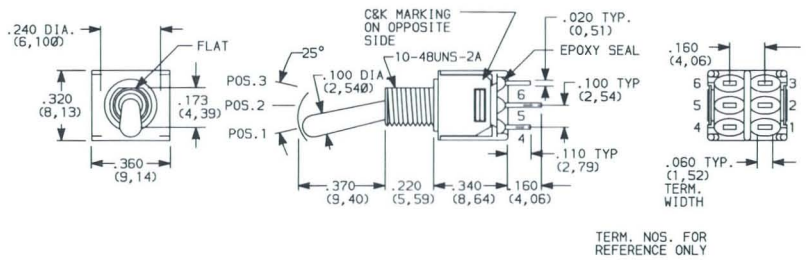


**SWITCHES WITH STANDARD OPTIONS**



SPST and SPDT

Part No. Shown: T101SHZQE



DPDT

Part No. Shown: T201SHZQE

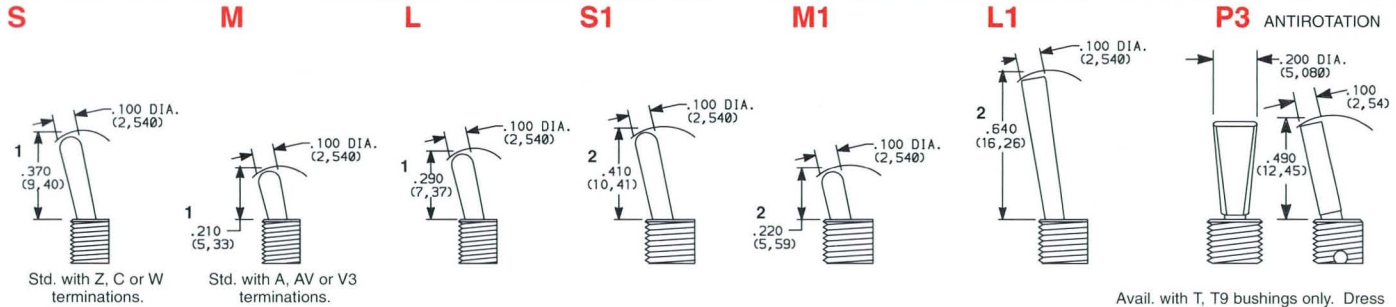
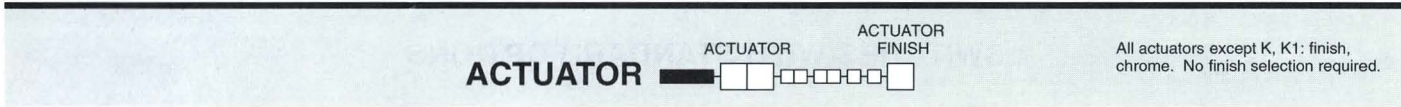
**SWITCH FUNCTION**

| NO. POLES | MODEL* NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |         | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|--------|---------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3  |           |
| SP        | T101       | ON              | NONE   | ON     | 2-3                 | OPEN   | 2-1     |           |
|           | T103       | ON              | OFF    | ON     |                     |        |         |           |
|           | T105       | MOM.            | OFF    | MOM.   |                     |        |         |           |
|           | T107       | ON              | OFF    | MOM.   |                     |        |         |           |
|           | T108       | ON              | NONE   | MOM.   |                     |        |         |           |
|           | T102       | OFF             | NONE   | ON     |                     |        |         |           |
| DP        | T201       | ON              | NONE   | ON     | 2-3,5-6             | OPEN   | 2-1,5-4 |           |
|           | T203       | ON              | OFF    | ON     |                     |        |         |           |
|           | T205       | MOM.            | OFF    | MOM.   |                     |        |         |           |
|           | T207       | ON              | OFF    | MOM.   |                     |        |         |           |
|           | T208       | ON              | NONE   | MOM.   |                     |        |         |           |
|           | T211**     | ON              | ON     | ON     |                     |        |         |           |

MOM. = MOMENTARY

\* All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

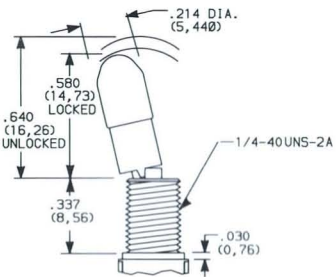
\*\* Wiring for 3-way switch, see page X.



1 Actuators shown with standard H bushing. Subtract .040 (1,02) for TD and D9 bushings, subtract .090 (2,29) for T, T9, TK, K9, CF bushings.

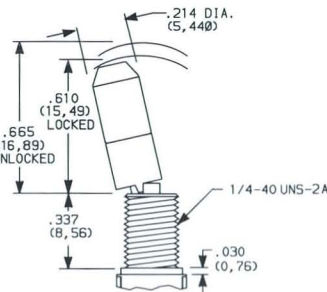
2 Actuators shown with T, TK, CF bushings. Add .050 (1,27) for TD and D9 bushings add .090 (2,29) for H, H9, Y, Y9 bushings.

### K LOCKING LEVER



Keyway on right side. Bushing option code not required. Not avail. with TX05, TX07 models.

### K1 LOCKING LEVER



### ACTUATOR CAP FINISH

K, K1 actuators only.

| OPTION CODE   | ACTUATOR FINISH    |
|---------------|--------------------|
| (NONE) (std.) | Natural AL. (std.) |
| 2             | Black Anodized AL. |
| 3             | Red Anodized AL.   |
| 7             | Blue Anodized AL.  |

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

**Please note:** Overtightening mounting nut may cause actuator to bind.

K, K1 Locking Positions



-01, -02 Models  
2 Pos. Lock



-03, -11 Models  
3 Pos. Lock



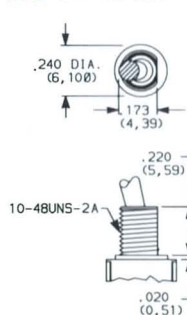
-08 Models  
1 Pos. Lock

Keyway on right side.

### BUSHING

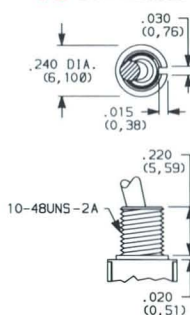
Hardware is supplied where applicable, see HOW TO ORDER, page B-17.

### H UNTHREADED

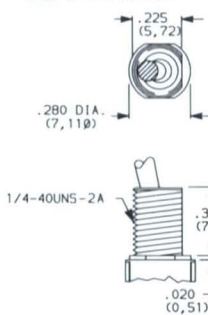


H standard with Z, C, W terminations. H9 standard with A, AV, V3 terminations.

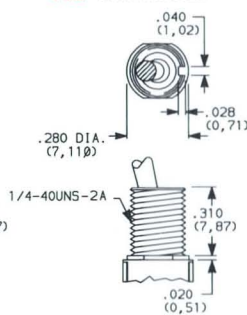
### Y UNTHREADED



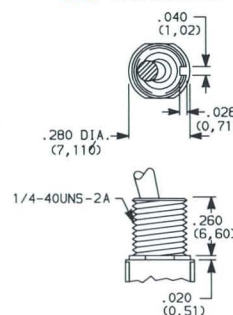
### T UNTHREADED



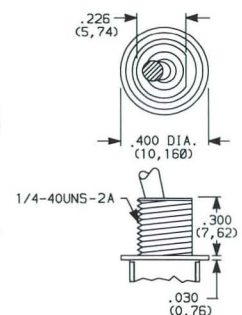
### TK UNTHREADED



### TD UNTHREADED

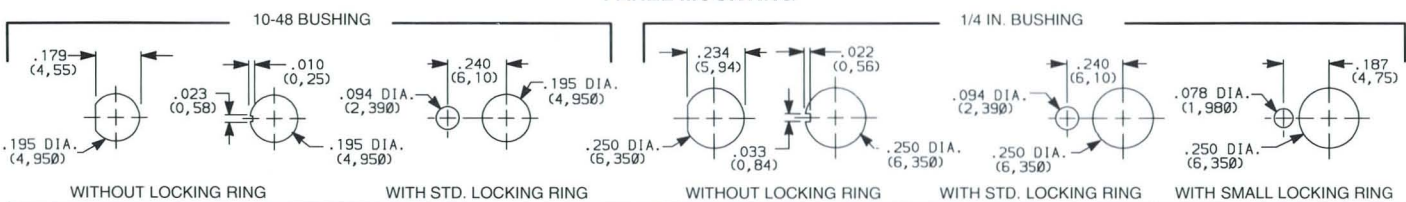


### CF SPLASHPROOF



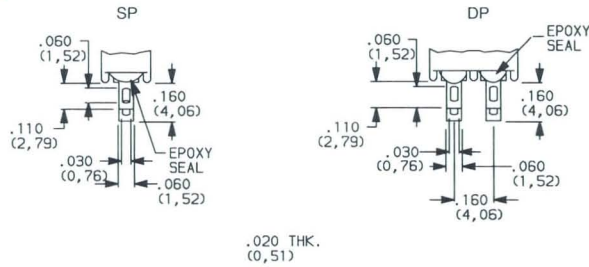
Internal o-ring actuator seal and external bushing seal washer standard.

### PANEL MOUNTING



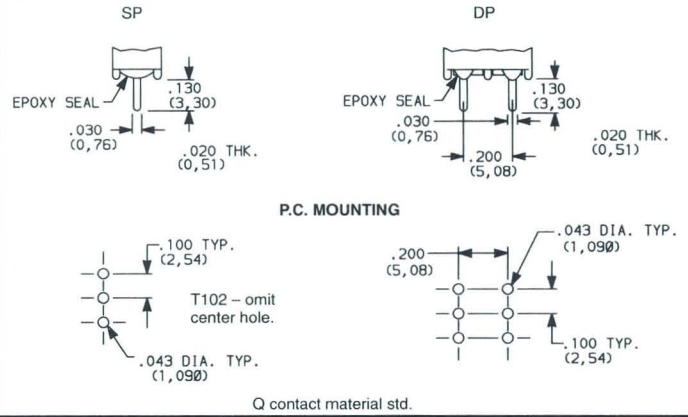
TERMINATIONS

**Z (STD)**

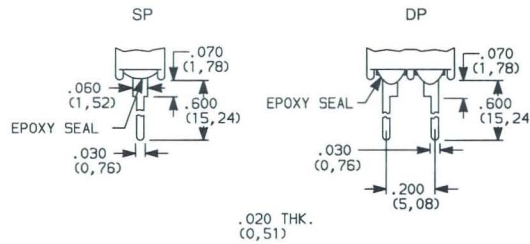


Q contact material std.  
Not avail. with K, L, or M contact material.

**C**

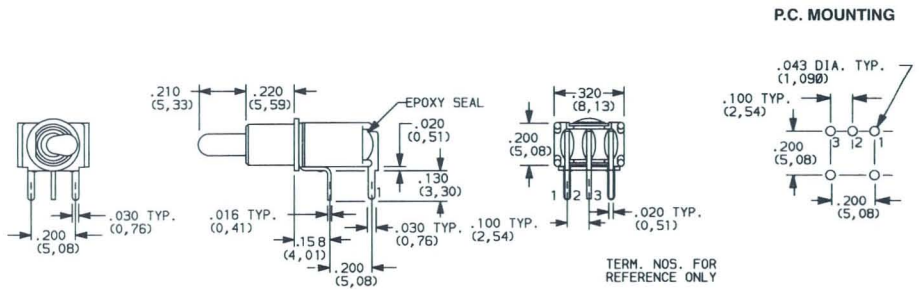
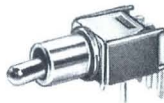


**W WIRE WRAP**



B contact material std.

**A**

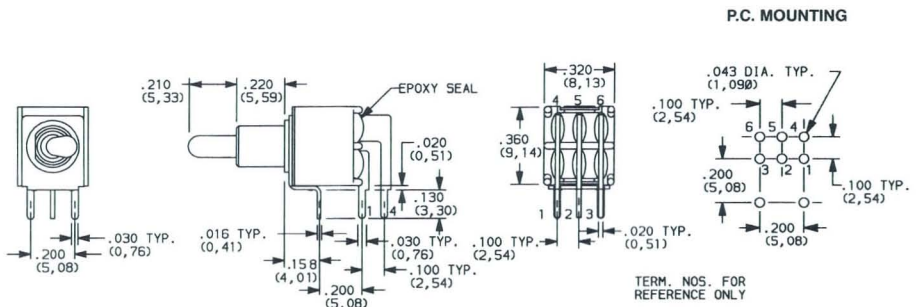
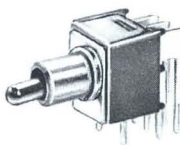


**SPDT**

Actuator shown in pos.1.  
B contact material std.  
Not available with T102 model.

Part No. Shown: T101MH9ABE

**A**



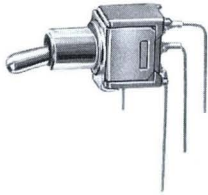
**DPDT**

Actuator shown in pos.1.  
B contact material std.

Part No. Shown: T201MH9ABE

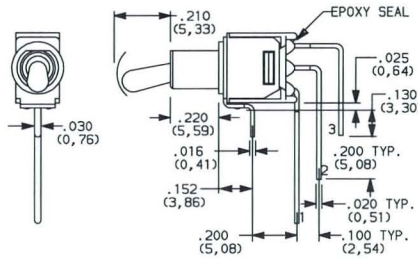
## TERMINATIONS

**AV**

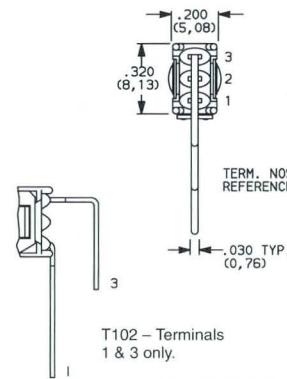


**SPST and SPDT**

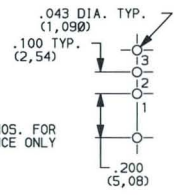
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1  
B contact material std.



Part No. Shown: T101MH9AVBE



**P.C. MOUNTING**

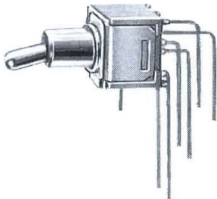


TERM. NOS. FOR REFERENCE ONLY

T102 - omit center hole 2.

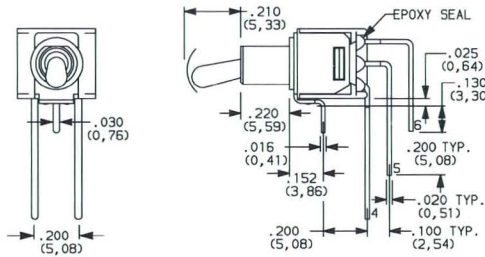
T102 - Terminals 1 & 3 only.

**AV**

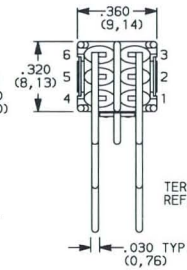


**DPDT**

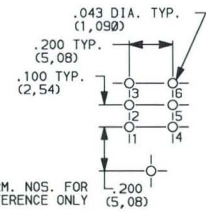
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1  
B contact material std.



Part No. Shown: T201MH9AVBE



**P.C. MOUNTING**



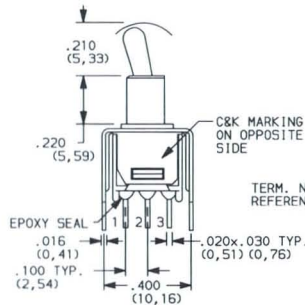
TERM. NOS. FOR REFERENCE ONLY

**V3**

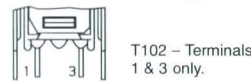


**SPST and SPDT**

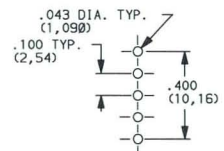
Actuator shown in pos. 1.  
B contact material std.



Part No. Shown: T101MH9V3BE



**P.C. MOUNTING**



TERM. NOS. FOR REFERENCE ONLY

T102 - omit center hole.

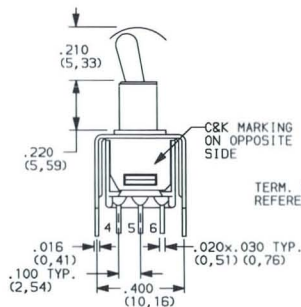
T102 - Terminals 1 & 3 only.

**V3**

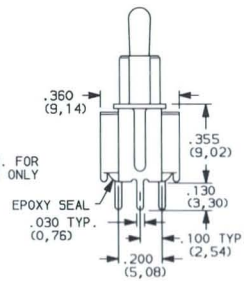


**DPDT**

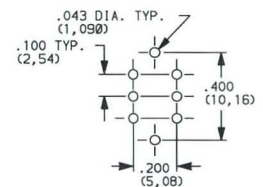
Actuator shown in pos. 1.  
B contact material std.



Part No. Shown: T201MH9V3BE



**P.C. MOUNTING**



TERM. NOS. FOR REFERENCE ONLY

**CONTACT MATERIAL** 

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | TX01 MODELS: 3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.   |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | TX01 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>2 AMPS @ 120 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models  with all options when ordered with G, L, M or Q contact material. See pages B-13 and VIII.


B contact material standard with A, AV, V3, W terminations.  
Q contact material standard with Z, C terminations.

**SEAL** 



**HOW TO ORDER**

All available T SERIES TINY TOGGLE SWITCH options are listed on page B-12, and are described on pages B-13 thru B-17. Switches with standard options are shown on page B-13. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods.  models available, see page B-13. Hardware: one mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available. Hardware and accessories are available separately, see catalog section H.

**SPECIFICATIONS**

- CONTACT RATING: TX01 MODELS: 3 AMPS @ 120 V AC or 28 V DC. ALL OTHER MODELS: 2 AMPS @ 120 V AC or 28 V DC (Q contact material).
- ELECTRICAL LIFE: TX01 models: 60,000 make-and-break cycles at full load. ALL OTHER MODELS: 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

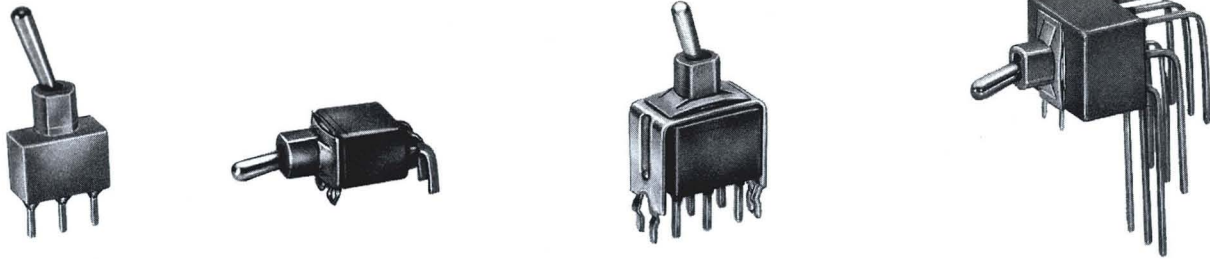
**MATERIALS**

- CASE: Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).
- ACTUATOR: Brass, chrome plated.
- BUSHING: Brass, nickel plated.
- HOUSING: Stainless steel.
- SWITCH SUPPORT: Brass, tin plated.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.
- HARDWARE: Nut & Locking ring—Brass, nickel plated.  
Lockwasher—Steel, nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



\*Process sealed—withstands soldering and cleaning processes.



FULC® models available, see page B-20

Easy Build-A-Switch:

Below is a complete listing of available options for E SERIES SEALED TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-19; all available options are shown and described on pages B-20 thru B-29. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-29. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

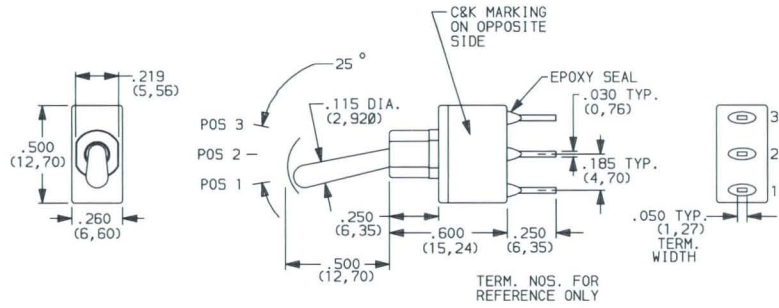
| SWITCH FUNCTION | ACTUATOR | BUSHING | TERMINATIONS    | CONTACT MATERIAL | SEAL | ACTUATOR COLOR |
|-----------------|----------|---------|-----------------|------------------|------|----------------|
|                 |          |         |                 | Gold             |      | Chrome         |
| [ ] [ ] [ ] [ ] | [ ] [ ]  | [ ] [ ] | [ ] [ ] [ ] [ ] | [ ]              | [ ]  | [ ]            |
| E101            | L3       | D1      | A               | V61              | B    | E (NONE)       |
| E103            | M        | D9      | A3              | V71              | G    | 1              |
| E105            | S        | F1      | AV1             | V81              | K    | 2              |
| E107            |          | Y       | AV2             | V91              | L    | 3              |
| E108            |          |         | AV3             | W                | M    | 4              |
| E201            |          |         | AV4             | W1               | Q    | 5              |
| E203            |          |         | AV5             | W3               |      | 6              |
| E205            |          |         | AW              | W4               |      | 7              |
| E207            |          |         | AW1             | W5               |      | 8              |
| E208            |          |         | AW3             | Z                |      | 9              |
| E211            |          |         | AW4             | Z3               |      |                |
| E213            |          |         | AW5             |                  |      |                |
| E215            |          |         | C               |                  |      |                |
| E301            |          |         | R               |                  |      |                |
| E303            |          |         | R2              |                  |      |                |
| E305            |          |         | V2              |                  |      |                |
| E307            |          |         | V3              |                  |      |                |
| E308            |          |         | V4              |                  |      |                |
|                 |          |         | V6              |                  |      |                |
|                 |          |         | V7              |                  |      |                |
|                 |          |         | V8              |                  |      |                |
|                 |          |         | V9              |                  |      |                |
|                 |          |         | V21             |                  |      |                |
|                 |          |         | V31             |                  |      |                |
|                 |          |         | V41             |                  |      |                |





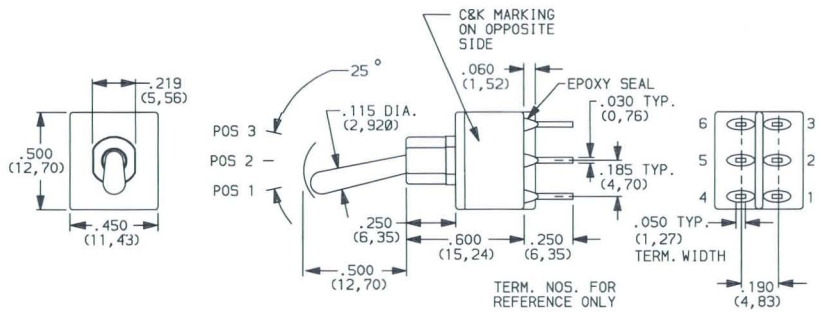
\*Process sealed-withstands soldering and cleaning processes.

SWITCHES WITH STANDARD OPTIONS



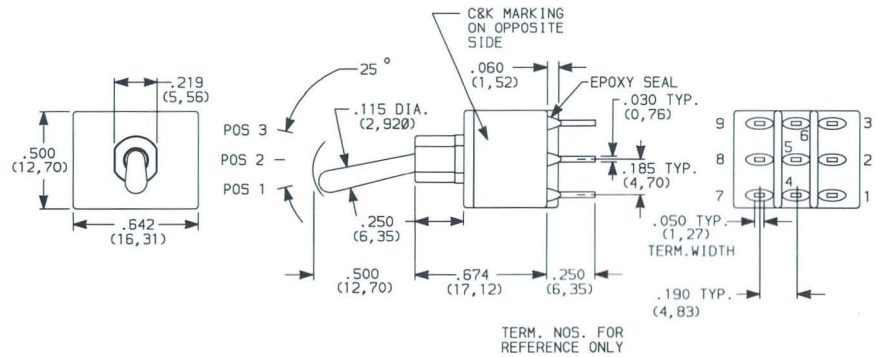
SPDT

Part No. Shown: E101SD1CBE



DPDT

Part No. Shown: E201SD1CBE



3PDT

Part No. Shown: E301SD1CBE



\*Process sealed—withstands soldering and cleaning processes.

SWITCH FUNCTION

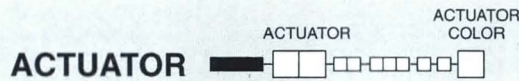
| NO. POLES | MODEL† NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |             | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|--------|-------------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3      |           |
| SP        | E101       | ON              | NONE   | ON     | 2-3                 | OPEN   | 2-1         | <br>SPDT  |
|           | E103       | ON              | OFF    | ON     |                     |        |             |           |
|           | E105       | MOM.            | OFF    | MOM.   |                     |        |             |           |
|           | E107       | ON              | OFF    | MOM.   |                     |        |             |           |
|           | E108       | ON              | NONE   | MOM.   |                     |        |             |           |
| DP        | E201       | ON              | NONE   | ON     | 2-3,5-6             | OPEN   | 2-1,5-4     | <br>DPDT  |
|           | E203       | ON              | OFF    | ON     |                     |        |             |           |
|           | E205       | MOM.            | OFF    | MOM.   |                     |        |             |           |
|           | E207       | ON              | OFF    | MOM.   |                     |        |             |           |
|           | E208       | ON              | NONE   | MOM.   |                     |        |             |           |
|           | E211**     | ON              | ON     | ON     |                     |        |             |           |
|           | E213**     | ON              | ON     | MOM.   |                     |        |             |           |
| E215**    | MOM.       | ON              | MOM.   |        |                     |        |             |           |
| 3P        | E301       | ON              | NONE   | ON     | 2-3,5-6,8-9         | OPEN   | 2-1,5-4,8-7 | <br>3PDT  |
|           | E303       | ON              | OFF    | ON     |                     |        |             |           |
|           | E305       | MOM.            | OFF    | MOM.   |                     |        |             |           |
|           | E307       | ON              | OFF    | MOM.   |                     |        |             |           |
|           | E308       | ON              | NONE   | MOM.   |                     |        |             |           |

MOM. = MOMENTARY

E3XX models not available with D9 bushing.

† All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

\*\* Wiring for 3-way switch, see page X.



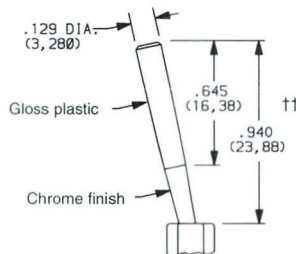
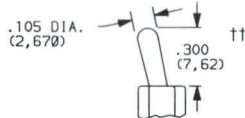
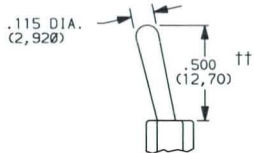
S

M

L3 PLASTIC

ACTUATOR COLOR

L3 Actuator only.



| OPTION CODE | ACTUATOR COLOR | OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|-------------|----------------|
| 1           | WHITE          | 6           | GREEN          |
| 2           | BLACK (std.)   | 7           | BLUE           |
| 3           | RED            | 8           | BROWN          |
| 4           | ORANGE         | 9           | GRAY           |
| 5           | YELLOW         |             |                |

Select L3 actuator color from chart. Place option code in appropriate box of ordering format. No color choice required for S, M actuators.

†† Actuators shown with standard D1 bushing. Subtract .030 (0,76) for D9 bushing. Subtract .100 (2,54) for Y bushing.

Standard when ordered with Z, C, Z3, W-W5 terminations. Finish: Chrome.

Standard when ordered with A, A3, AW-AW5, R, R2, AV1-AV5, V2-V91 terminations. Finish: Chrome.



\*Process sealed—withstands soldering and cleaning processes.

BUSHING

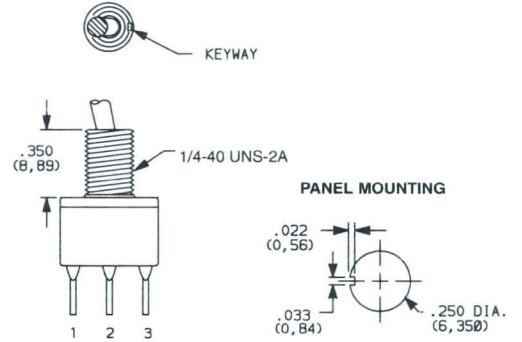
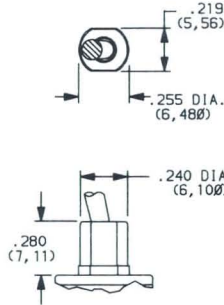
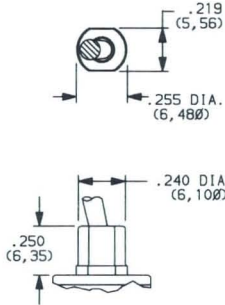
D1 (STD.)

F1 ESD RESISTANT CONDUCTIVE BUSHING

**NEW**

D9

Y



E3XX models not available with D9 bushing.

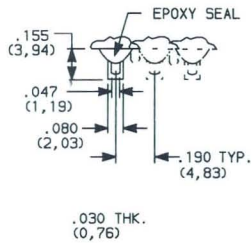
F1 conductive bushing option is impregnated with carbon fibers; dissipates electrostatic discharge (ESD) up to 20,000 V from actuator to ground. Available with M, S actuator options and A, A3, AW-AW5, R, R2, AV1-AV5, V2-V91 termination options. Note: ESD protection depends on proper grounding of switch support bracket.

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

Available only with Z, C, Z3, W-W5 terminations. Hardware: One dress nut P/N 780701201, one hex nut and lockwasher supplied standard.

TERMINATIONS

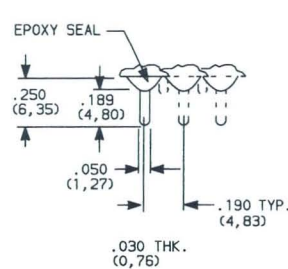
Z (STD.)



SPDT thru 3PDT

B contact material std. Not available with F1 conductive bushing or K, L, or M contact materials.

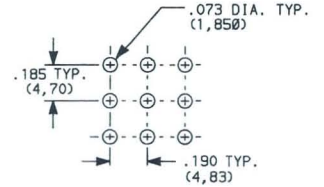
C



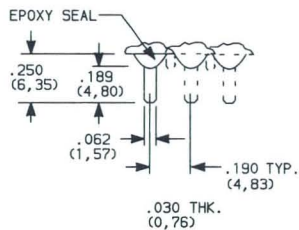
SPDT thru 3PDT

B contact material std. Not available with F1 conductive bushing.

P.C. MOUNTING



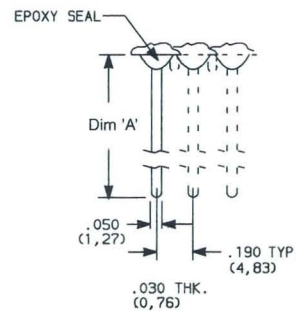
Z3 QUICK CONNECT



SPDT thru 3PDT

B contact material std. Mating quick connect available; order P/N 530100000. Not available with F1 conductive bushing.

W-W1-W3-W4-W5 WIRE WRAP



SPDT thru 3PDT

B contact material std. Not available with F1 conductive bushing.

| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

B

**A**

**P.C. MOUNTING**

Part No. Shown: E101MD1ABE



**A**

**SPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with Y bushing.

**A3 SNAP-IN**

SNAP-IN DESIGN RETAINS SWITCH.

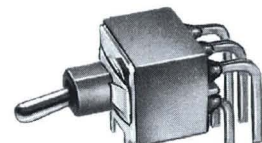
**AW-AW1-AW3-AW4-AW5 EXTENDED**

| Option     | Dim 'A'     |
|------------|-------------|
| <b>AW</b>  | .50 (12,7)  |
| <b>AW1</b> | .72 (18,3)  |
| <b>AW3</b> | .20 (5,1)   |
| <b>AW4</b> | .83 (21,1)  |
| <b>AW5</b> | 1.08 (27,4) |

**A**

**P.C. MOUNTING**

Part No. Shown: E201MD1ABE



**A**

**DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with Y bushing.

**A3 SNAP-IN**

SNAP-IN DESIGN RETAINS SWITCH.

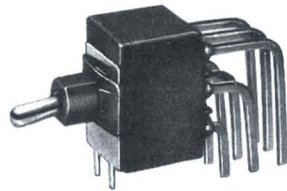
**AW-AW1-AW4-AW5 EXTENDED**

| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .21 (5,3)  |
| <b>AW1</b> | .42 (10,7) |
| <b>AW4</b> | .52 (13,2) |
| <b>AW5</b> | .76 (19,3) |



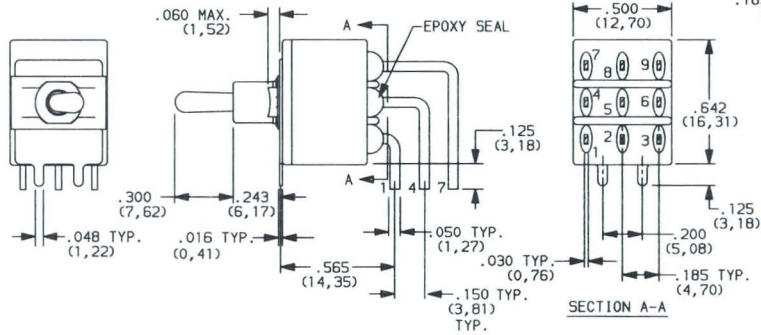
\*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

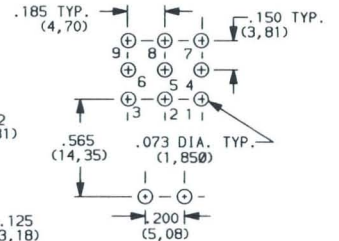


A

A

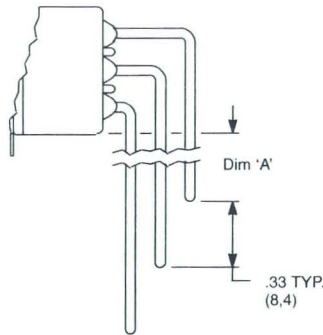


P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

AW4-AW5 EXTENDED



| Option     | Dim 'A'    |
|------------|------------|
| <b>AW4</b> | .18 (4,6)  |
| <b>AW5</b> | .42 (10,7) |

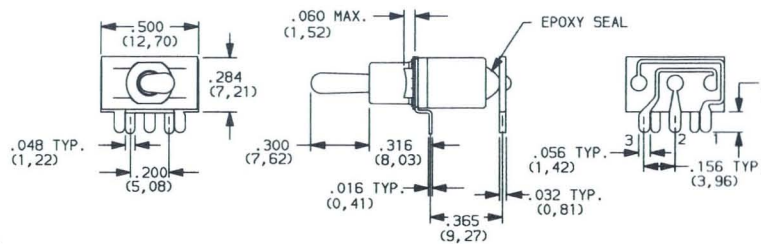
3PDT

Term. bend radii and lead-in mfg. option. Actuator shown in pos.1. B contact material std. Not available with D9,Y bushings.

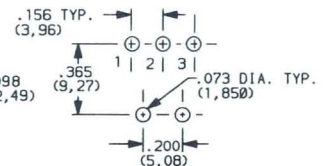
R



SPDT



P.C. MOUNTING



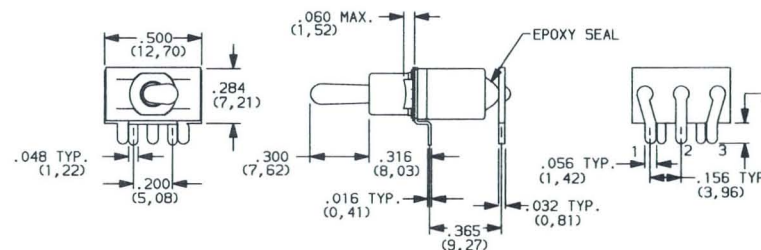
TERM. NOS. FOR REFERENCE ONLY

Contact makes on same side act. thrown. Actuator shown in pos.1. Available with B contact material only. Not available with Y bushing.

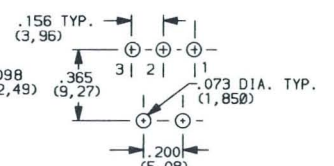
R2



SPDT



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

Contact makes on opposite side act. thrown. Actuator shown in pos.1. Available with B contact material only. Not available with Y bushing.

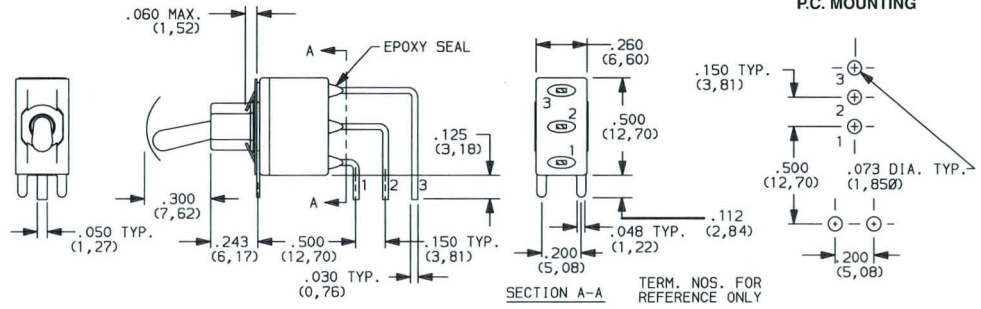


\*Process sealed—withstands soldering and cleaning processes.

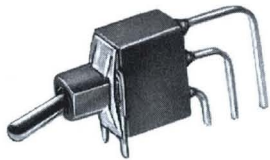
TERMINATIONS

B

AV2

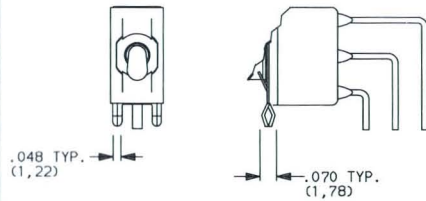


Part No. Shown: E101MD1AV2BE



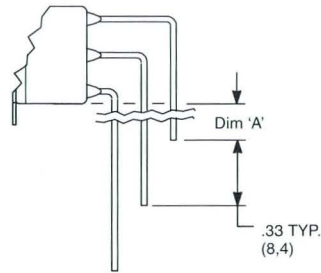
AV2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

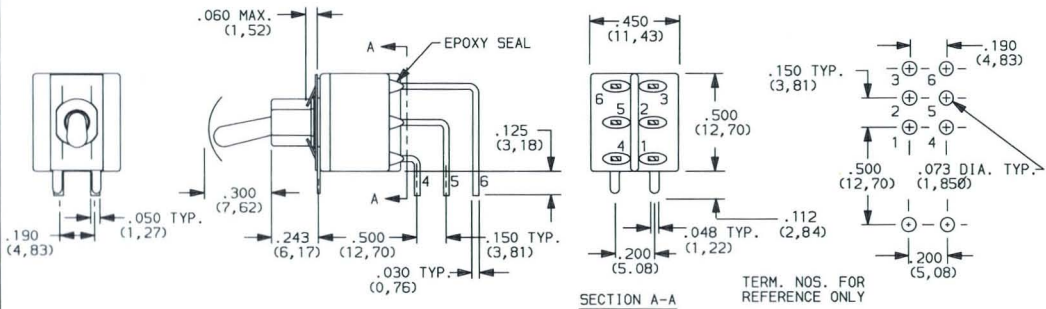


| Option | Dim 'A'    |
|--------|------------|
| AV1    | .15 (3,8)  |
| AV4    | .25 (6,4)  |
| AV5    | .49 (12,4) |

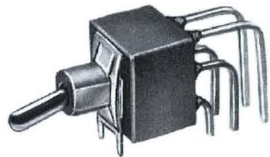
SPDT

Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1. B contact material std. Not available with Y bushing.

AV2

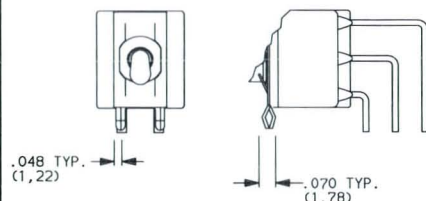


Part No. Shown: E201MD1AV2BE



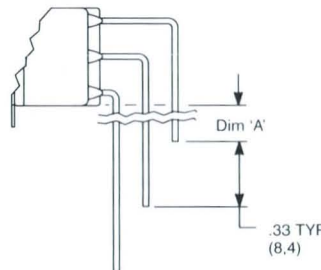
AV2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED



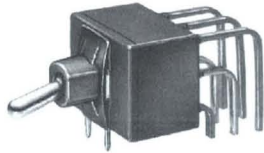
| Option | Dim 'A'    |
|--------|------------|
| AV1    | .15 (3,8)  |
| AV4    | .25 (6,4)  |
| AV5    | .49 (12,4) |

DPDT

Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1. B contact material std. Not available with Y bushing.

## TERMINATIONS

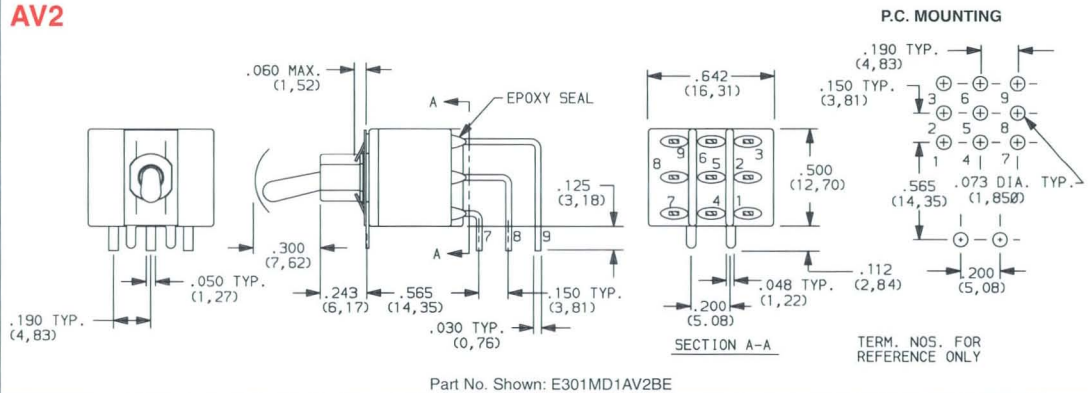
### AV2



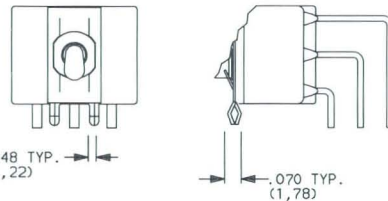
AV2

3PDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with D9, Y bushings.

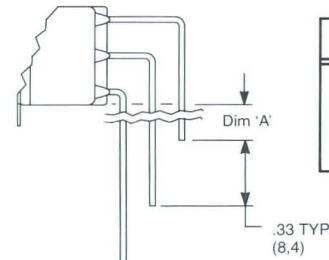


### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4-AV5 EXTENDED



| Option | Dim 'A'    |
|--------|------------|
| AV1    | .15 (3,8)  |
| AV4    | .25 (6,4)  |
| AV5    | .49 (12,4) |

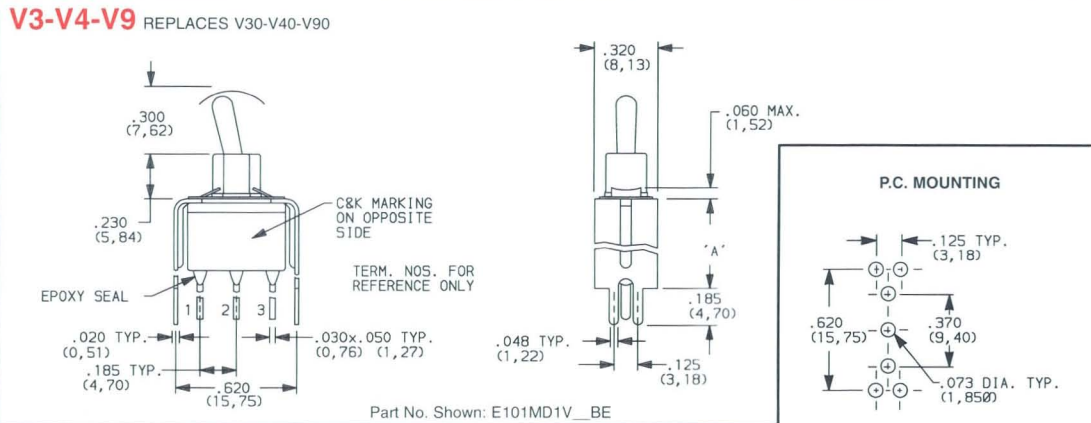
### V3-V4-V9 REPLACES V30-V40-V90



V3

SPDT

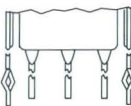
Actuator shown in pos.1.  
B contact material std.  
Not available with Y bushing.



### V31-V41-V91 SNAP-IN



V31



SNAP-IN DESIGN RETAINS SWITCH.

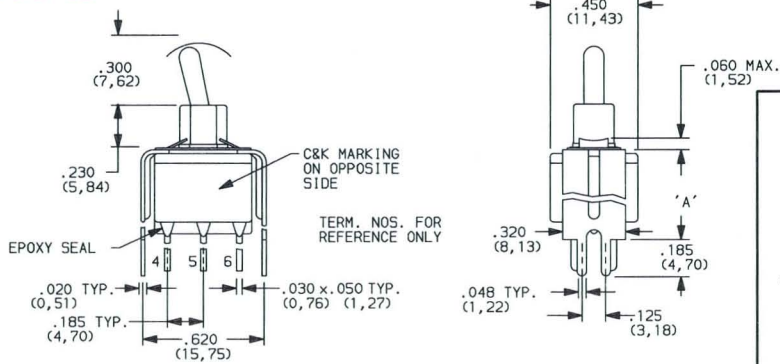
| Option  | Dim 'A'       |
|---------|---------------|
| V3, V31 | .460 (11,68)  |
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |



\*Process sealed—withstands soldering and cleaning processes.

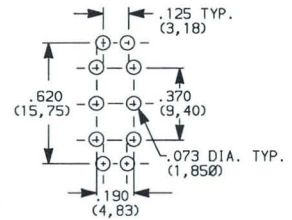
TERMINATIONS

**V3-V4-V9** REPLACES V30-V40-V90

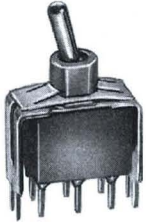


Part No. Shown: E201MD1V\_\_BE

P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

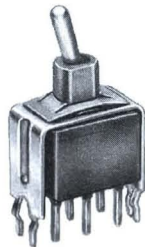


V3

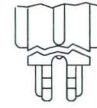
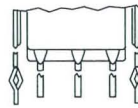
DPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with Y bushing.

**V31-V41-V91** SNAP-IN

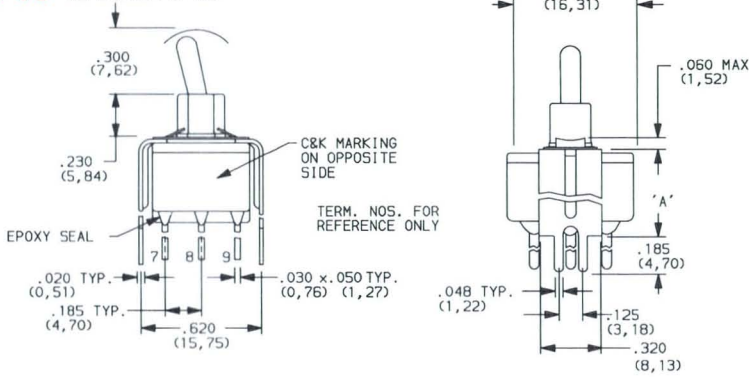


V31



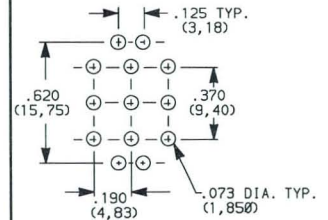
SNAP-IN DESIGN RETAINS SWITCH.

**V4-V9** REPLACES V40-V90

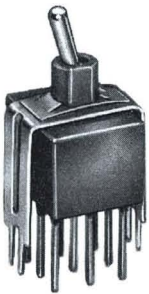


Part No. Shown: E301MD1V\_\_BE

P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

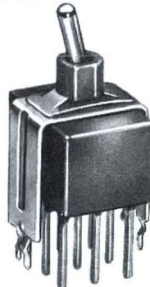


V4

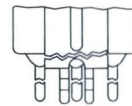
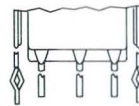
3PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with D9, Y bushings.

**V41-V91** SNAP-IN



V41



SNAP-IN DESIGN RETAINS SWITCH.

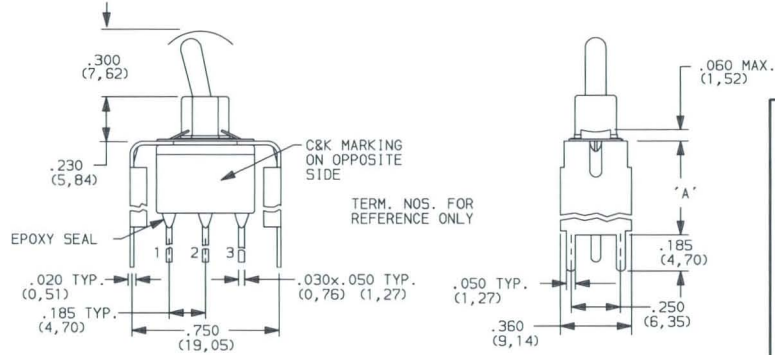




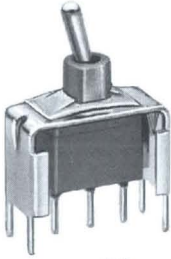
\*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80

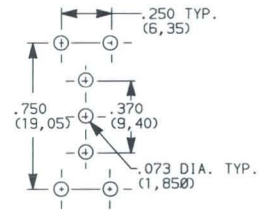


Part No. Shown: E101MD1V\_\_BE

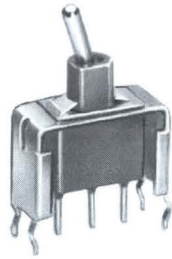


V6

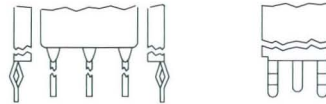
P.C. MOUNTING



**V21-V61-V71-V81** SNAP-IN



V61



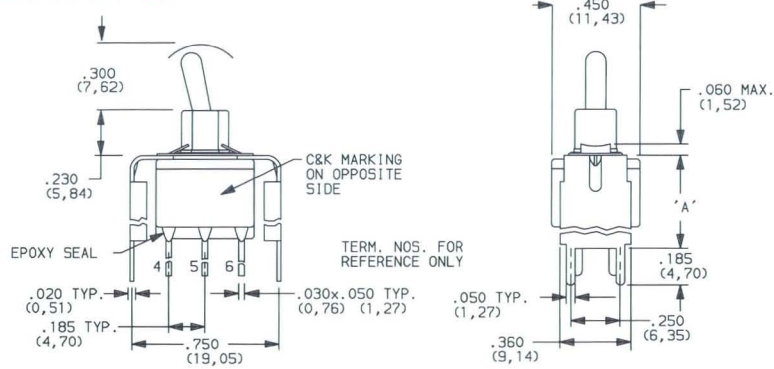
SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V2, V21</b> | .555 (14,10)  |
| <b>V6, V61</b> | .460 (11, 68) |
| <b>V7, V71</b> | .630 (16, 00) |
| <b>V8, V81</b> | .953 (24, 21) |

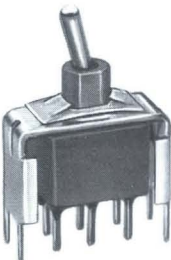
SPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with Y bushing.

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80

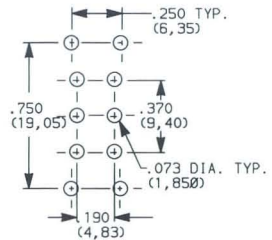


Part No. Shown: E201MD1V\_\_BE

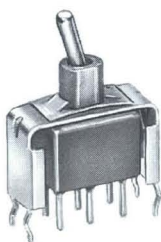


V6

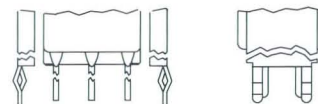
P.C. MOUNTING



**V21-V61-V71-V81** SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V2, V21</b> | .555 (14,10)  |
| <b>V6, V61</b> | .460 (11, 68) |
| <b>V7, V71</b> | .630 (16, 00) |
| <b>V8, V81</b> | .953 (24, 21) |

DPDT

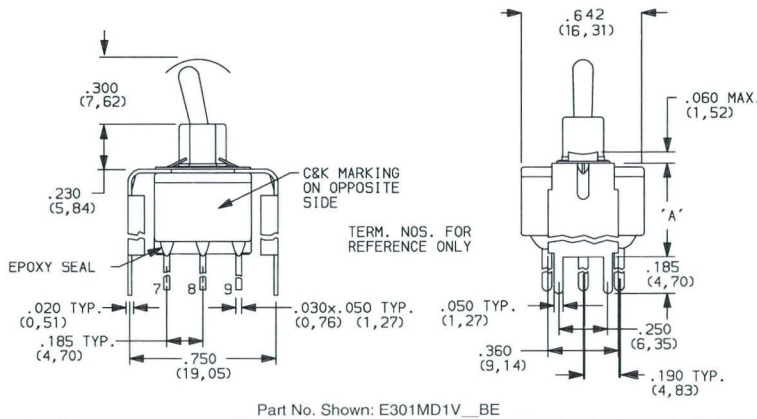
Actuator shown in pos.1.  
B contact material std.  
Not available with Y bushing.



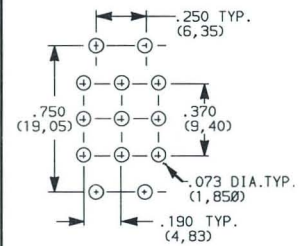
\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

**V2-V7-V8** REPLACES V20-V70-V80



### P.C. MOUNTING

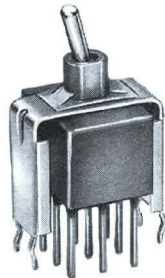


| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

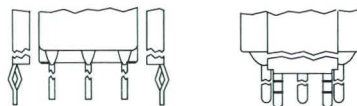


V7

**V21-V71-V81** SNAP-IN



V71



SNAP-IN DESIGN RETAINS SWITCH.

### 3PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with D9, Y bushings.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.<br>E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.   |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | E1XX AND E2XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.<br>E3XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

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

All models with all options when ordered with G, L, M or Q contact material. See pages B-20 and VIII.

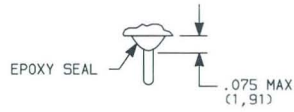
B contact material standard with all terminations.  
B contact material must be ordered with R, R2 terminations.  
K, L, M contact materials not available with Z terminations.



\*Process sealed—withstands soldering and cleaning processes.



**E** (STD.)



B

## HOW TO ORDER

All available E SERIES SEALED TOGGLE SWITCH options are listed on page B-18, and are described on pages B-20 thru B-29. Switches with standard options are shown on page B-19. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page B-20. Hardware and accessories are available separately, see catalog section H.

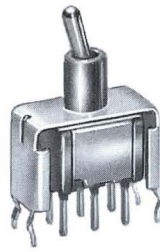
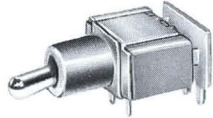
## SPECIFICATIONS

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact material).
- ELECTRICAL LIFE: E1XX and E2XX MODELS: 40,000 make-and-break cycles at full load. E3XX MODELS: 30,000 cycles.
- CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- ELECTROSTATIC DISCHARGE (ESD) RESISTANT OPTION: F1 conductive bushing only—Dissipates up to 20,000 V DC from actuator to ground.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

## MATERIALS

- CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0). F1 conductive bushing option is impregnated with carbon fibers.
- ACTUATOR: Brass, chrome plated with internal o-ring seal standard.
- SWITCH SUPPORT: Brass or steel, tin plated.
- SWITCH SUPPORT RETAINER: Stainless steel.
- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).
- TERMINAL SEAL: Epoxy.
- HARDWARE: Nut & Locking ring—Brass, nickel plated. Lockwasher—Steel, nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



models available, see page B-32

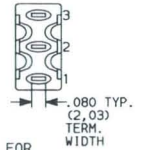
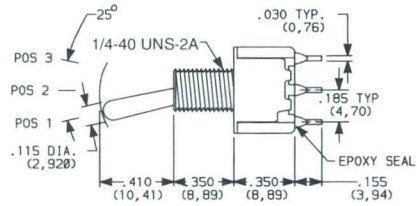
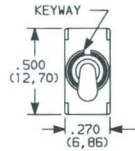
## Easy Build-A-Switch:

Below is a complete listing of available options for 7000 SERIES TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-31; all available options are shown and described on pages B-32 thru B-46. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-46. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

| SWITCH FUNCTION | ACTUATOR        | BUSHING | TERMINATIONS    | CONTACT MATERIAL | SEAL  | ACTUATOR COLOR/FINISH | BUSHING FINISH |
|-----------------|-----------------|---------|-----------------|------------------|-------|-----------------------|----------------|
|                 |                 |         |                 | Silver           | Epoxy | Chrome                | Nickel         |
| [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] | [ ] [ ] | [ ] [ ] [ ] [ ] | [ ]              | [ ]   | [ ]                   | [ ]            |
| 7101 U11        | K               | (NONE)  | A               | V21              | B     | (NONE)                | (NONE)         |
| 7103 U13        | K1              | CW      | A2              | V31              | G     | 0                     | 2              |
| 7105 U15        | K8              | D       | A3              | V41              | K     | 1                     |                |
| 7107 U17        | K18             | D8      | A4              | V61              | L     | 2                     |                |
| 7108 U18        | L               | D9      | A7              | V71              | M     | 3                     |                |
| 7109 U19        | L1              | H       | AV1             | V81              | Q     | 4                     |                |
| 7201 U21        | L1P             | H3      | AV2             | V91              |       | 5                     |                |
| 7203 U23        | L2              | H4      | AV3             | W                |       | 6                     |                |
| 7205 U25        | L2P             | Y       | AV4             | W1               |       | 7                     |                |
| 7207 U27        | L3              | Y1      | AV5             | W3               |       | 8                     |                |
| 7208 U28        | L3P             | Y3      | AW              | W4               |       | 9                     |                |
| 7209 U29        | L40             | Y4      | AW1             | W5               |       | S                     |                |
| 7211 U211       | L41             | Y9      | AW3             | W6               |       |                       |                |
| 7213 U213       | L42             |         | AW4             | W7               |       |                       |                |
| 7215 U215       | L43             |         | AW5             | Z                |       |                       |                |
| 7301 U31        | LP              |         | AW6             | Z3               |       |                       |                |
| 7303 U33        | M               |         | AW7             |                  |       |                       |                |
| 7305 U35        | MP              |         | C               |                  |       |                       |                |
| 7307 U37        | P1              |         | R               |                  |       |                       |                |
| 7308 U38        | P3              |         | R2              |                  |       |                       |                |
| 7309 U39        | P4              |         | V2              |                  |       |                       |                |
| 7401 U41        | S               |         | V3              |                  |       |                       |                |
| 7403 U43        | SP              |         | V4              |                  |       |                       |                |
| 7405 U45        | T               |         | V6              |                  |       |                       |                |
| 7407 U47        | T1              |         | V7              |                  |       |                       |                |
| 7408 U48        | T1P             |         | V8              |                  |       |                       |                |
| 7409 U49        | T2P             |         | V9              |                  |       |                       |                |
| 7411 U411       | TP              |         |                 |                  |       |                       |                |
| 7413 U413       |                 |         |                 |                  |       |                       |                |
| 7415 U415       |                 |         |                 |                  |       |                       |                |



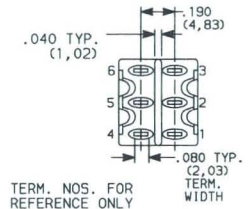
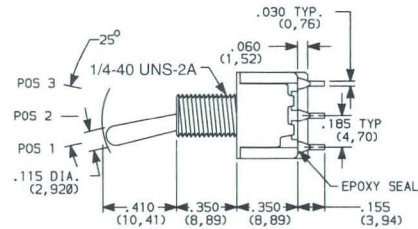
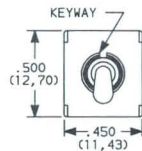
SWITCHES WITH STANDARD OPTIONS



TERM. NOS. FOR REFERENCE ONLY

SPDT

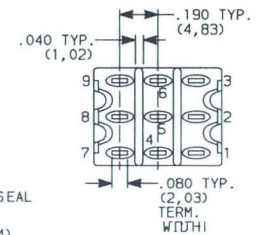
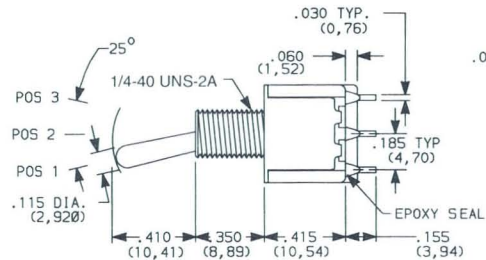
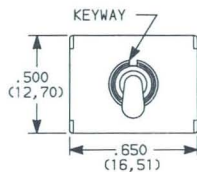
Part No. Shown: 7101SYZQE



TERM. NOS. FOR REFERENCE ONLY

DPDT

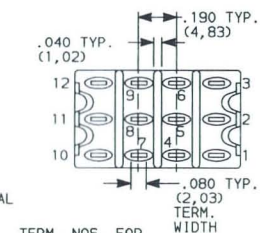
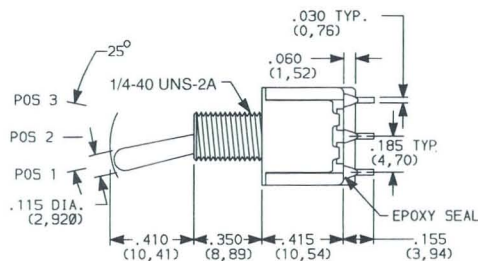
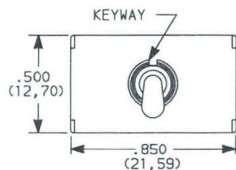
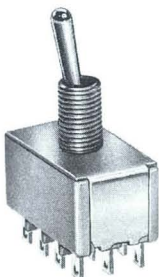
Part No. Shown: 7201SYZQE



TERM. NOS. FOR REFERENCE ONLY

3PDT

Part No. Shown: 7301SYZQE



TERM. NOS. FOR REFERENCE ONLY

4PDT

Part No. Shown: 7401SYZQE

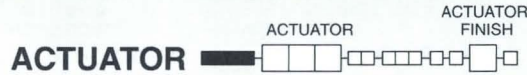
## SWITCH FUNCTION

| NO. POLES | MODEL NO. | UL/CSA MODEL NO.** | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |                   |                   | SCHEMATIC |
|-----------|-----------|--------------------|-----------------|--------|--------|---------------------|-------------------|-------------------|-----------|
|           |           |                    | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2            | POS. 3            |           |
|           |           |                    |                 |        |        |                     |                   |                   |           |
| SP        | 7101      | U11                | ON              | NONE   | ON     |                     |                   |                   |           |
|           | 7103      | U13                | ON              | OFF    | ON     |                     |                   |                   |           |
|           | 7105      | U15                | MOM.            | OFF    | MOM.   | 2-3                 | OPEN              | 2-1               |           |
|           | 7107      | U17                | ON              | OFF    | MOM.   |                     |                   |                   |           |
|           | 7108      | U18                | ON              | NONE   | MOM.   |                     |                   |                   |           |
|           | 7109      | U19                | NONE            | ON     | MOM.   | N/A                 | 2-3               | 2-1               |           |
| DP        | 7201      | U21                | ON              | NONE   | ON     |                     |                   |                   |           |
|           | 7203      | U23                | ON              | OFF    | ON     |                     |                   |                   |           |
|           | 7205      | U25                | MOM.            | OFF    | MOM.   | 2-3,5-6             | OPEN              | 2-1,5-4           |           |
|           | 7207      | U27                | ON              | OFF    | MOM.   |                     |                   |                   |           |
|           | 7208      | U28                | ON              | NONE   | MOM.   |                     |                   |                   |           |
|           | 7209      | U29                | NONE            | ON     | MOM.   | N/A                 | 2-3,5-6           | 2-1,5-4           |           |
|           | 7211*     | U211*              | ON              | ON     | ON     |                     |                   |                   |           |
|           | 7213*     | U213*              | ON              | ON     | MOM.   | 2-3,5-6             | 2-3,5-4           | 2-1,5-4           |           |
| 3P        | 7301      | U31                | ON              | NONE   | ON     |                     |                   |                   |           |
|           | 7303      | U33                | ON              | OFF    | ON     |                     |                   |                   |           |
|           | 7305      | U35                | MOM.            | OFF    | MOM.   | 2-3,5-6,8-9         | OPEN              | 2-1,5-4,8-7       |           |
|           | 7307      | U37                | ON              | OFF    | MOM.   |                     |                   |                   |           |
|           | 7308      | U38                | ON              | NONE   | MOM.   |                     |                   |                   |           |
|           | 7309      | U39                | NONE            | ON     | MOM.   | N/A                 | 2-3,5-6,8-9       | 2-1,5-4,8-7       |           |
| 4P        | 7401      | U41                | ON              | NONE   | ON     |                     |                   |                   |           |
|           | 7403      | U43                | ON              | OFF    | ON     |                     |                   |                   |           |
|           | 7405      | U45                | MOM.            | OFF    | MOM.   | 2-3,5-6,8-9,11-12   | 2-3,5-6,8-9,11-12 | 2-1,5-4,8-7,11-10 |           |
|           | 7407      | U47                | ON              | OFF    | MOM.   |                     |                   |                   |           |
|           | 7408      | U48                | ON              | NONE   | MOM.   |                     |                   |                   |           |
|           | 7409      | U49                | NONE            | ON     | MOM.   | N/A                 | 2-3,5-6,8-9,11-12 | 2-1,5-4,8-7,11-10 |           |
|           | 7411*     | U411*              | ON              | ON     | ON     |                     |                   |                   |           |
|           | 7413*     | U413*              | ON              | ON     | MOM.   | 2-3,5-6,8-9,11-12   | 2-3,5-4,8-9,11-10 | 2-1,5-4,8-7,11-10 |           |
| 7415*     | U415*     | MOM.               | ON              | MOM.   |        |                     |                   |                   |           |

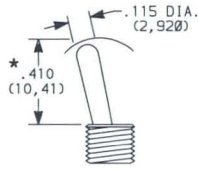
MOM. = MOMENTARY

\* Wiring for 3-way switch, see page X.

\*\* U11-U415 model nos. with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

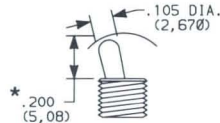


**S**  
**SP** ANTIROTATION <sup>1,2</sup>



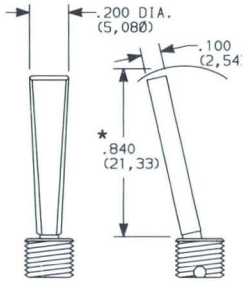
S actuator standard when ordered with Z, C, Z3 or W-W5 terminations.

**M**  
**MP** ANTIROTATION <sup>1,2</sup>

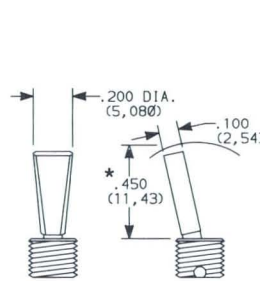


M actuator standard when ordered with all terminations except Z, C, Z3, W-W5 terminations.

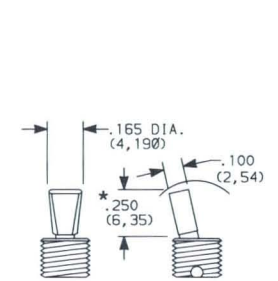
**P1** ANTIROTATION <sup>2</sup>



**P3** ANTIROTATION <sup>2</sup>

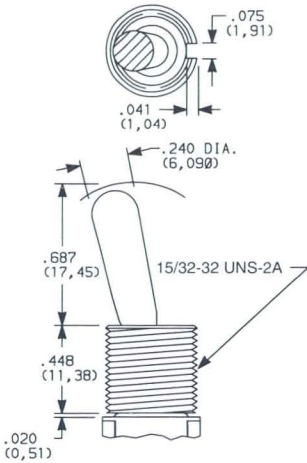


**P4** ANTIROTATION <sup>2</sup>



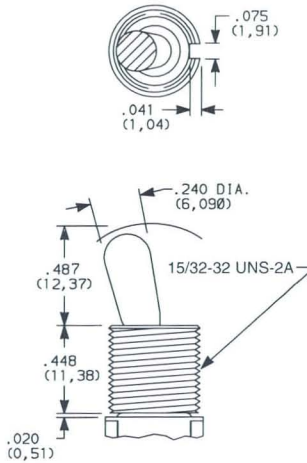
Dress nut P/N 709901201 supplied standard with threaded bushing. (P/N 709903201 with metric threaded bushings).

**T**  
**TP** ANTIROTATION <sup>2</sup>

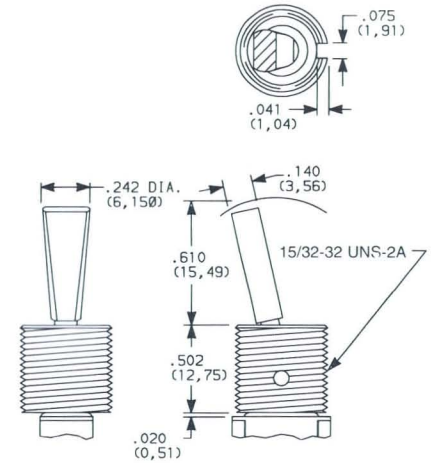


Bushing option code not required unless CW splashproof bushing desired. TP, T1P actuators not available with CW splashproof bushing. All TXX actuators not available on single pole models with A-A7, AW-AW7, R, R2 terminations.

**T1**  
**T1P** ANTIROTATION <sup>2</sup>

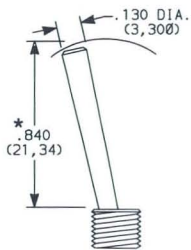


**T2P** ANTIROTATION <sup>2</sup>

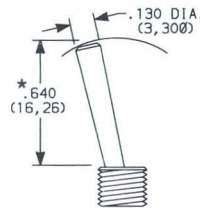


Bushing option code not required. T2P actuator not available with CW splashproof bushing or single pole models with A-A7, AW-AW7, R, R2 terminations.

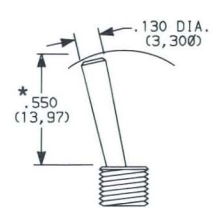
**L**  
**LP** ANTIROTATION <sup>1,2</sup>



**L1**  
**L1P** ANTIROTATION <sup>1,2</sup>



**L2**  
**L2P** ANTIROTATION <sup>1,2</sup>



## ACTUATOR FINISH

SX, LXX, MX, PX, TXX actuators.

| OPTION CODE | ACTUATOR FINISH                                   |
|-------------|---|
| (NONE)      | BRIGHT CHROME—WITH NICKEL PLATED BUSHING** (std.) |
| 0           | BRIGHT CHROME—WITH BLACK BUSHING**                |
| S           | SATIN CHROME                                      |
| 2           | BLACK   |

Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

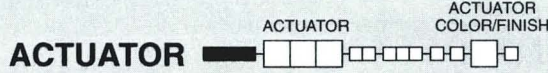
\*\* See BUSHING FINISH page B-35.

<sup>1</sup> S, M, L, L1, L2, TXX actuators not available with Y1 bushing.

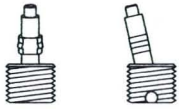
<sup>2</sup> SP, MP, P1, P3, P4, TXX, LP, L1P, L2P actuators not available with D8, H4 bushing.

\* Add .070 (1,78) for D, D8, D9 bushings, subtract .020 (0,51) for H3 bushing.

**Antirotation:** provides anti-'push-in' feature on actuator. All hardware is available separately, see catalog section H.

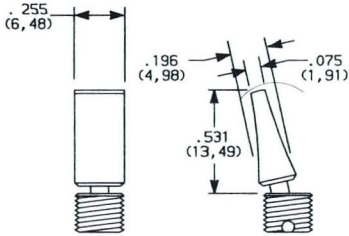


### L40 ANTIROTATION<sup>1</sup>

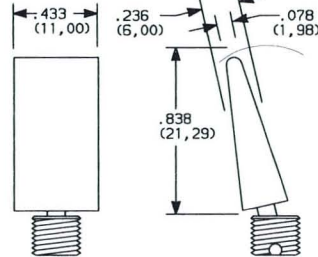


No color choice required.

### L41 PLASTIC LEVER HANDLE- ANTIROTATION<sup>1</sup>

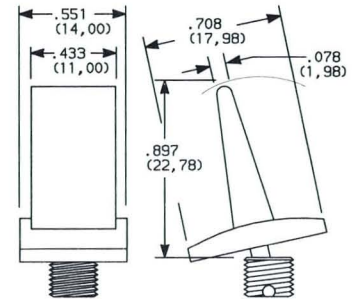


### L42 PLASTIC LEVER HANDLE- ANTIROTATION<sup>1</sup>



Finish: matte (L41, L42, L43).

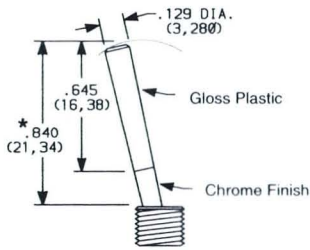
### L43 PLASTIC LEVER HANDLE- ANTIROTATION<sup>1</sup>



L41, L42, L43 lever handle actuators supplied not installed. For interchangeability, order L40 actuator option and order lever handles separately, see hardware, catalog section H.

### L3 PLASTIC

### L3P ANTIROTATION



\* Add .070 (1,78) for D, D8, D9 bushings; subtract .020 (0,51) for H3 bushing.

<sup>1</sup> L4X actuators not available with H4, Y1, Y4 bushings. **Antirotation:** provides anti-'push-in' feature on actuator.

## ACTUATOR COLOR

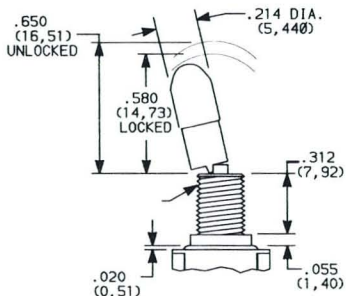
LXX actuators (except L40).

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code (if required) in appropriate box of ordering format. No color choice required for L40 actuator.

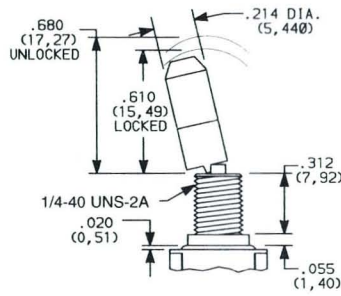
### K LOCKING LEVER

### K8 UNTHREADED



### K1 LOCKING LEVER

### K18 UNTHREADED



Keyway on right side.

Bushing code not required unless CW splashproof bushing desired.

K, K1, K8, & K18 actuators available with all termination options except A4, R, & R2.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

**Please note:** Overtightening mounting nut may cause actuator to bind.

## ACTUATOR CAP FINISH

KXX actuators.

| OPTION CODE | ACTUATOR FINISH                                 |
|-------------|---|
| (NONE)      | NATURAL AL.—WITH NICKEL PLATED BUSHING** (std.) |
| 0           | NATURAL AL.—WITH BLACK BUSHING**                |
| 2           | BLACK ANODIZED AL.                              |
| 3           | RED ANODIZED AL.                                |
| 7           | BLUE ANODIZED AL.                               |

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

\*\* See BUSHING FINISH, page B-35.

K, K1, K8, K18 Locking Positions



-01 Models  
2 Pos. Lock



-03,-11 Models  
3 Pos. Lock



-05,-09,-15 Models  
1 Pos. Lock



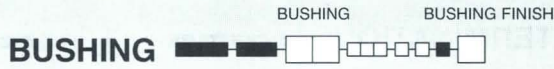
-07,-13 Models  
2 Pos. Lock



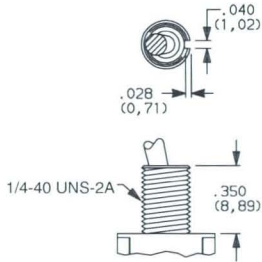
-08 Models  
1 Pos. Lock

Keyway on right side.



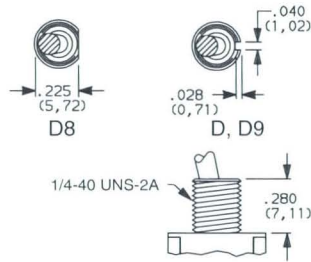


**Y**  
**Y9** UNTHREADED



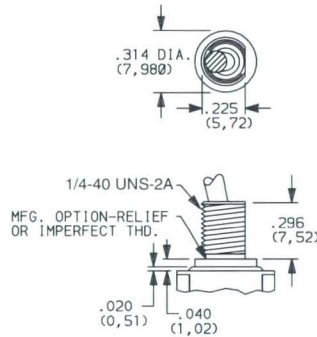
Y bushing standard with Z, C, Z3 or W-W5 terminations.

**D** KEYWAY  
**D8** UNTHREADED - FLAT<sup>3</sup>  
**D9** UNTHREADED - KEYWAY

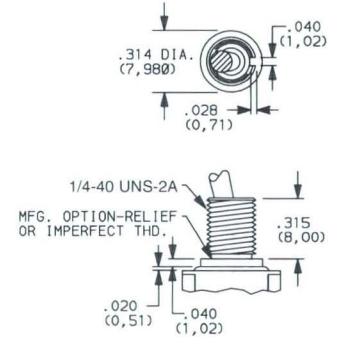


D9 bushing standard with all terminations except Z, C, Z3, or W-W5. Add .070 (1,78) to all actuator lengths with D, D8, D9 bushings.

**H** HIGH TORQUE<sup>1,2</sup>

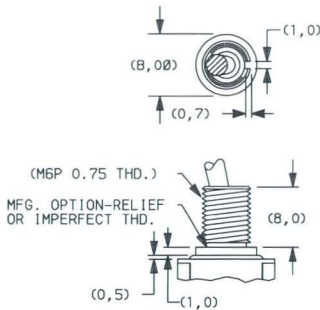


**H3** HIGH TORQUE<sup>1,2</sup>

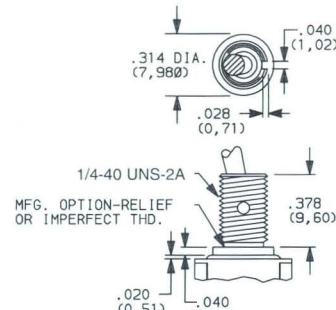


Subtract .020 (0,51) from all actuator lengths for H3 bushing.

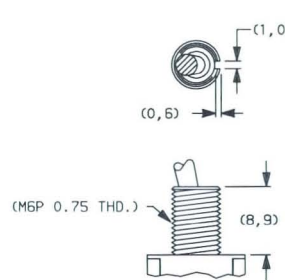
**H4** METRIC HIGH TORQUE<sup>1,2,3</sup>



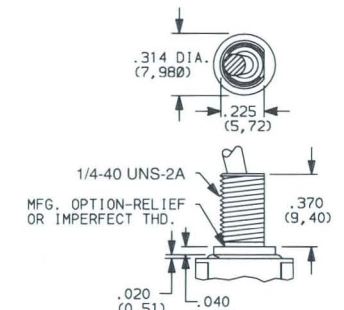
**Y1** HIGH TORQUE<sup>1,2,4</sup>



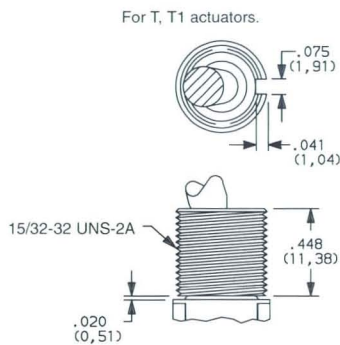
**Y3** METRIC



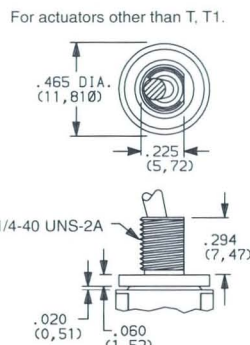
**Y4** HIGH TORQUE<sup>1,2,5</sup>



**CW** SPLASHPROOF<sup>1,2</sup>



Internal actuator seal standard External bushing seal washer available from: Multi-Flex Seals, Inc., Hackensack, NJ P/N MFS-60064



Internal actuator seal and external bushing seal washer standard

## BUSHING FINISH

| OPTION CODE | BUSHING FINISH |
|-------------|----------------|
| (NONE)      | NICKEL (std.)  |
| 2           | BLACK OXIDE    |

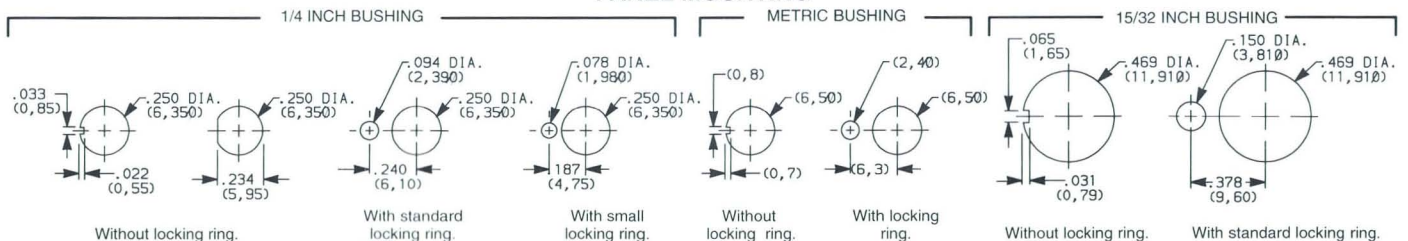
Select bushing finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black bushings or actuators are specified. All hardware is available separately, see catalog section H.

### NOTES:

- Will withstand 12 in.-lbs. of torque with no distortion.
- CW, H, H3, H4, Y1, Y4 bushings not available on single pole models with A4, R, R2 terminations.
- D8, H4 bushing available only with S, M, L, L1, L2, L3 actuators.
- Y1 bushing available only with SP, MP, PX, LP, LXP actuators.
- Y4 bushing not available with L4X actuators.

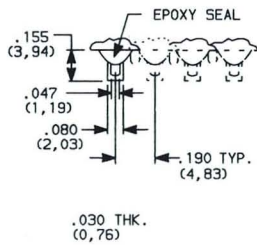
Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

## PANEL MOUNTING



## TERMINATIONS

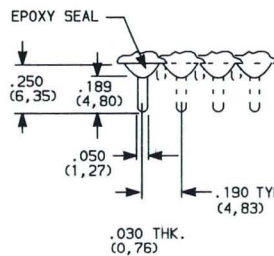
**Z** (STD.)



SPDT thru  
4PDT

Q contact material std.  
Not available with K, L, or M contact material.

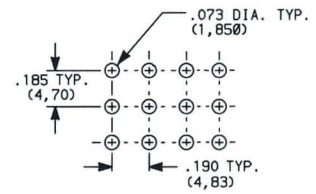
**C**



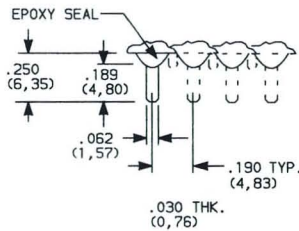
SPDT thru  
4PDT

Q contact material std.

P.C. MOUNTING



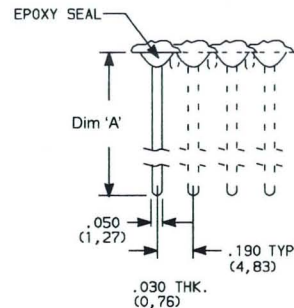
**Z3** QUICK CONNECT



SPDT thru  
4PDT

Q contact material std.  
Mating quick connector available; order part no. 530100000.

**W-W1-W3-W4-W5** WIRE WRAP

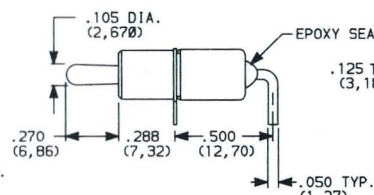
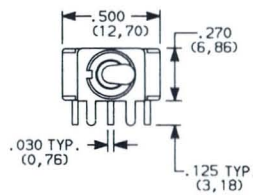


SPDT thru  
4PDT

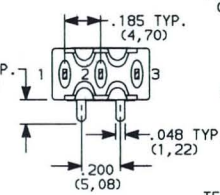
B contact material std.

| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,48)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

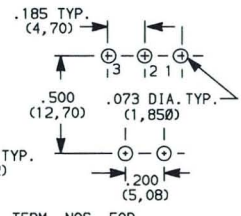
**A**



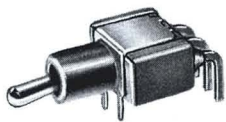
Part No. Shown: 7101MD9ABE



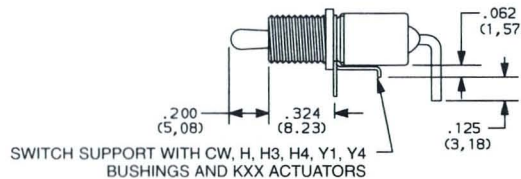
SECTION A-A



TERM. NOS. FOR REFERENCE ONLY



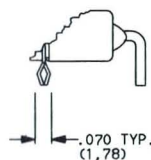
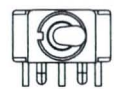
**A**



SWITCH SUPPORT WITH CW, H, H3, H4, Y1, Y4 BUSHINGS AND KXX ACTUATORS

Part No. Shown: 7101MHABE

**A3** SNAP-IN

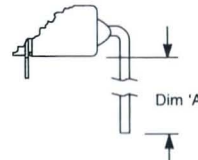


SNAP-IN DESIGN RETAINS SWITCH.

SPDT

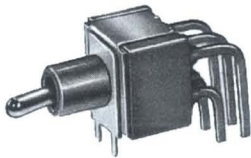
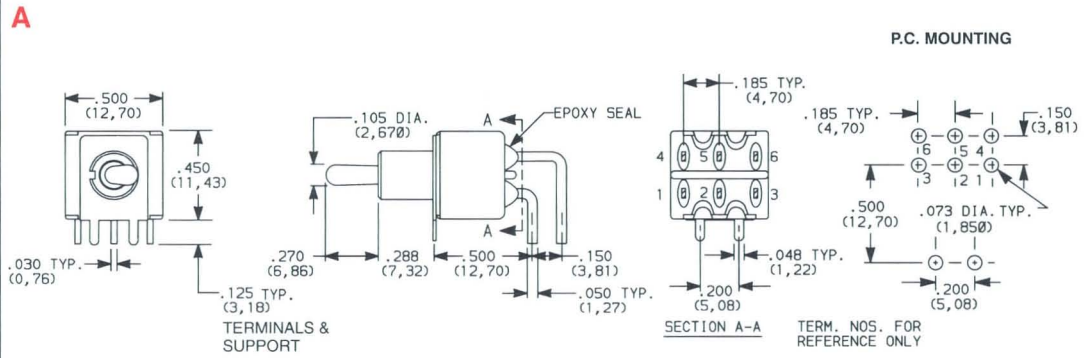
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with TXX actuators,  
I seal option.

**AW-AW1-AW3-AW4-AW5** EXTENDED



| Option     | Dim 'A'     |
|------------|-------------|
| <b>AW</b>  | .50 (12,7)  |
| <b>AW1</b> | .72 (18,3)  |
| <b>AW3</b> | .20 (5,1)   |
| <b>AW4</b> | .83 (21,1)  |
| <b>AW5</b> | 1.08 (27,4) |

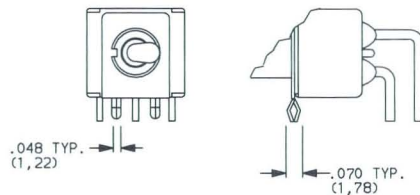
**TERMINATIONS**



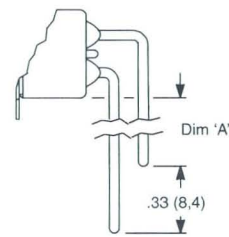
**A**

Part No. Shown: 7201MD9ABE

**A3 SNAP-IN**



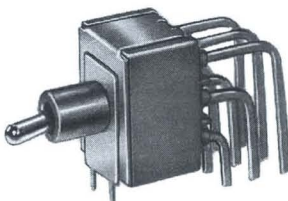
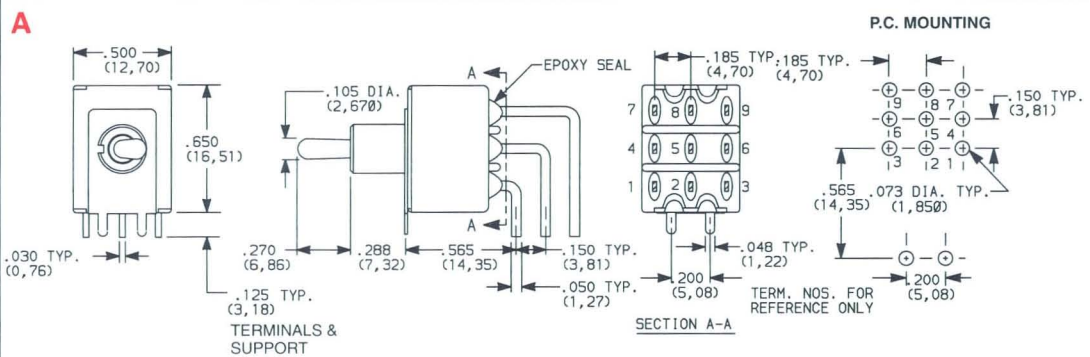
**AW-AW1-AW4-AW5 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .19 (4,8)  |
| <b>AW1</b> | .40 (10,2) |
| <b>AW4</b> | .50 (12,7) |
| <b>AW5</b> | .74 (18,8) |

**DPDT**

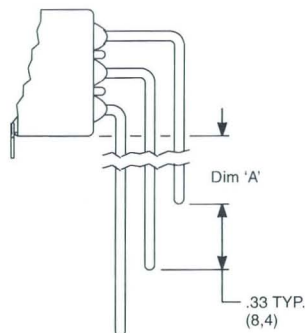
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.



**A**

Part No. Shown: 7301MD9ABE

**AW4-AW5 EXTENDED**



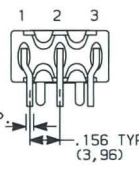
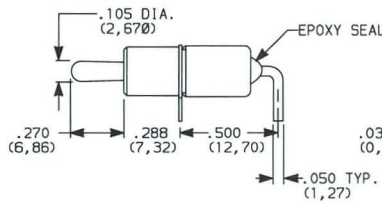
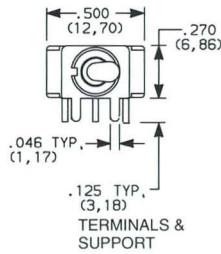
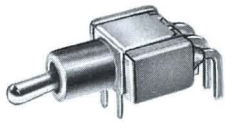
| Option     | Dim 'A'    |
|------------|------------|
| <b>AW4</b> | .18 (4,6)  |
| <b>AW5</b> | .40 (10,2) |

**3PDT**

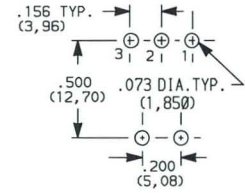
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

## TERMINATIONS

### A2



### P.C. MOUNTING

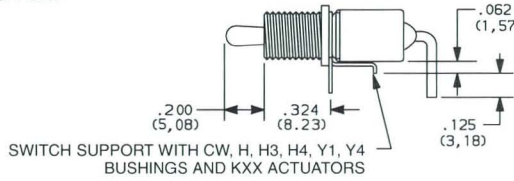


Part No. Shown: 7101MD9A2BE

TERM. NOS. FOR REFERENCE ONLY

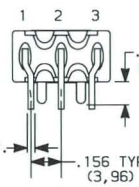
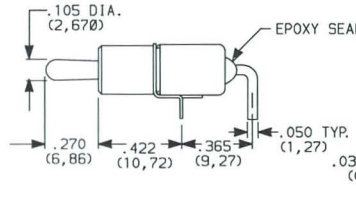
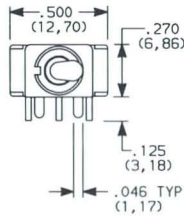
### SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with TXX actuators, I seal option.

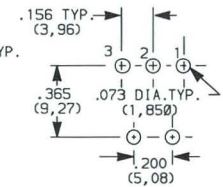


Part No. Shown: 7101MHA2BE

### A4



### P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

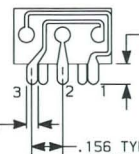
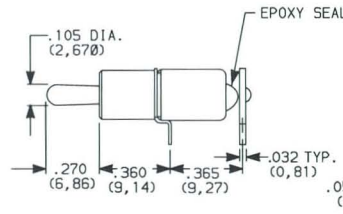
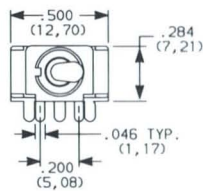
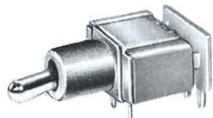
### SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with KXX, TXX actuators, CW, H, H3, H4, Y1, Y4 bushings, I seal option.

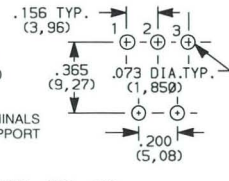
The A4 and R2 termination options are functionally identical and fit the same P.C. mounting pattern. The switches, however, are shifted relative to the mounting holes. Unlike the R2, the A4 option is available with any contact material and can be UL recognized and CSA certified. Note that the P.C. pattern must clear switch support legs.

Part No. Shown: 7101MD9A4BE

### R



### P.C. MOUNTING



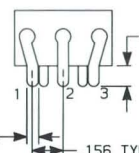
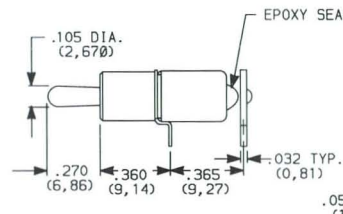
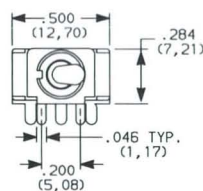
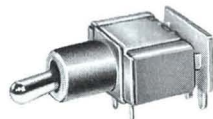
TERM. NOS. FOR REFERENCE ONLY

### SPDT

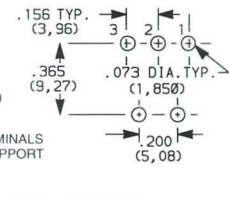
Contact makes on same side act. thrown.  
Actuator shown in pos. 1.  
Available with B contact material only.  
Not available with KXX, TXX actuators, CW, H, H3, H4, Y1, Y4 bushings, I seal option.

Part No. Shown: 7101MD9RBE

### R2



### P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

### SPDT

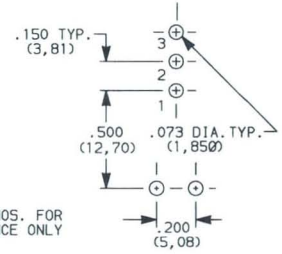
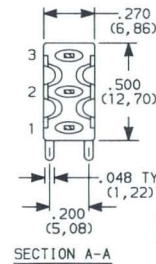
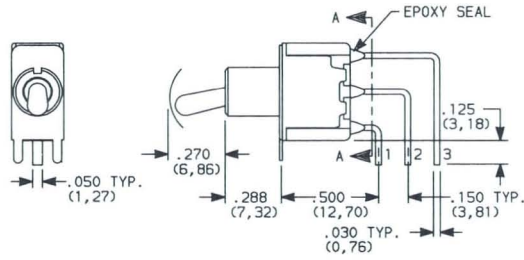
Contact makes on opposite side act. thrown.  
Actuator shown in pos. 1.  
Available with B contact material only.  
Not available with KXX, TXX actuators, CW, H, H3, H4, Y1, Y4 bushings, I seal option.

Part No. Shown: 7101MD9R2BE

**TERMINATIONS** 

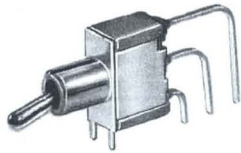
**AV2**

**P.C. MOUNTING**



TERM. NOS. FOR REFERENCE ONLY

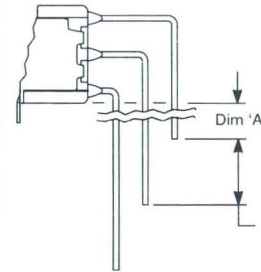
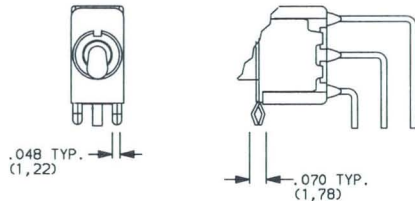
Part No. Shown: 7101MD9AV2BE



**AV2**

**AV3 SNAP-IN**

**AV1-AV4-AV5 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AV1</b> | .15 (3,8)  |
| <b>AV4</b> | .24 (6,1)  |
| <b>AV5</b> | .48 (12,2) |

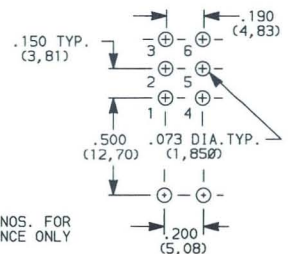
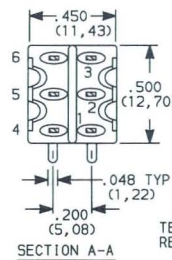
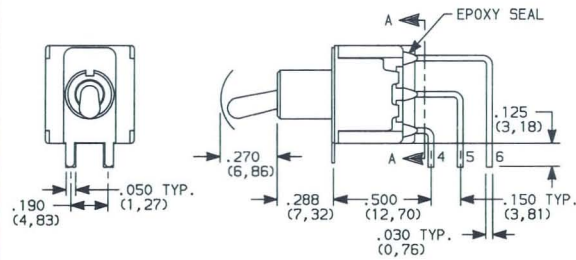
SNAP-IN DESIGN RETAINS SWITCH.

**SPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

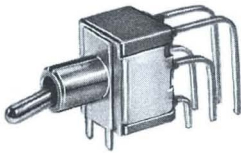
**AV2**

**P.C. MOUNTING**



TERM. NOS. FOR REFERENCE ONLY

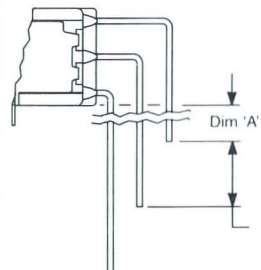
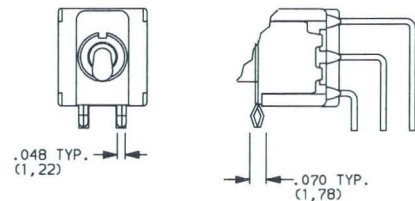
Part No. Shown: 7201MD9AV2BE



**AV2**

**AV3 SNAP-IN**

**AV1-AV4-AV5 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AV1</b> | .15 (3,8)  |
| <b>AV4</b> | .24 (6,1)  |
| <b>AV5</b> | .48 (12,2) |

SNAP-IN DESIGN RETAINS SWITCH.

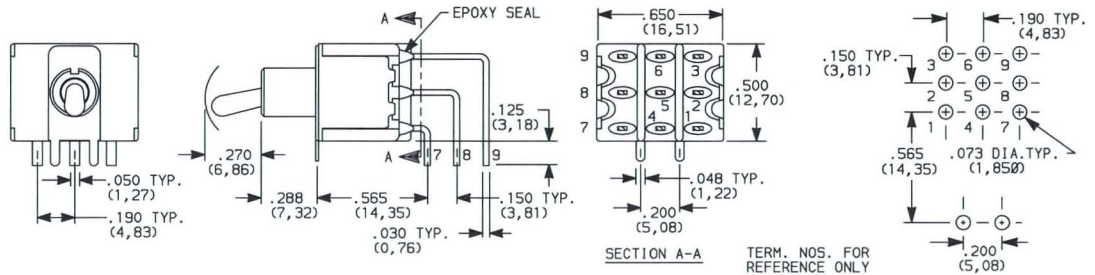
**DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

## TERMINATIONS

### AV2

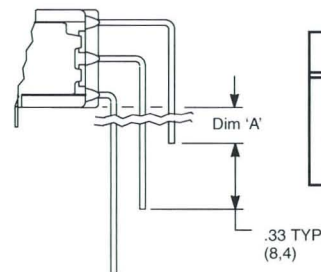
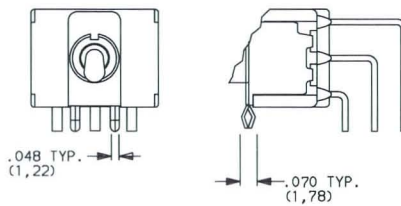
### P.C. MOUNTING



Part No. Shown: 7301MD9AV2BE

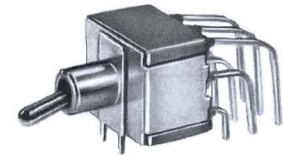
### AV3 SNAP-IN

### AV1-AV4-AV5 EXTENDED



| Option     | Dim 'A'    |
|------------|------------|
| <b>AV1</b> | .15 (3,8)  |
| <b>AV4</b> | .24 (6,1)  |
| <b>AV5</b> | .48 (12,2) |

SNAP-IN DESIGN RETAINS SWITCH.



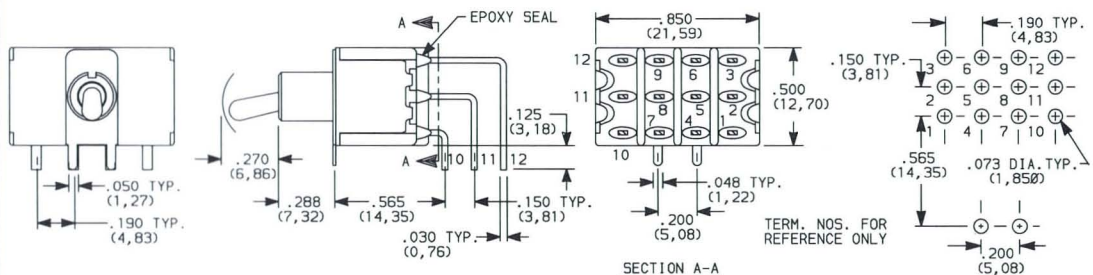
AV2

3PDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

### AV2

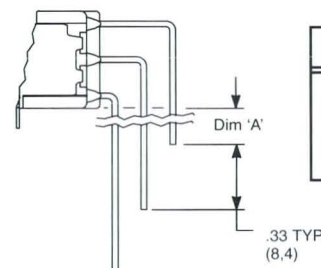
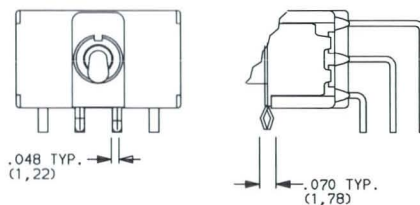
### P.C. MOUNTING



Part No. Shown: 7401MD9AV2BE

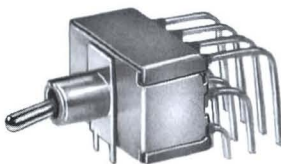
### AV3 SNAP-IN

### AV1-AV4-AV5 EXTENDED



| Option     | Dim 'A'    |
|------------|------------|
| <b>AV1</b> | .15 (3,8)  |
| <b>AV4</b> | .24 (6,1)  |
| <b>AV5</b> | .48 (12,2) |

SNAP-IN DESIGN RETAINS SWITCH.



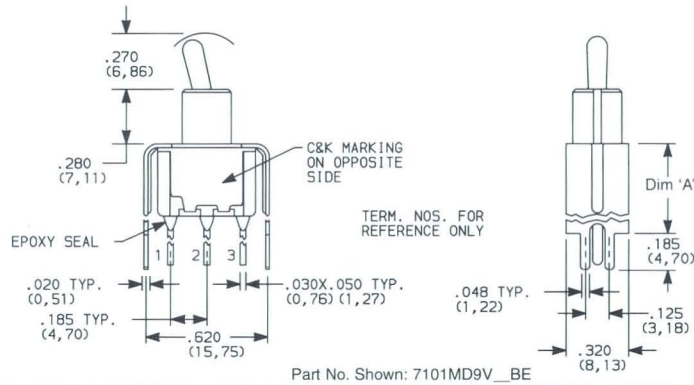
AV2

4PDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

## TERMINATIONS

### V3-V4-V9 REPLACES V30-V40-V90



V3

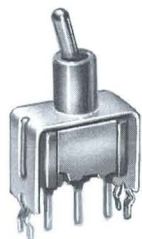
SPDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

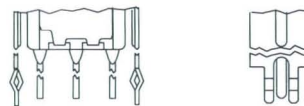
### P.C. MOUNTING

| Option  | Dim 'A'       |
|---------|---------------|
| V3, V31 | .460 (11,68)  |
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

### V31-V41-V91 SNAP-IN

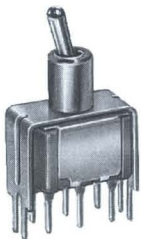
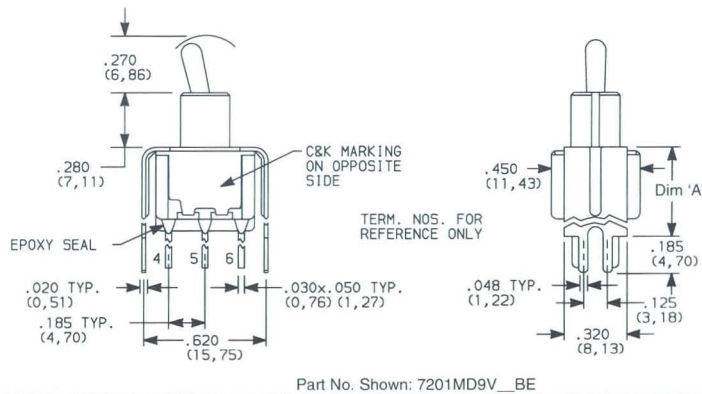


V31



SNAP-IN DESIGN RETAINS SWITCH.

### V3-V4-V9 REPLACES V30-V40-V90



V3

DPDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

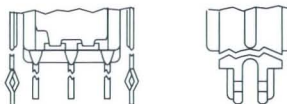
### P.C. MOUNTING

| Option  | Dim 'A'       |
|---------|---------------|
| V3, V31 | .460 (11,68)  |
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

### V31-V41-V91 SNAP-IN



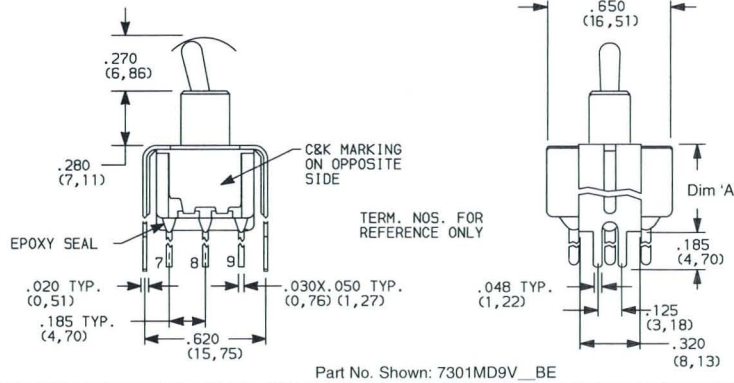
V31



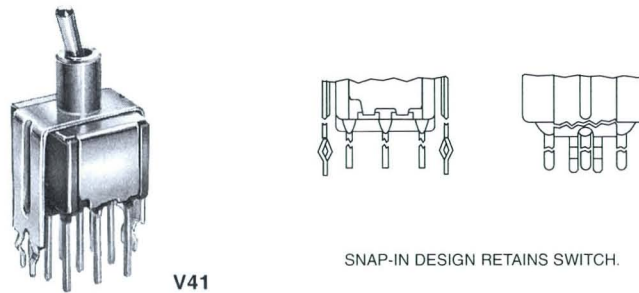
SNAP-IN DESIGN RETAINS SWITCH.

## TERMINATIONS

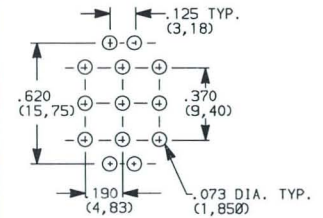
### V4-V9 REPLACES V40-V90



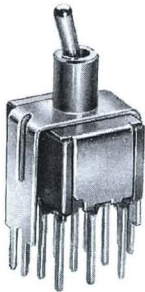
### V41-V91 SNAP-IN



### P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

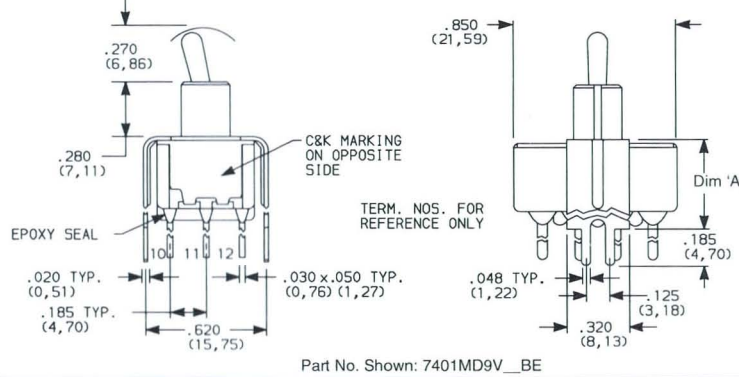


V4

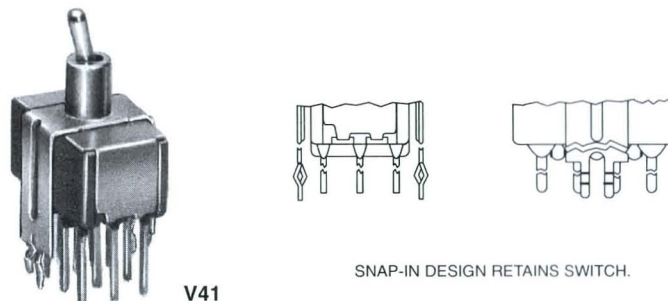
3PDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

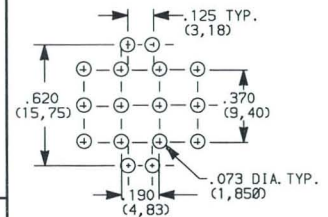
### V4-V9 REPLACES V40-V90



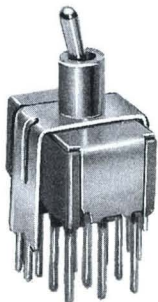
### V41-V91 SNAP-IN



### P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |



V4

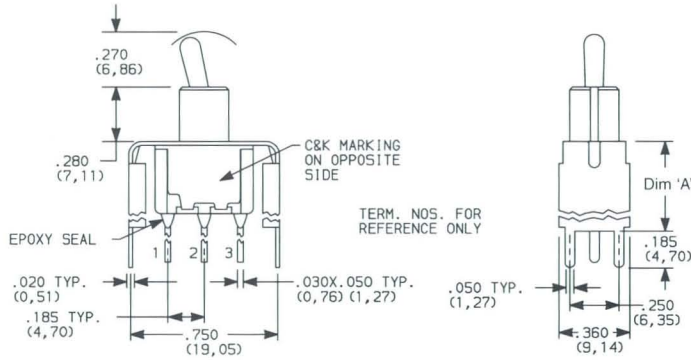
4PDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

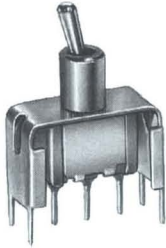


## TERMINATIONS

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80



Part No. Shown: 7101MD9V\_\_BE

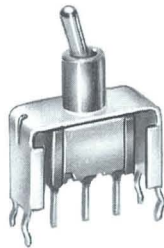


V6

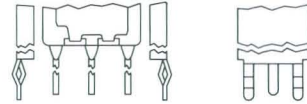
SPDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

**V21-V61-V71-V81** SNAP-IN

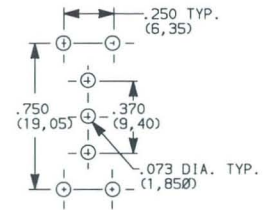


V61



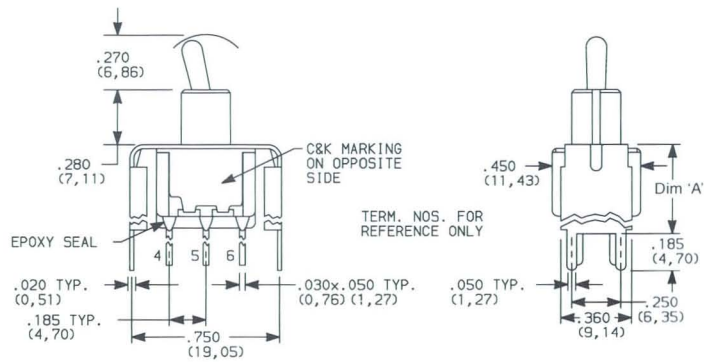
SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING

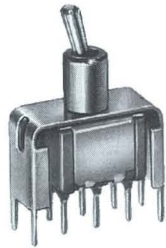


| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80



Part No. Shown: 7201MD9V\_\_BE

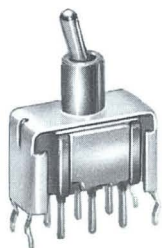


V6

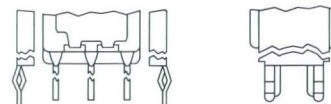
DPDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

**V21-V61-V71-V81** SNAP-IN

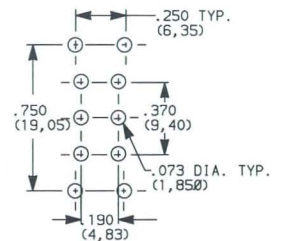


V61



SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING

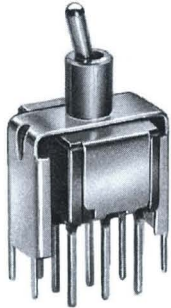


| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

## TERMINATIONS

B

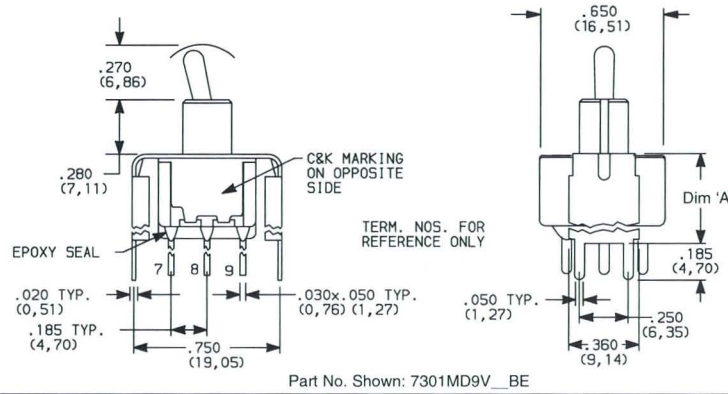
### V2-V7-V8 REPLACES V20-V70-V80



V7

3PDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

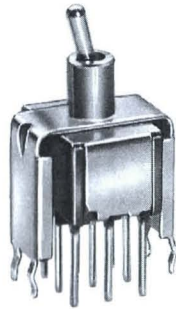


#### P.C. MOUNTING

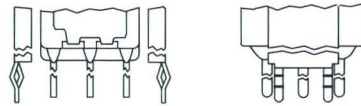
Dimensions: .250 TYP. (6,35), .750 (19,05), .370 (9,40), .073 DIA. TYP. (1,850), .190 TYP. (4,83)

| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

### V21-V71-V81 SNAP-IN

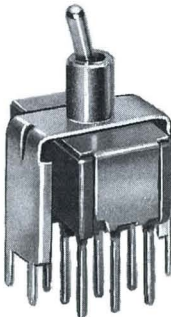


V71



SNAP-IN DESIGN RETAINS SWITCH.

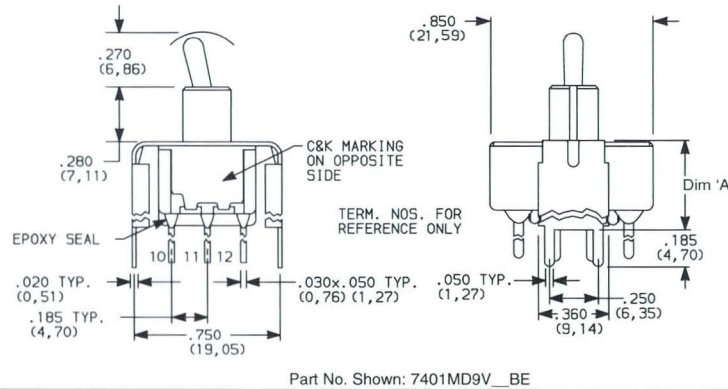
### V2-V7-V8 REPLACES V20-V70-V80



V7

4PDT

Actuator shown in pos. 1.  
B contact material std.  
Not available with I seal option.

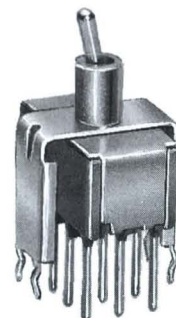


#### P.C. MOUNTING

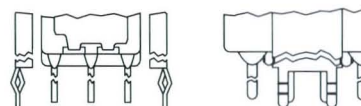
Dimensions: .250 TYP. (6,35), .750 (19,05), .370 (9,40), .073 DIA. TYP. (1,850), .190 (4,83)

| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

### V21-V71-V81 SNAP-IN



V71

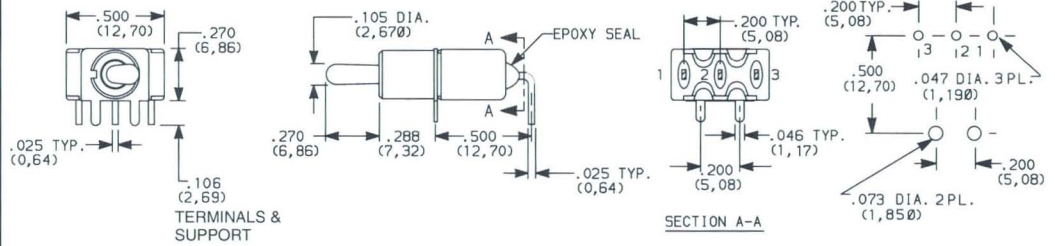


SNAP-IN DESIGN RETAINS SWITCH.

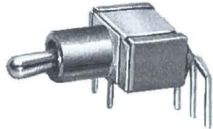
## TERMINATIONS

REPLACES W SERIES

### A7 .025 SQ. WIRE-WRAP—.200 SPACING

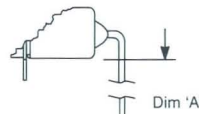


Part No. Shown: 7101MD9A7BE



A7

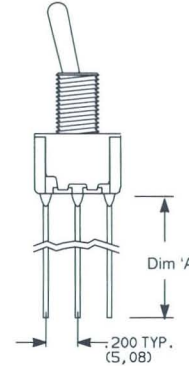
### AW6-AW7 SNAP-IN



Terminals - .025 (0,64) sq.

| Option     | Dim 'A'    |
|------------|------------|
| <b>AW6</b> | .42 (10,7) |
| <b>AW7</b> | .55 (14,0) |

### W6-W7 .025 SQ. WIRE-WRAP—.200 SPACING



Terminals - .025 (0,64) sq.

| Option    | Dim 'A'      |
|-----------|--------------|
| <b>W6</b> | .655 (16,64) |
| <b>W7</b> | .780 (19,81) |

Part No. Shown: 7101SYW\_\_BE

SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
Available with B contact material only.  
Not available with KXX, TXX actuators, H, H3,  
H4, Y1, Y4 bushings, I seal option.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.                                     |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

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

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

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

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

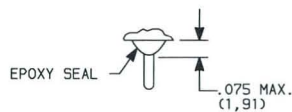
<sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material standard with all terminations except Z, C, Z3.  
B contact material must be ordered with A7, AW6-AW7, R, R2, W6-W7 terminations.  
Q contact material standard with Z, C, Z3 terminations.  
K, L, M contact materials not available with Z terminations.

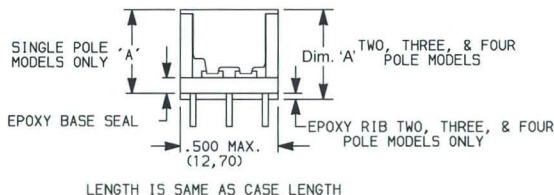
U11-U415 model numbers with all options when ordered with G, L, M or Q contact material. See pages B-32 and VIII.

## SEAL

**E** (STD.)



**I**



| Poles | Dim 'A'      |
|-------|--------------|
| SP    | .410 (10,41) |
| DP    | .440 (11,18) |
| 3P    | .505 (12,83) |
| 4P    | .505 (12,83) |

Available with Z, C, Z3, W-W5 terminations only.

## HOW TO ORDER

All available 7000 SERIES TOGGLE SWITCH options are listed on page B-30, and are described on pages B-31 thru B-46. Switches with standard options are shown on page B-31. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page B-32. Hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC (Q contact material).

ELECTRICAL LIFE: 7X01 and UX1 MODELS: 100,000 make-and-break cycles at full load. All other models, 40,000 cycles.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE:  $10^9$  ohms min.

DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

## MATERIALS

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

ACTUATOR: Brass, chrome plated.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

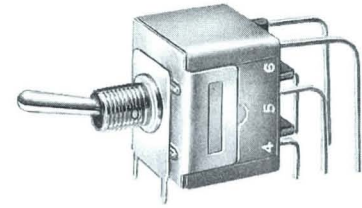
END CONTACTS: Coin silver, silver plated (Q contact material).

CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact material).

TERMINAL SEAL: Epoxy

HARDWARE: Nut & Locking ring—Brass, nickel plated.  
Lockwasher—Steel, nickel plated.

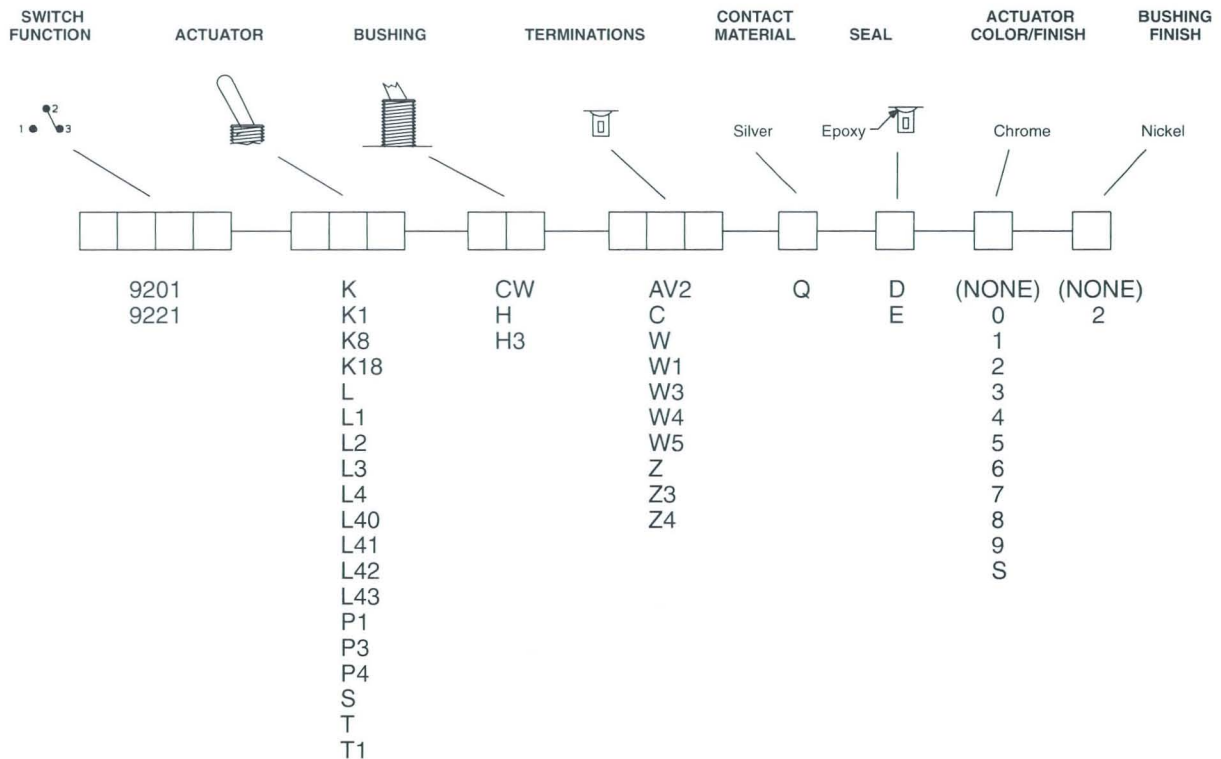
**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



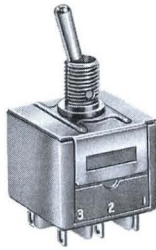
All 9000 Series models meet international dimensional and electrical requirements.

Easy Build-A-Switch:

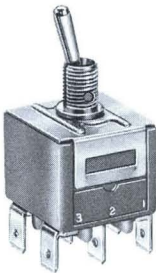
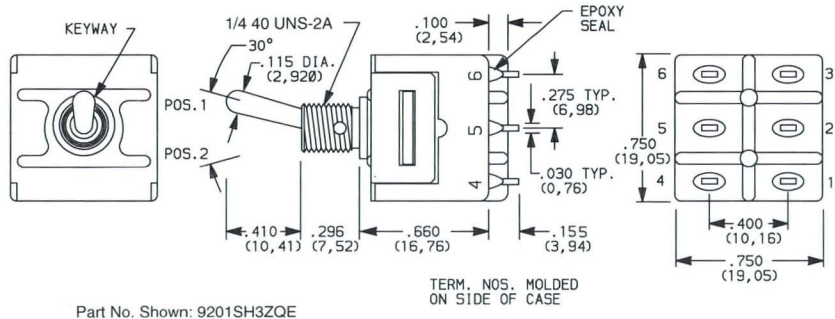
Below is a complete listing of available options for 9000 SERIES POWER TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-48; all available options are shown and described on pages B-48 thru B-52. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-52. Hardware and accessories are available separately, see catalog section H.



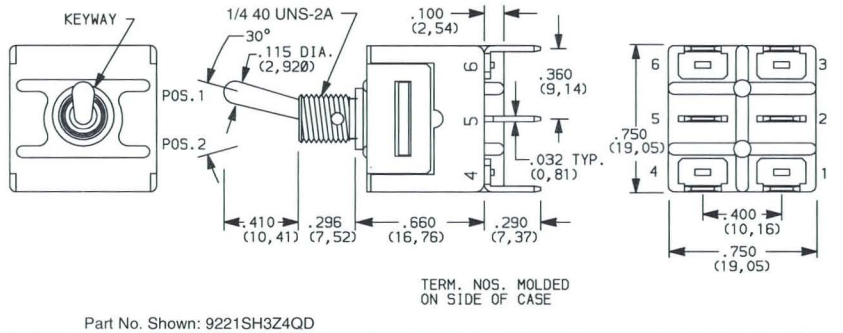
## SWITCHES WITH STANDARD OPTIONS



**DPDT  
6 AMP MODEL**



**DPDT  
10 AMP MODEL**



## SWITCH FUNCTION

| NO. POLES | MODEL NO. | RATING* | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|-----------|---------|-----------------|--------|---------------------|---------|-----------|
|           |           |         | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| DP        | 9201      | 6 AMPS  | ON              | ON     | 2-3,5-6             | 2-1,5-4 |           |
|           | 9221      | 10 AMPS | ON              | ON     |                     |         |           |



All 9000 Series models meet international dimensional and electrical requirements. See AGENCY APPROVALS, page VIII. 9221 model must be ordered with Z4 terminations and D seal option.

\* See CONTACT MATERIAL, page B-52, for complete ratings.

## ACTUATOR

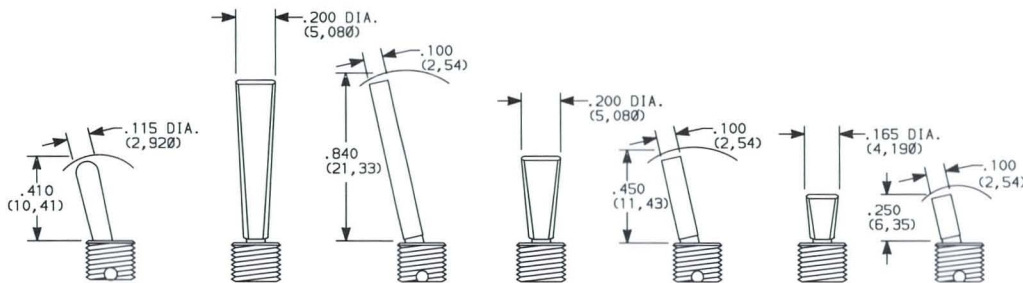
**S** (STD.)

**P1**

**P3**

**P4**

## ACTUATOR FINISH



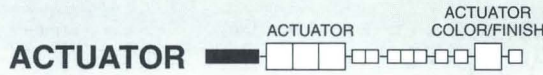
Dress nut P/N 709901201 supplied standard with P1, P3, P4 actuators.

Antirotation: Standard on all actuators, provides anti-'push-in' feature on actuator.

| OPTION CODE | ACTUATOR FINISH                                  |
|-------------|--|
| (NONE)      | NATURAL AL.— WITH NICKEL PLATED BUSHING** (std.) |
| 0           | NATURAL AL.— WITH BLACK BUSHING**                |
| S           | SATIN CHROME                                     |
| 2           | BLACK  |

Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

\*\* See BUSHING FINISH, page B-50.



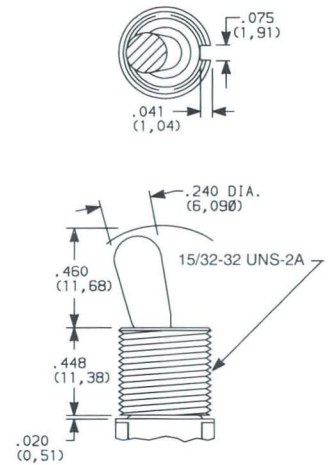
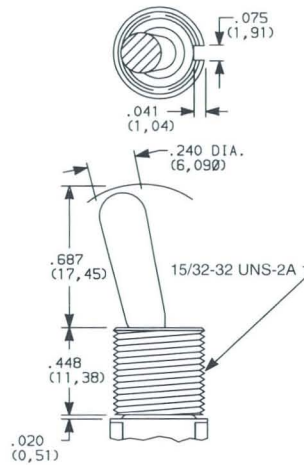
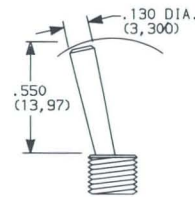
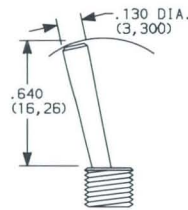
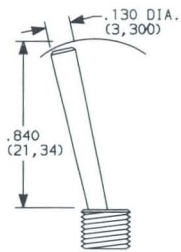
**L**

**L1**

**L2**

**T**

**T1**



## ACTUATOR FINISH

LX, TX Actuators

| OPTION CODE | ACTUATOR FINISH                                  |
|-------------|--|
| (NONE)      | BRIGHT CHROME—WITH NICKEL PLATED BUSHING* (std.) |
| 0           | BRIGHT CHROME—WITH BLACK BUSHING*                |
| S           | SATIN CHROME                                     |
| 2           | BLACK  |

Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

\* See BUSHING FINISH, page B-50.

**Antirotation:** Standard on all actuators except T, T1, provides anti-'push-in' feature on actuator.

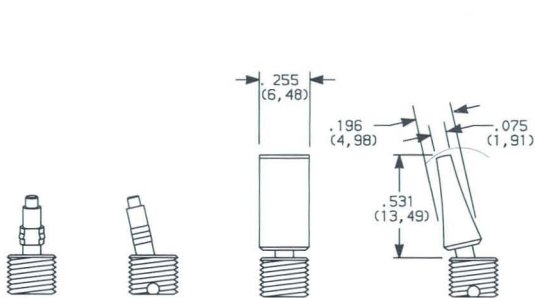
Bushing option code not required unless CW splashproof bushing desired.

**L40**

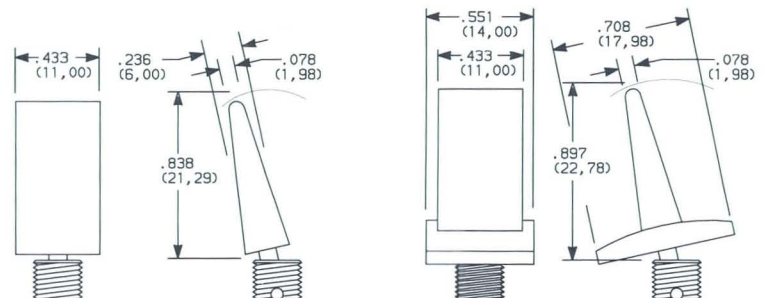
**L41** PLASTIC LEVER HANDLE

**L42** PLASTIC LEVER HANDLE

**L43** PLASTIC LEVER HANDLE



No color choice required.



Finish: matte (L41, L42, L43).

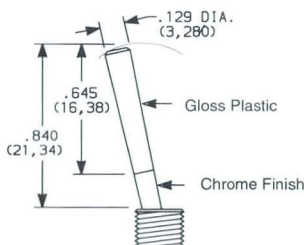
L41, L42, L43 lever handle actuators supplied not installed. For interchangeability, order L40 actuator option and order lever handles separately, see hardware, catalog section H.

**L3** PLASTIC

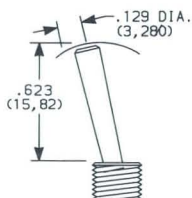
**L4** PLASTIC

## ACTUATOR COLOR

LXX, Actuators (except L40)



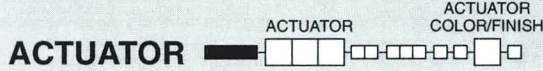
Finish: gloss



| OPTION CODE | ACTUATOR COLOR | OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|-------------|----------------|
| 1           | WHITE          | 6           | GREEN          |
| 2           | BLACK (std.)   | 7           | BLUE           |
| 3           | RED            | 8           | BROWN          |
| 4           | ORANGE         | 9           | GRAY           |
| 5           | YELLOW         |             |                |

Select actuator color from chart. Place option code (if required) in appropriate box of ordering format. No color choice required for L40 actuator.

**Antirotation:** Standard on all actuators, provides anti-'push-in' feature on actuator.



**K** LOCKING LEVER  
**K8** UNTHREADED

**K1** LOCKING LEVER  
**K18** UNTHREADED

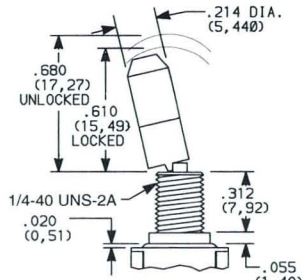
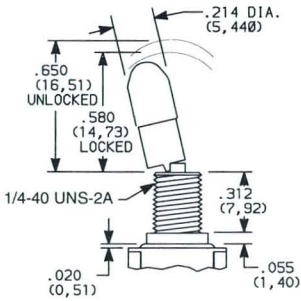
## ACTUATOR CAP FINISH

KXX actuators.

| OPTION CODE | ACTUATOR FINISH                                |
|-------------|--|
| (NONE)      | NATURAL AL.—WITH NICKEL PLATED BUSHING* (std.) |
| 0           | NATURAL AL.—WITH BLACK BUSHING*                |
| 2           | BLACK ANODIZED AL.                             |
| 3           | RED ANODIZED AL.                               |
| 7           | BLUE ANODIZED AL.                              |

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

\* See BUSHING FINISH, below.



Keyway on right side.

Bushing option code not required.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

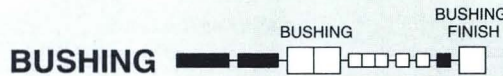
**Please note:** Overtightening mounting nut may cause actuator to bind.

K, K1, K8, K18 Locking Positions



2 Pos. Lock

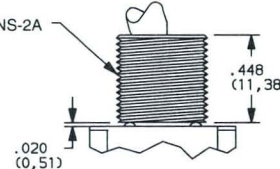
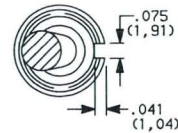
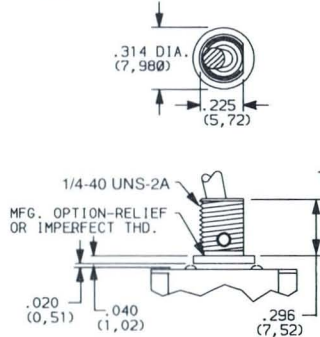
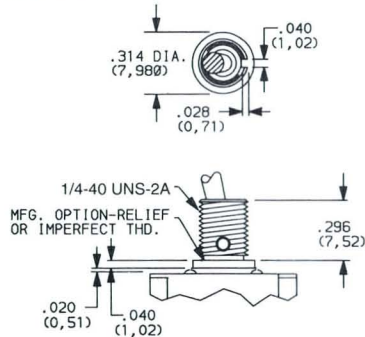
Keyway on right side.



**H3** (STD.)

**H**

**CW** SPLASHPROOF



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

For T, T1 actuators only.

Internal actuator seal standard External bushing seal washer available from: Multi-Flex Seals, Inc., Hackensack, NJ P/N MFS-60064

## BUSHING FINISH

| OPTION CODE | BUSHING FINISH |
|-------------|----------------|
| (NONE)      | NICKEL (std.)  |
| 2           | BLACK OXIDE    |

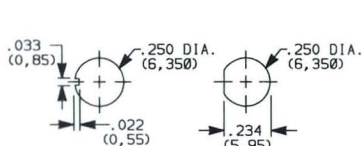
Select bushing finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black bushings or actuators are specified. All hardware is available separately, see catalog section H.

Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

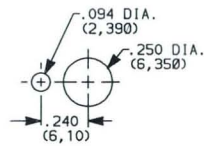
## PANEL MOUNTING

1/4 INCH BUSHINGS

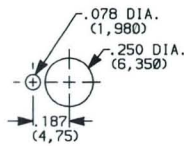
15/32 INCH BUSHINGS



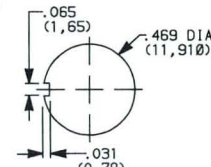
Without locking ring.



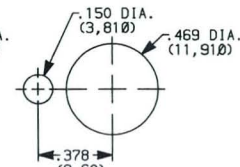
With standard locking ring.



With small locking ring.



Without locking ring.

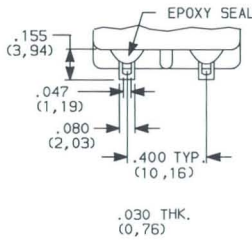


With locking ring.



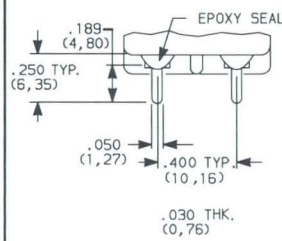
## TERMINATIONS

**Z (STD.)**



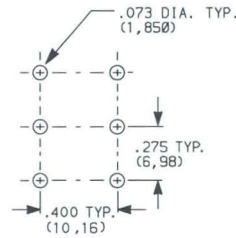
**9201 MODEL ONLY**

**C**

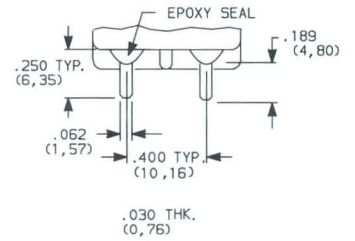


**9201 MODEL ONLY**

**P.C. MOUNTING**



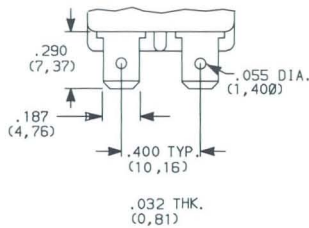
**Z3 QUICK CONNECT**



**9201 MODEL ONLY**

Mating quick connector available; order part no. 53010000.

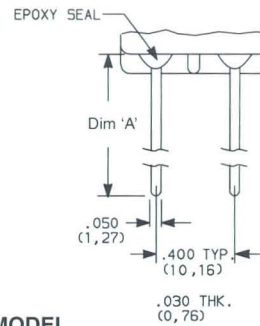
**Z4 QUICK CONNECT**



Only termination available with 9221 model. Must be ordered with D seal option. Mating quick connector available from: Hollingsworth Solderless Terminals, Phoenixville, PA 19460 or AMP Special Industries, Harrisburg, PA 17105

**9201 and 9221**

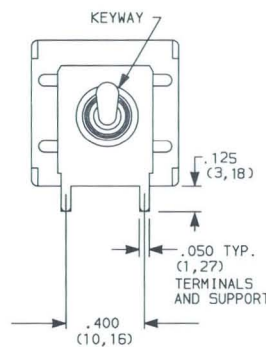
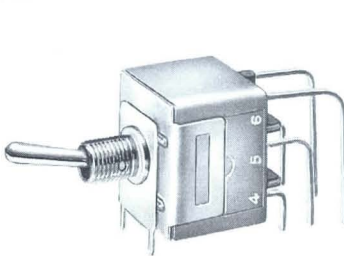
**W-W1-W3-W4-W5 WIRE WRAP**



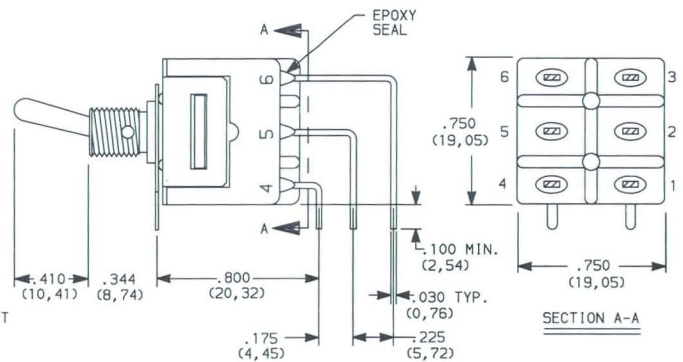
**9201 MODEL ONLY**

| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,48)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

**AV2**

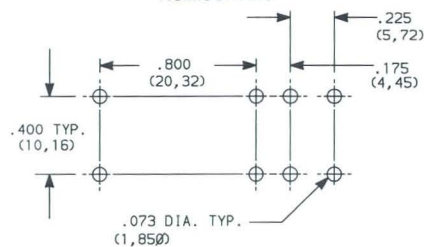


**9201 MODEL ONLY**



TERM. NOS. MOLDED ON SIDE OF CASE

**P.C. MOUNTING**



Term. bend radii and lead-in mfg. option  
Term spacing greater than 3mm at all points  
Actuator shown in pos. 1.

Part No. Shown: 9201SH3AV2QE

## CONTACT MATERIAL

| OPTION CODE | MODEL | CONTACT MATERIAL                    | TERMINAL PLATING             | RATINGS |   |
|-------------|-------|-------------------------------------|------------------------------|---------|---|
| Q           | 9201  | SILVER <sup>1,2</sup>               | SILVER OR TIN <sup>2,5</sup> | POWER   | 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.  |
|             | 9221  | SILVER CADMIUM OXIDE <sup>3,4</sup> | TIN <sup>5</sup>             |         | 10 AMPS @ 125 V AC OR 28 V DC; 5 AMPS @ 250 V AC. |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> END CONTACTS: Coin silver, silver plated.
- <sup>2</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- <sup>3</sup> END CONTACTS: Silver cadmium oxide
- <sup>4</sup> CENTER CONTACT: Copper alloy, silver plated.
- <sup>5</sup> Z4 TERMINALS ONLY: Copper alloy, tin plated.

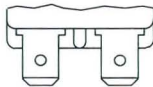


All 9000 Series models meet international dimensional and electrical requirements. See pages B-48 and VIII.

9221 model must be ordered with Z4 terminations and D seal option.

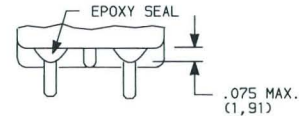
## SEAL

### D NO SEAL



Must be ordered with 9221 model and Z4 terminations. Not available with any other terminations.

### E



Must be ordered with all terminations except Z4. Not available with 9221 model or Z4 terminations.

## HOW TO ORDER

All available 9000 SERIES POWER TOGGLE SWITCH options are listed on page B-47, and are described on pages B-48 thru B-52. Switches with standard options are shown on page B-48. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All 9000 Series models meet international dimensional and electrical requirements. Hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

### CONTACT RATING:

- 9201 MODEL: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC.
- 9221 MODEL: 10 AMPS @ 125 V AC or 28 V DC; 5 AMPS @ 250 V AC.

ELECTRICAL LIFE: 25,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 2,500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

## MATERIALS

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

ACTUATOR: Brass, chrome plated.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

### END CONTACTS:

- 9201 MODEL: Coin silver, silver plated.
- 9221 MODEL: Silver cadmium oxide.

CENTER CONTACTS: Copper alloy, silver plated.

### ALL TERMINALS:

- 9201 MODEL: Copper alloy, silver plated.
- 9221 MODEL: Copper alloy, tin plated.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking ring—Brass, nickel plated.  
Lockwasher—Steel, nickel plated.

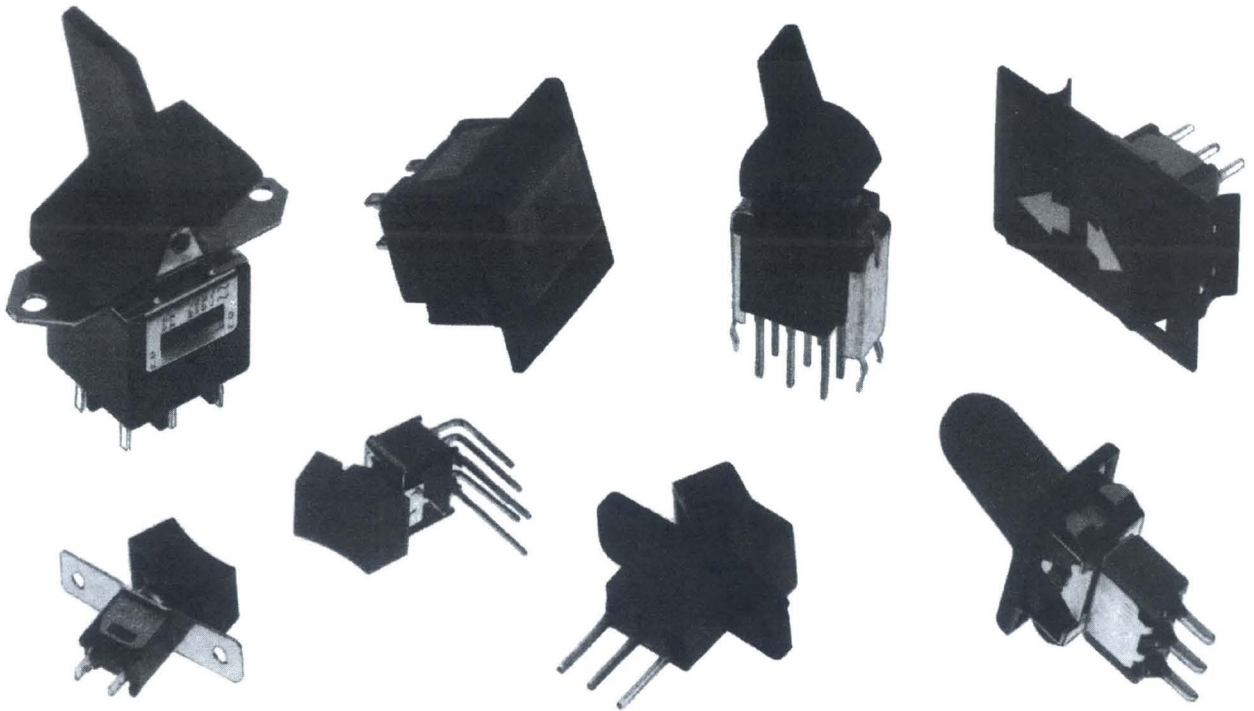
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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## SECTION C

### ROCKER AND LEVER HANDLE SWITCHES

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|             |   |                |
|-------------|---|----------------|
| ET Series   | Sealed Tiny Rocker Switches                         | C-2 thru C-6   |
| T Series    | Tiny Rocker Switches                                | C-7 thru C-11  |
| E Series    | Sealed Anti-Static Rocker and Lever Handle Switches | C-12 thru C-26 |
| 7000 Series | Rocker and Lever Handle Switches                    | C-27 thru C-48 |
| 5000 Series | Illuminated Rocker Switches                         | C-49 thru C-53 |
| 9000 Series | Power Rocker and Lever Handle Switches              | C-54 thru C-60 |

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models available, see page C-3.

**Easy Build-A-Switch:**

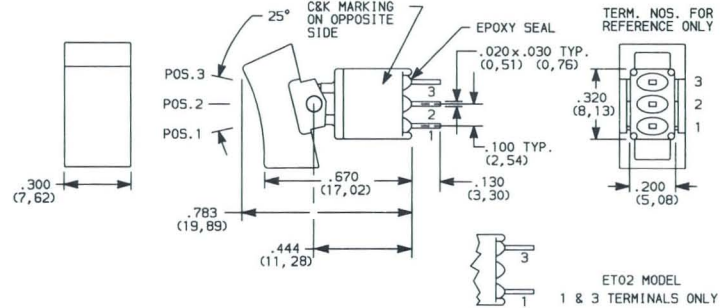
Below is a complete listing of available options for ET SERIES SEALED TINY ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-3; all available options are shown and described on pages C-3 thru C-6. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-6. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

| SWITCH FUNCTION | ACTUATOR | TERMINATIONS | CONTACT MATERIAL | SEAL | ACTUATOR COLOR |
|-----------------|----------|--------------|------------------|------|----------------|
|                 |          |              | Gold             |      | Black          |
| ET01            | J1       | A            | B                | E    | 1              |
| ET02            | J6       | AV           | G                |      | 2              |
| ET03            |          | C            | K                |      | 3              |
| ET05            |          | V3           | L                |      | 4              |
| ET07            |          | V31          | M                |      | 5              |
| ET08            |          | W            | Q                |      | 6              |
| ET21            |          |              |                  |      | 7              |
| ET23            |          |              |                  |      | 8              |
| ET24            |          |              |                  |      | 9              |
| ET25            |          |              |                  |      |                |
| ET27            |          |              |                  |      |                |
| ET28            |          |              |                  |      |                |



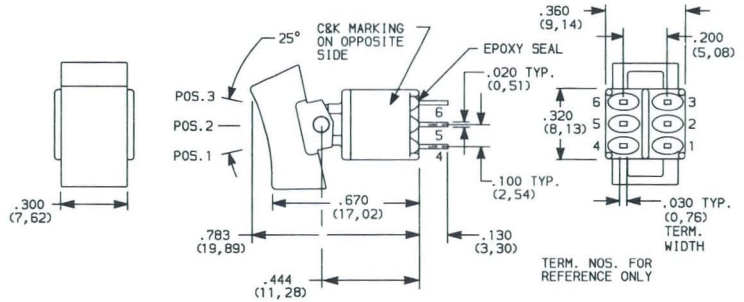
\*Process sealed—withstands soldering and cleaning processes.

SWITCHES WITH STANDARD OPTIONS



SPST and SPDT

Part No. Shown: ET01J1CBE2



DPDT

Part No. Shown: ET21J1CBE2

SWITCH FUNCTION

| NO. POLES | MODEL† NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |         |         | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|---------|---------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2  | POS. 3  |           |
| SP        | ET01       | ON              | NONE   | ON     |                     |         |         |           |
|           | ET03       | ON              | OFF    | ON     | 2-3                 | OPEN    | 2-1     |           |
|           | ET05       | MOM.            | OFF    | MOM.   |                     |         |         |           |
|           | ET07       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | ET08       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | ET02       | OFF             | NONE   | ON     | OPEN                | N/A     | 3-1     |           |
| DP        | ET21       | ON              | NONE   | ON     | 2-3,5-6             | OPEN    | 2-1,5-4 |           |
|           | ET23       | ON              | OFF    | ON     |                     |         |         |           |
|           | ET25       | MOM.            | OFF    | MOM.   |                     |         |         |           |
|           | ET27       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | ET28       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | ET24**     | ON              | ON     | ON     | 2-3,5-6             | 2-3,5-4 | 2-1,5-4 | DPDT      |

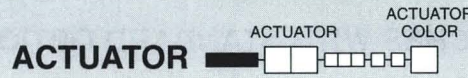
MOM. = MOMENTARY

† All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

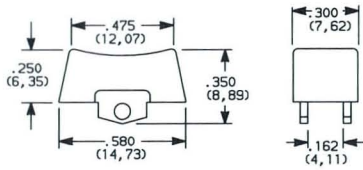
\*\* Wiring for 3-way switch, see page X.



\*Process sealed-withstands soldering and cleaning processes.

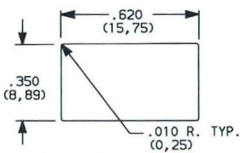


J1

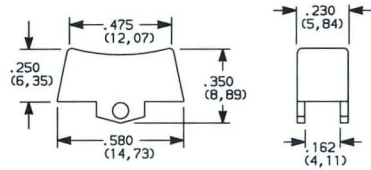


Standard with all models except ET0X with A terminations.

PANEL MOUNTING - J1

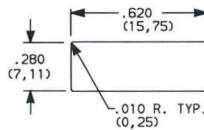


J6



Standard with ET0X models with A terminations.

PANEL MOUNTING - J6



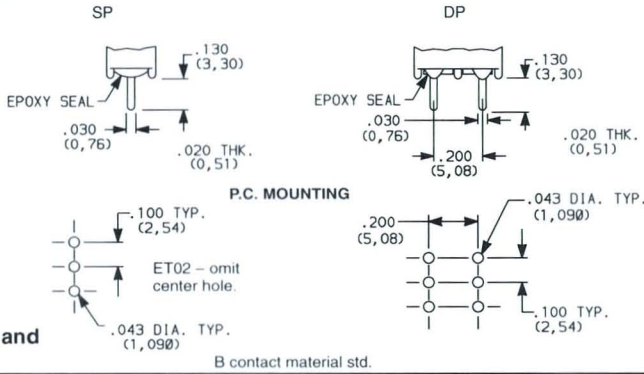
ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

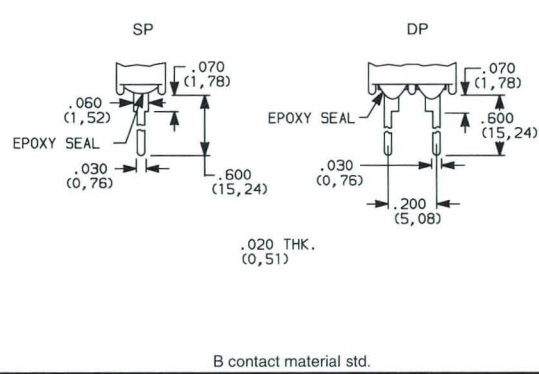
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators are available separately, see catalog section H.

TERMINATIONS

C (STD.)



W WIRE WRAP

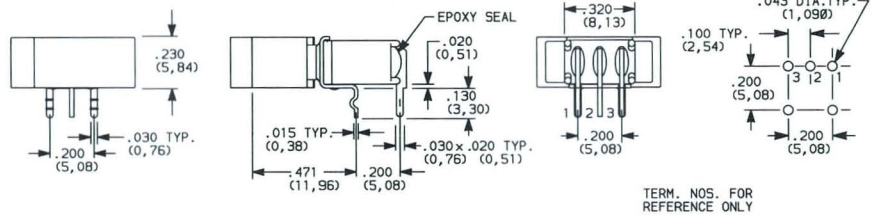


A



SPDT

Actuator shown in pos.1. B contact material std. J6 actuator std. only on ET0X models with A terminations. Not avail. with ET02 model.



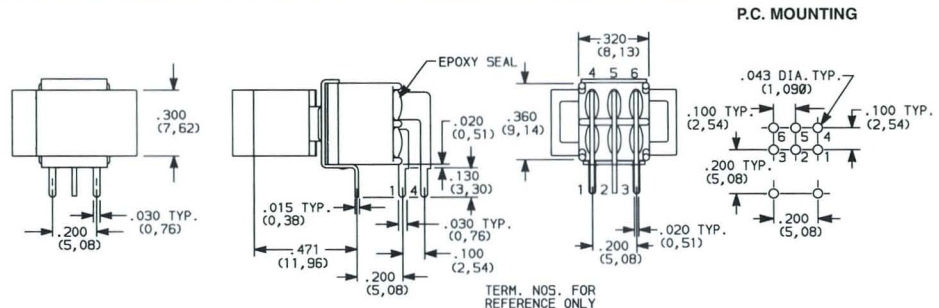
Part No. Shown: ET01J6ABE2

A



DPDT

Actuator shown in pos.1. B contact material std. J1 actuator std. on ET2X models with A terminations.

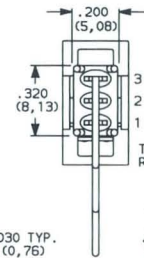
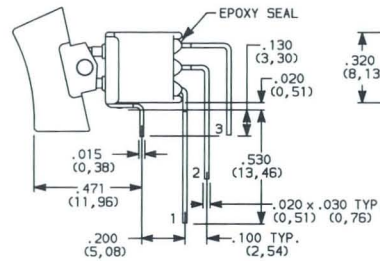
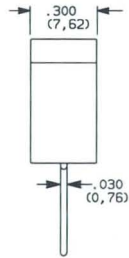


Part No. Shown: ET21J1ABE2

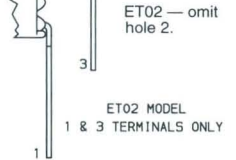
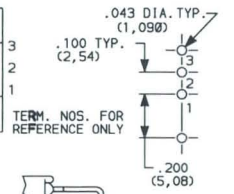
\*Process sealed—withstands soldering and cleaning processes.

**TERMINATIONS**

**AV**



**P.C. MOUNTING**

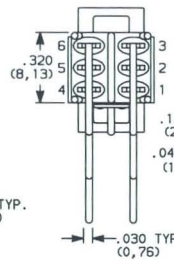
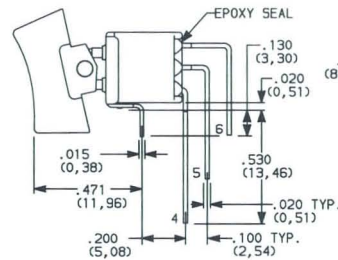
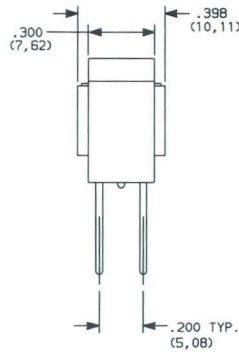


**SPST and SPDT**

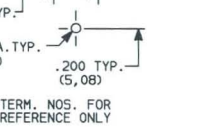
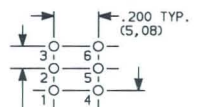
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET01J1AVBE2

**AV**



**P.C. MOUNTING**



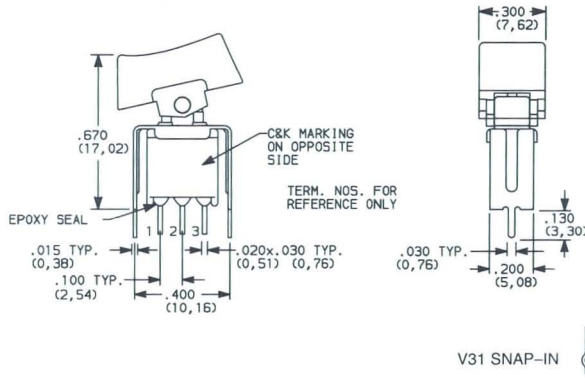
**DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

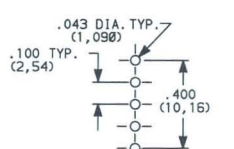
Part No. Shown: ET21J1AVBE2

**V3**

**V31** SNAP-IN **NEW**



**P.C. MOUNTING**



ET02 — omit center hole.

ET02 MODEL 1 & 3 TERMINALS ONLY

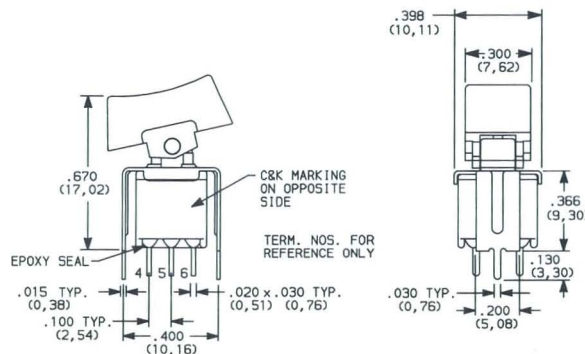
V31 SNAP-IN

**SPST and SPDT**

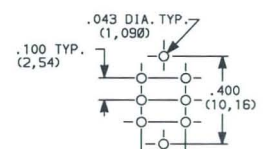
Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET01J1V3BE2

**V3**



**P.C. MOUNTING**



.200 TYP. (5,08)

**DPDT**

Actuator shown in pos.1.  
B contact material std.

Part No. Shown: ET21J1V3BE2



\*Process sealed—withstands soldering and cleaning processes.

CONTACT MATERIAL 

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | ETX1 MODELS: 3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.   |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | ETX1 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>2 AMPS @ 120 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models  with all options when ordered with G, L, M or Q contact material. See pages C-3 and VIII.

B contact material standard with all terminations.


SEAL 

**E** (STD.)



HOW TO ORDER

All available ET SERIES SEALED TINY ROCKER SWITCH options are listed on page C-2, and are described on pages C-3 thru C-6. Switches with standard options are shown on page C-3. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.  models available, see page C-3. Actuators are available separately, see catalog section H.

SPECIFICATIONS

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact material).
- ELECTRICAL LIFE: ETX1 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

MATERIALS

- CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
- ACTUATOR: Nylon, black standard. Internal o-ring seal standard with all actuators.
- SWITCH SUPPORT: Brass, tin plated.
- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).
- TERMINAL SEAL: Epoxy.

NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.





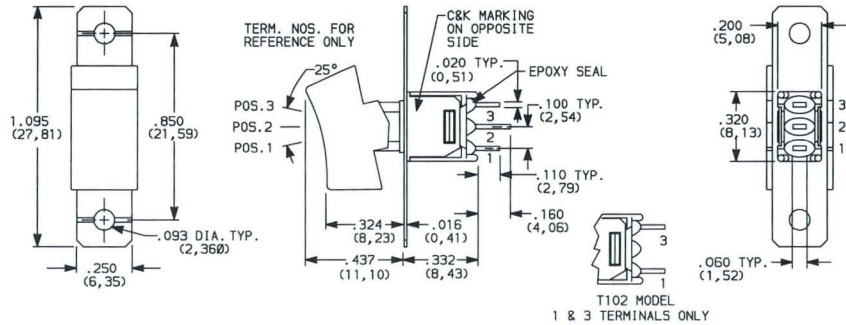
**RU** models available, see page C-8.

**Easy Build-A-Switch:**

Below is a complete listing of available options for T SERIES TINY ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-8; all available options are shown and described on pages C-8 thru C-11. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-11. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

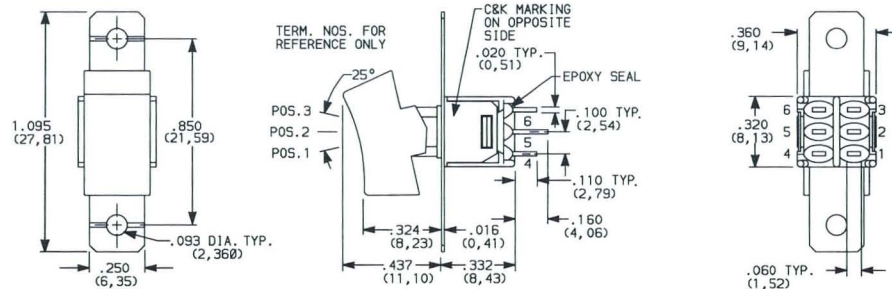
| SWITCH FUNCTION | ACTUATOR | TERMINATIONS | CONTACT MATERIAL | SEAL | ACTUATOR COLOR |
|-----------------|----------|--------------|------------------|------|----------------|
|                 |          |              | Silver           |      | Black          |
|                 |          |              |                  |      |                |
| T101            | J1       | A            | B                | E    | 1              |
| T102            | J6       | AV           | G                |      | 2              |
| T103            |          | C            | K                |      | 3              |
| T105            |          | V3           | L                |      | 4              |
| T107            |          | W            | M                |      | 5              |
| T108            |          | Z            | Q                |      | 6              |
| T201            |          |              |                  |      | 7              |
| T203            |          |              |                  |      | 8              |
| T205            |          |              |                  |      | 9              |
| T207            |          |              |                  |      |                |
| T208            |          |              |                  |      |                |
| T211            |          |              |                  |      |                |

## SWITCHES WITH STANDARD OPTIONS



SPST and SPDT

Part No. Shown: T101J1ZQE2



DPDT

Part No. Shown: T201J1ZQE2

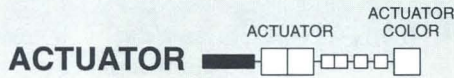
## SWITCH FUNCTION

| NO. POLES | MODEL† NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |         |         | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|---------|---------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2  | POS. 3  |           |
| SP        | T101       | ON              | NONE   | ON     |                     |         |         |           |
|           | T103       | ON              | OFF    | ON     |                     |         |         |           |
|           | T105       | MOM.            | OFF    | MOM.   | 2-3                 | OPEN    | 2-1     |           |
|           | T107       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | T108       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | T102       | OFF             | NONE   | ON     | OPEN                | N/A     | 3-1     |           |
| DP        | T201       | ON              | NONE   | ON     |                     |         |         |           |
|           | T203       | ON              | OFF    | ON     |                     |         |         |           |
|           | T205       | MOM.            | OFF    | MOM.   | 2-3,5-6             | OPEN    | 2-1,5-4 |           |
|           | T207       | ON              | OFF    | MOM.   |                     |         |         |           |
|           | T208       | ON              | NONE   | MOM.   |                     |         |         |           |
|           | T211**     | ON              | ON     | ON     | 2-3,5-6             | 2-3,5-4 | 2-1,5-4 |           |

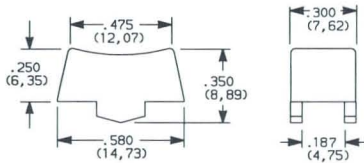
MOM. = MOMENTARY

† All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

\*\* Wiring for 3-way switch, see page X.

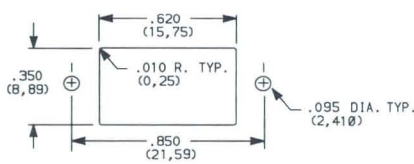


## J1

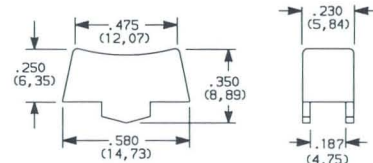


Std. with all models except T10X with A terminations.

### PANEL MOUNTING—J1

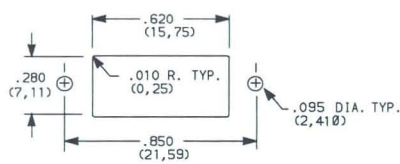


## J6



Std. on all T10X models with A terminations.

### PANEL MOUNTING—J6



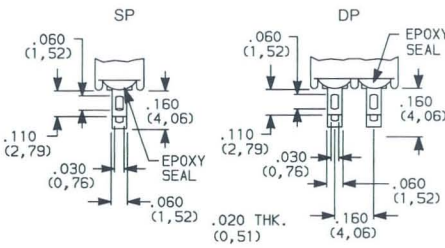
## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory.

## TERMINATIONS

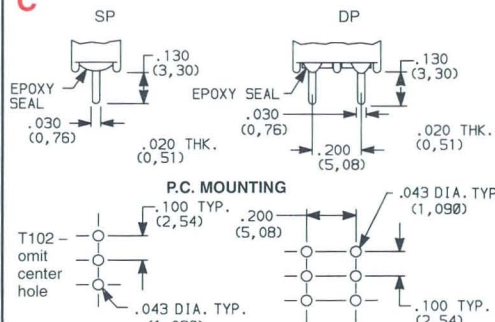
### Z (STD.)



#### SP and DP

Q contact material std.  
Not available with K, L, or M contact material.

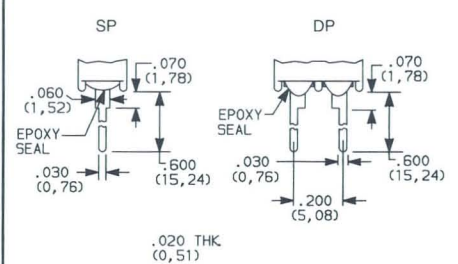
### C



#### SP and DP

Q contact material std.

### W WIRE WRAP



#### SP and DP

B contact material std.

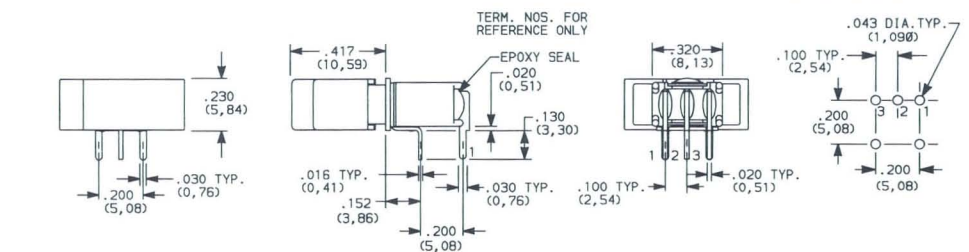
Models with Z, C or W terminations supplied with panel mounting bracket standard, as shown on page C-8.

## A



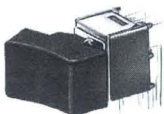
### SPDT

Actuator shown in pos. 1.  
B contact material std.  
J6 actuator std. only on T10X models with A terminations.  
Not avail. with T102 model.



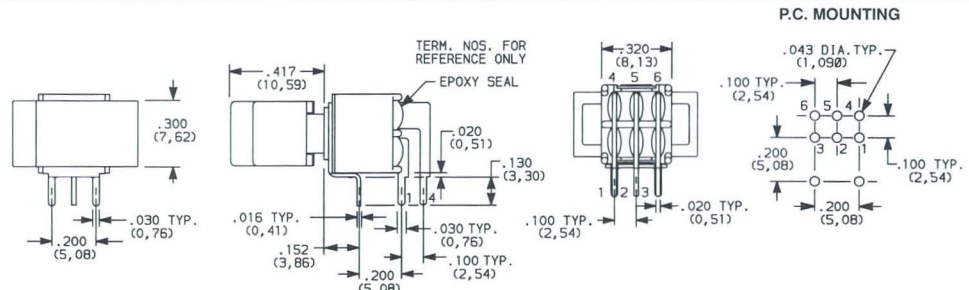
Part No. Shown: T101J6ABE2

## A



### DPDT

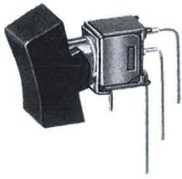
Actuator shown in pos. 1.  
B contact material std.  
J1 actuator std. on T2XX models with A terminations.



Part No. Shown: T201J1ABE2

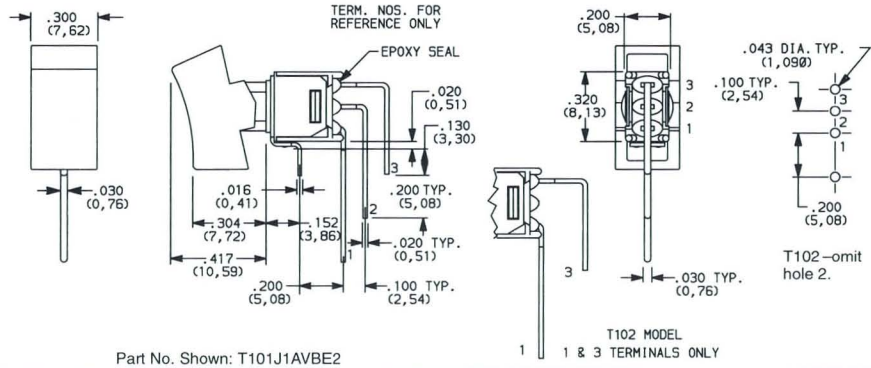
**TERMINATIONS** 

**AV**



**SPST and DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

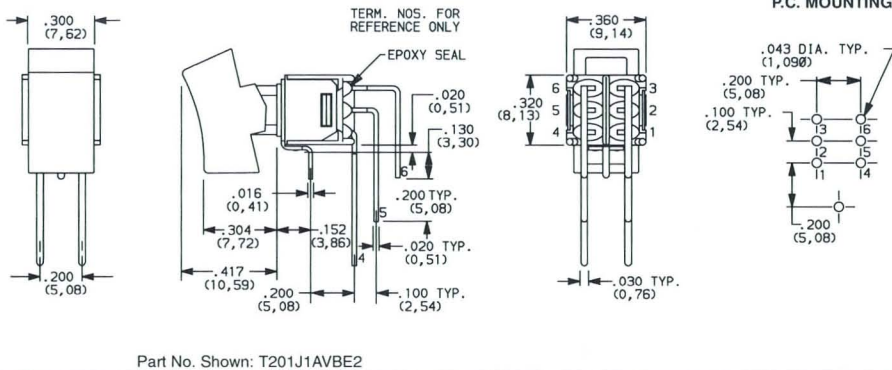


**AV**

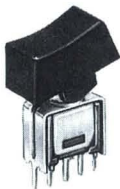


**DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.

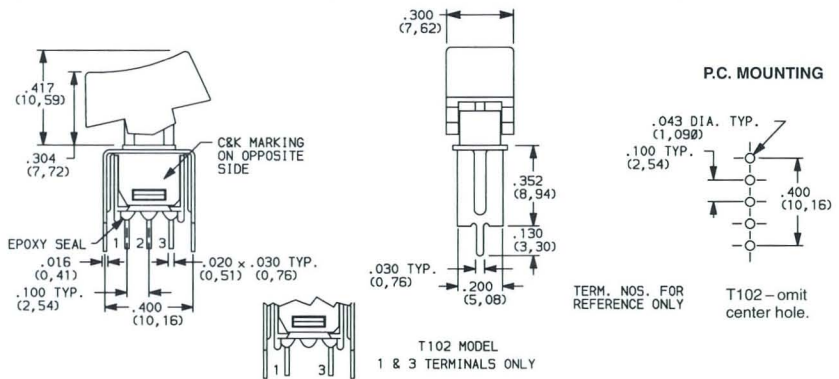


**V3**



**SPST and DPDT**

Actuator shown in pos.1.  
B contact material std.

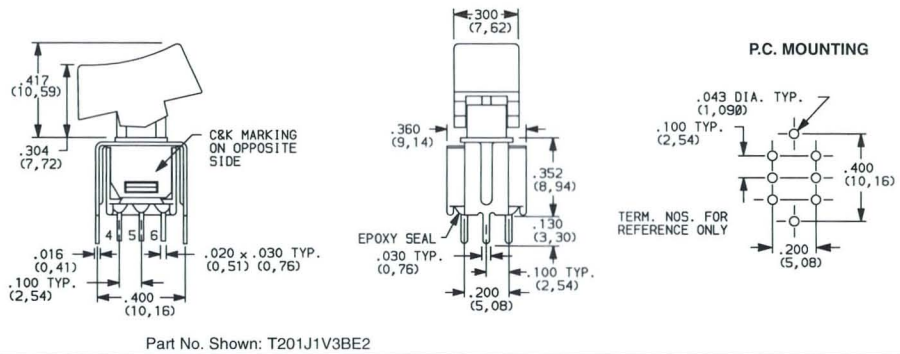


**V3**



**DPDT**

Actuator shown in pos.1.  
B contact material std.



## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | TX01 MODELS: 3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.   |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | TX01 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>3 AMPS @ 120 V AC OR 28 V DC.<br>ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>2 AMPS @ 120 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models  with all options when ordered with G, L, M or Q contact material. See pages C-8 and VIII.


B contact material standard with A, AV, V3, W terminations.  
Q contact material standard with Z, C terminations.

## SEAL



## HOW TO ORDER

All available T SERIES TINY ROCKER SWITCH options are listed on page C-7, and are described on pages C-8 thru C-11. Switches with standard options are shown on page C-8. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods.  models available, see page C-8.

Hardware: two each—mounting screws, nuts, lockwashers and standoffs for 1/8 in. thk. panel are supplied standard on switches with panel mounting bracket. Hardware for other panel thicknesses also available. Hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

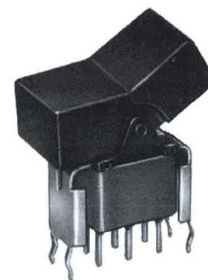
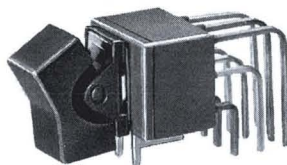
- CONTACT RATING: TX01 MODELS: 3 AMPS @ 120 V AC or 28 V DC. All other models: 2 AMPS @ 120 V AC or 28 V DC (Q contact material).
- ELECTRICAL LIFE: TX01 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

## MATERIALS

- CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP), (UL 94V-0).
- ACTUATOR: Nylon, black standard.
- BUSHING: Brass, nickel plated.
- HOUSING: Stainless steel.
- SWITCH SUPPORT: Brass, tin plated.
- MOUNTING BRACKET: Stainless steel.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.
- HARDWARE: Nut, Screw, & Lockwasher—Stainless steel.  
Standoff—Nylon standard Aluminum available, consult factory.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

\*Process sealed—withstands soldering and cleaning processes.



models available, see page C-14.

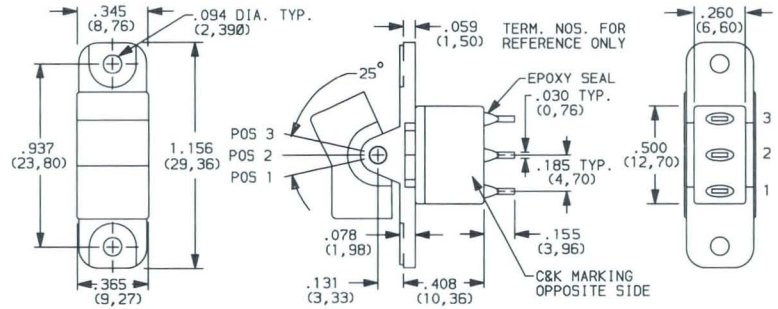
**Easy Build-A-Switch:**

Below is a complete listing of available options for E SERIES SEALED ANTI-STATIC ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-13; all available options are shown and described on pages C-14 thru C-26. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-26. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

| SWITCH FUNCTION | ACTUATOR        | TERMINATIONS            | CONTACT MATERIAL | SEAL  | ACTUATOR COLOR | FRAME COLOR |        |
|-----------------|-----------------|-------------------------|------------------|-------|----------------|-------------|--------|
|                 |                 |                         | Silver           | Epoxy | Black          | Black       |        |
| [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] | [ ]              | [ ]   | [ ]            | [ ]         |        |
| E101            | J1              | A                       | V61              | B     | E              | 1           | (NONE) |
| E103            | J2              | A3                      | V71              | G     |                | 1           |        |
| E105            | J3              | AV2                     | V81              | K     |                | 2           |        |
| E107            | J4              | AV3                     | V91              | L     |                | 3           | C      |
| E108            | J5              | AV5                     | W                | M     |                | 4           | S      |
| E201            | J11             | AW                      | W1               | Q     |                | 5           |        |
| E203            | J21             | AW1                     | W3               |       |                | 6           |        |
| E205            | J50             | AW3                     | W4               |       |                | 7           |        |
| E207            | J54             | AW4                     | W5               |       |                | 8           |        |
| E208            | J60             | AW5                     | Z                |       |                | 9           |        |
| E211            | J64             | C                       | Z3               |       |                |             |        |
| E213            | J90             | V2                      |                  |       |                |             |        |
| E215            | J94             | V3                      |                  |       |                |             |        |
| E301            |                 | V4                      |                  |       |                |             |        |
| E303            |                 | V5                      |                  |       |                |             |        |
| E305            |                 | V6                      |                  |       |                |             |        |
| E307            |                 | V7                      |                  |       |                |             |        |
| E308            |                 | V8                      |                  |       |                |             |        |
|                 |                 | V9                      |                  |       |                |             |        |
|                 |                 | V21                     |                  |       |                |             |        |
|                 |                 | V31                     |                  |       |                |             |        |
|                 |                 | V41                     |                  |       |                |             |        |
|                 |                 | V51                     |                  |       |                |             |        |
|                 |                 | V54                     |                  |       |                |             |        |
|                 |                 | V55                     |                  |       |                |             |        |

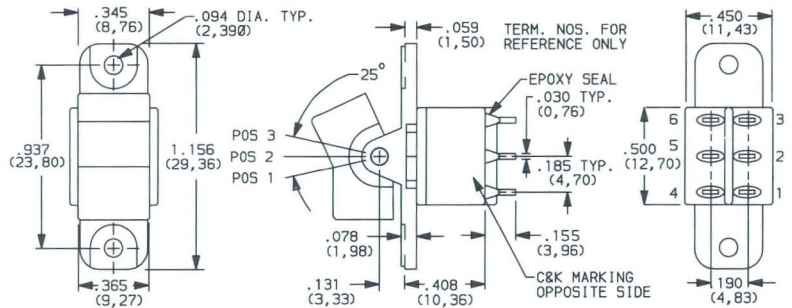
\*Process sealed—withstands soldering and cleaning processes.

**SWITCHES WITH STANDARD OPTIONS**



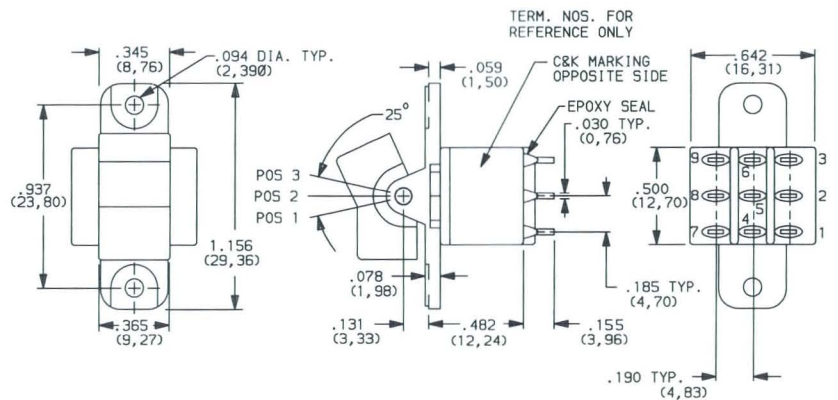
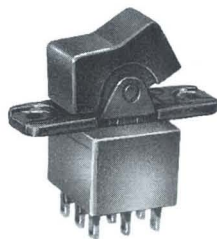
SPDT

Part No. Shown: E101J1ZBE2



DPDT


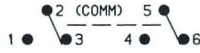
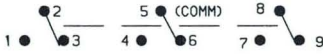
Part No. Shown: E201J1ZBE2



3PDT

Part No. Shown: E301J1ZBE2

**SWITCH FUNCTION** 

| NO. POLES     | MODEL† NO.    | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |             | SCHEMATIC   |
|---------------|---------------|-----------------|--------|--------|---------------------|--------|-------------|---|
|               |               | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3      |   |
| SP            | <b>E101</b>   | ON              | NONE   | ON     | 2-3                 | OPEN   | 2-1         | <br>SPDT   |
|               | <b>E103</b>   | ON              | OFF    | ON     |                     |        |             |   |
|               | <b>E105</b>   | MOM.            | OFF    | MOM.   |                     |        |             |   |
|               | <b>E107</b>   | ON              | OFF    | MOM.   |                     |        |             |   |
|               | <b>E108</b>   | ON              | NONE   | MOM.   |                     |        |             |   |
| DP            | <b>E201</b>   | ON              | NONE   | ON     | 2-3,5-6             | OPEN   | 2-1,5-4     | <br>DPDT   |
|               | <b>E203</b>   | ON              | OFF    | ON     |                     |        |             |   |
|               | <b>E205</b>   | MOM.            | OFF    | MOM.   |                     |        |             |   |
|               | <b>E207</b>   | ON              | OFF    | MOM.   |                     |        |             |   |
|               | <b>E208</b>   | ON              | NONE   | MOM.   |                     |        |             |   |
|               | <b>E211**</b> | ON              | ON     | ON     |                     |        |             |   |
|               | <b>E213**</b> | ON              | ON     | MOM.   |                     |        |             |   |
| <b>E215**</b> | MOM.          | ON              | MOM.   |        |                     |        |             |   |
| 3P            | <b>E301</b>   | ON              | NONE   | ON     | 2-3,5-6,8-9         | OPEN   | 2-1,5-4,8-7 | <br>3PDT |
|               | <b>E303</b>   | ON              | OFF    | ON     |                     |        |             |   |
|               | <b>E305</b>   | MOM.            | OFF    | MOM.   |                     |        |             |   |
|               | <b>E307</b>   | ON              | OFF    | MOM.   |                     |        |             |   |
|               | <b>E308</b>   | ON              | NONE   | MOM.   |                     |        |             |   |

MOM. = MOMENTARY

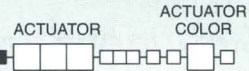
† All models   with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

\*\* Wiring for 3-way switch, see page X.

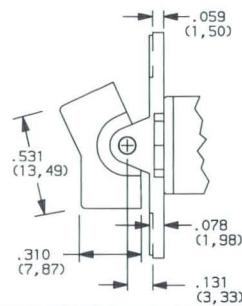
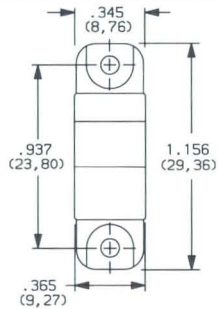


\*Process sealed—withstands soldering and cleaning processes.

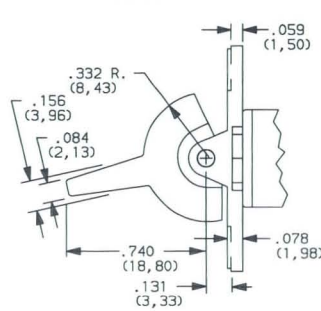
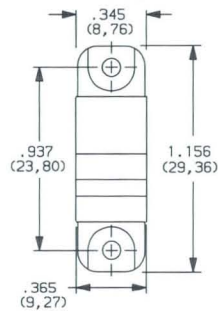
## ACTUATORS—PANEL REAR MOUNT



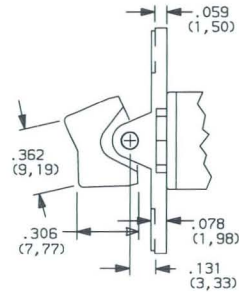
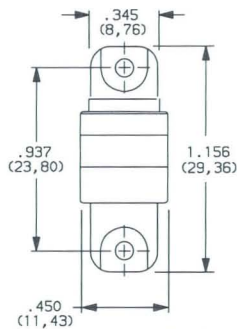
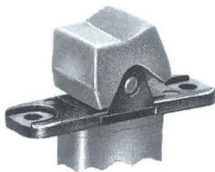
**J1 (STD.)**



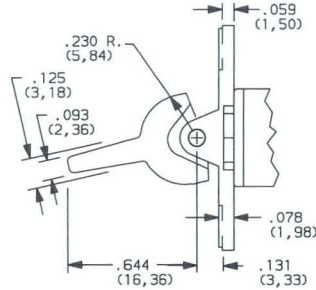
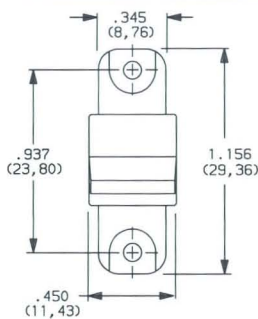
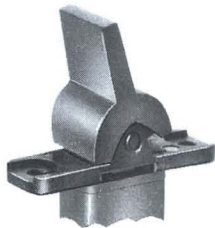
**J2**



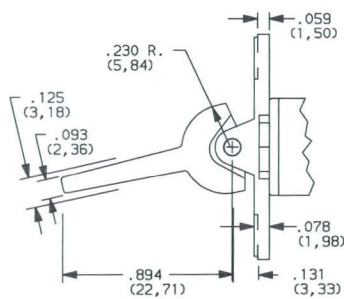
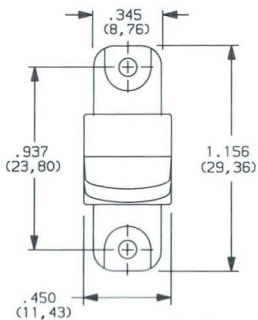
**J54**



**J64**



**J94**



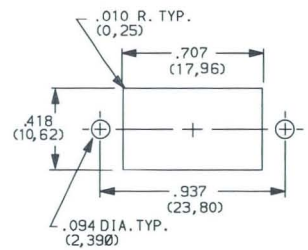
## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

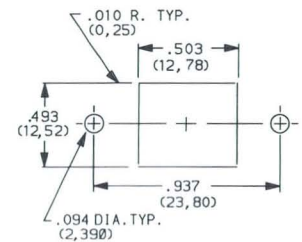
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-26. Internal o-ring actuator seal std. Actuators and hardware are available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

### J1 - J2 PANEL MOUNTING



### J54 - J64 - J94 PANEL MOUNTING



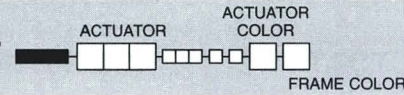


E Series

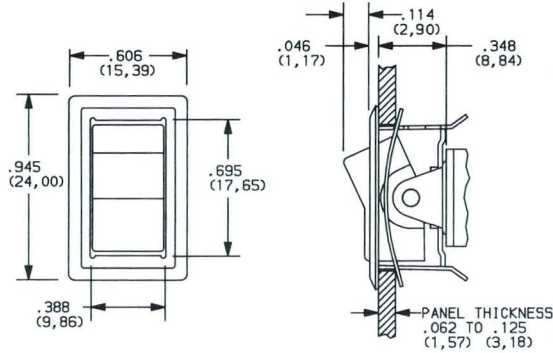
# Sealed\* Anti-Static Rocker and Lever Handle Switches

\*Process sealed—withstands soldering and cleaning processes.

## ACTUATORS—REAR MOUNT

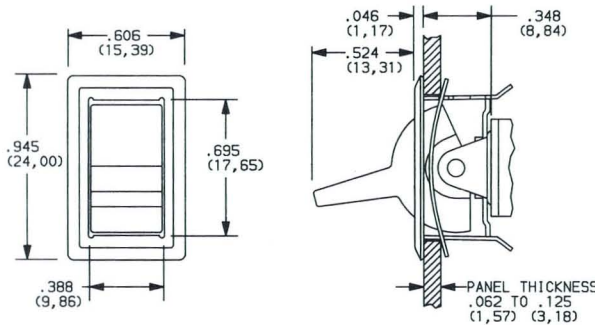


J11



NOTE: This option has reduced anti-static capability.

J21



NOTE: This option has reduced anti-static capability.

## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

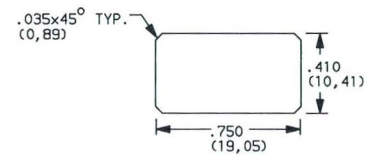
## FRAME COLOR

| OPTION CODE | FRAME COLOR   |
|-------------|---------------|
| 1           | WHITE         |
| 2           | BLACK (std.)  |
| C           | BRIGHT CHROME |
| S           | SATIN CHROME  |

Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Frames are available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

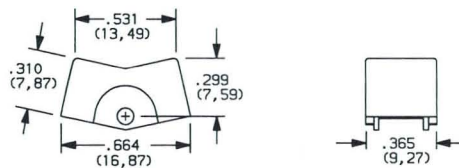
### J11 - J21 PANEL MOUNTING



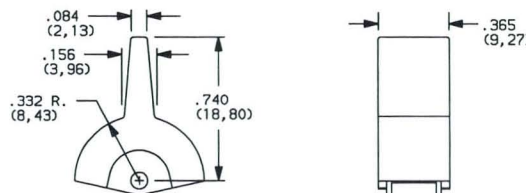
## ACTUATORS—P.C. MOUNT



J1



J2



## ACTUATOR COLOR

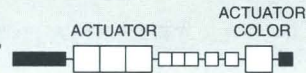
| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators available separately, see catalog section H.

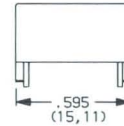
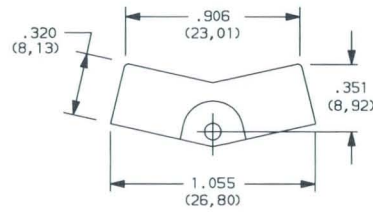
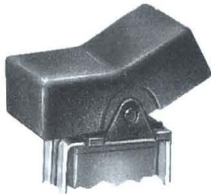
Available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations.

\*Process sealed—withstands soldering and cleaning processes.

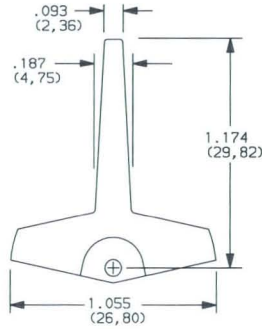
**ACTUATORS—P.C. MOUNT**



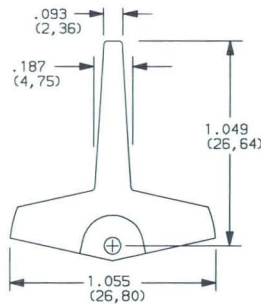
**J3**



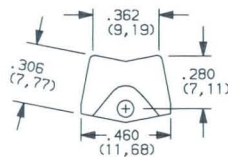
**J4**



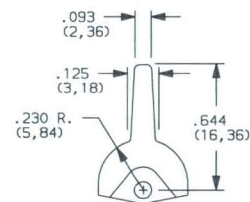
**J5**



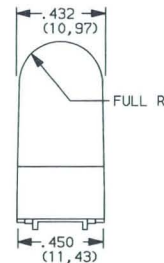
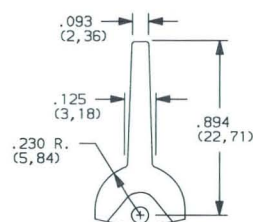
**J50**



**J60**



**J90**



**ACTUATOR COLOR**

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators are available separately, see catalog section H.

J3, J4, J5 actuators available with AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between actuator and P.C. board, and care must be exercised to accommodate this condition.

J50, J60, J90 actuators available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations.



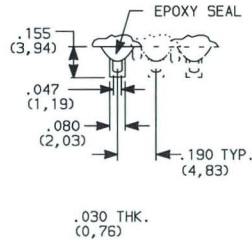
E Series

# Sealed\* Anti-Static Rocker and Lever Handle Switches

\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

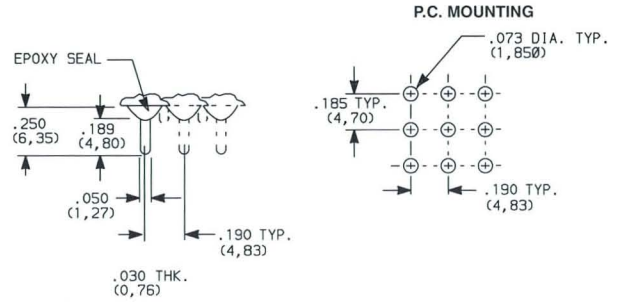
**Z** (STD.)



B contact material std.  
Available actuators, see pages C-15 and C-16.  
Not avail. with K, L, or M contact material.

SPDT thru  
3PDT

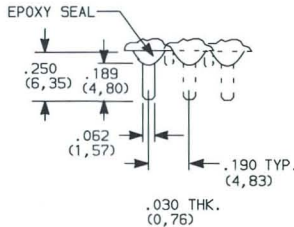
**C**



B contact material std.  
Available actuators, see pages C-15 and C-16.

SPDT thru  
3PDT

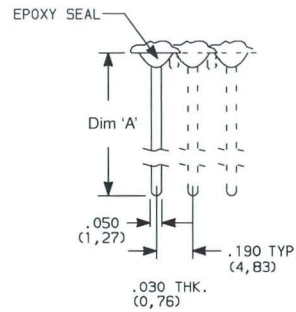
**Z3** QUICK CONNECT



B contact material std.  
Available actuators, see pages C-15 and C-16.  
Mating quick connect available; order P/N 530100000.

SPDT thru  
3PDT

**W-W1-W3-W4-W5** WIRE WRAP

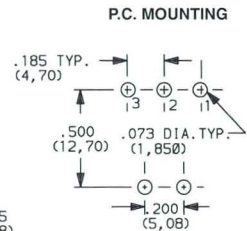
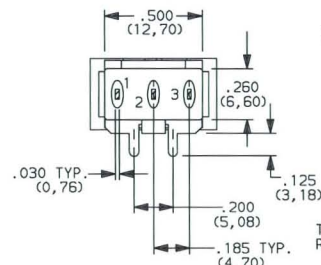
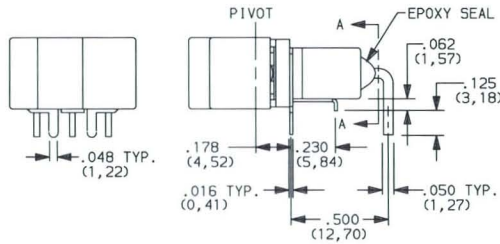


| Option    | DIM 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,48)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

B contact material std.  
Available actuators, see pages C-15 and C-16.

SPDT thru  
3PDT

**A**



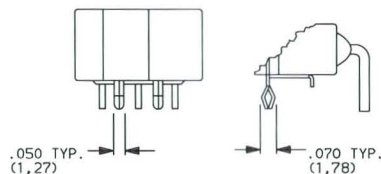
TERM. NOS. FOR  
REFERENCE ONLY

SECTION A-A

Part No. Shown: E101J1ABE2

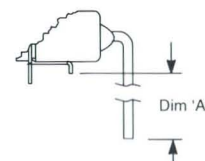


**A3** SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW3-AW4-AW5** EXTENDED



| Option     | DIM 'A'     |
|------------|-------------|
| <b>AW</b>  | .44 (11,2)  |
| <b>AW1</b> | .66 (16,8)  |
| <b>AW3</b> | .14 (3,6)   |
| <b>AW4</b> | .77 (19,6)  |
| <b>AW5</b> | 1.02 (25,9) |

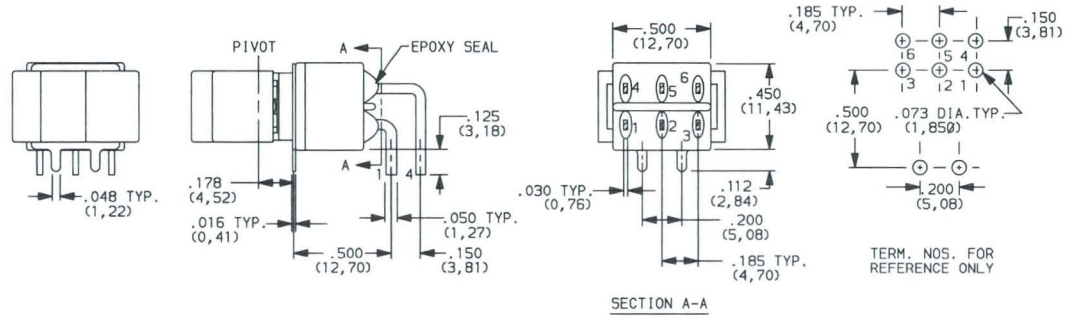
SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Note: P.C. pattern must clear switch support leg.  
Available actuators, see pages C-16 and C-17.

\*Process sealed—withstands soldering and cleaning processes.

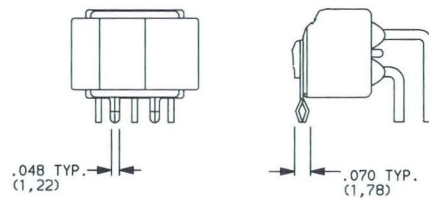
**TERMINATIONS**

**A**



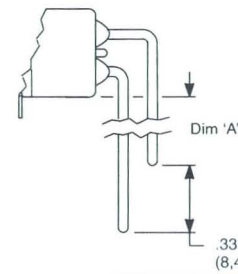
Part No. Shown: E201J1ABE2

**A3 SNAP-IN**



SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW4-AW5 EXTENDED**



| Option     | DIM 'A'    |
|------------|------------|
| <b>AW</b>  | .21 (5,3)  |
| <b>AW1</b> | .42 (10,7) |
| <b>AW4</b> | .52 (13,2) |
| <b>AW5</b> | .76 (19,3) |

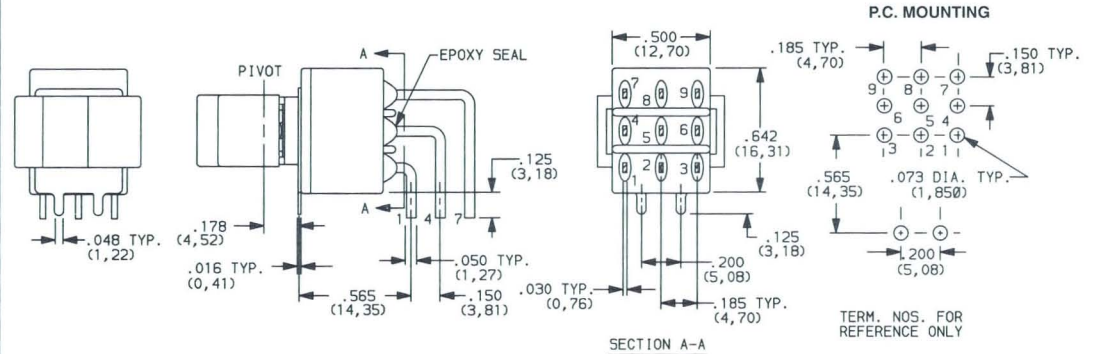


**DPDT**

**A**

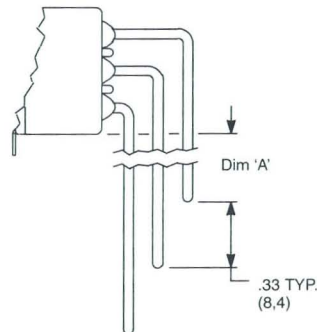
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

**A**

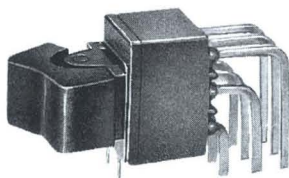


Part No. Shown: E301J1ABE2

**AW4-AW5 EXTENDED**



| Option     | DIM 'A'    |
|------------|------------|
| <b>AW4</b> | .18 (4,6)  |
| <b>AW5</b> | .42 (10,7) |



**3PDT**

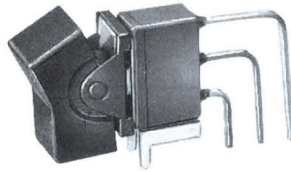
**A**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.



\*Process sealed-withstands soldering and cleaning processes.

## TERMINATIONS

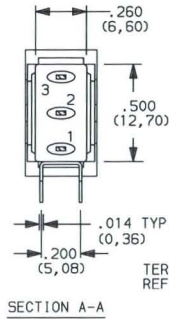
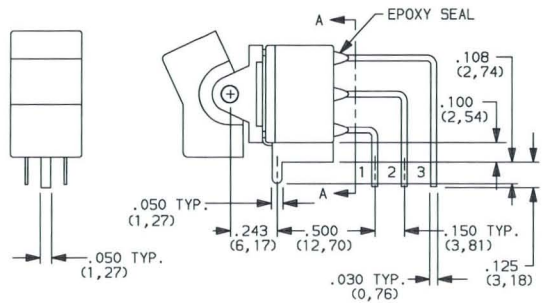


AV2

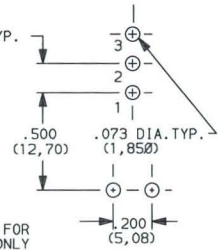
SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

### AV2



#### P.C. MOUNTING

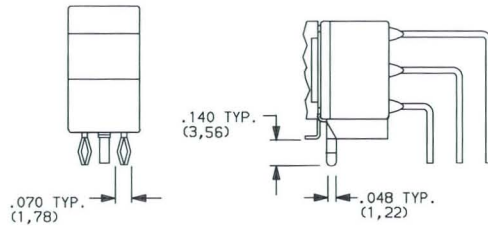


TERM. NOS. FOR REFERENCE ONLY

SECTION A-A

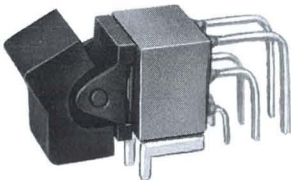
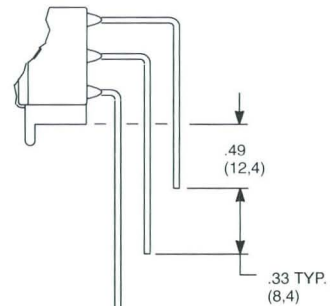
Part No. Shown: E101J1AV2BE2

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV5 EXTENDED

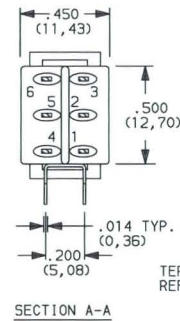
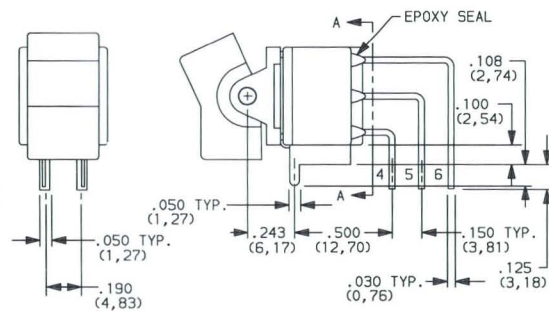


AV2

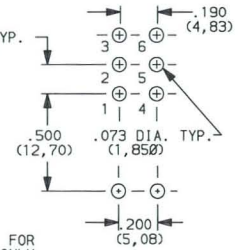
DPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

### AV2



#### P.C. MOUNTING

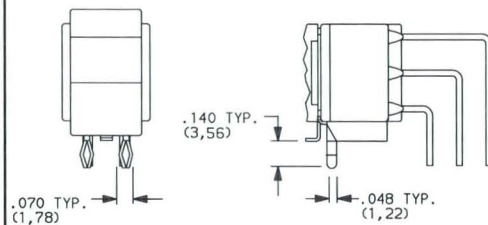


TERM. NOS. FOR REFERENCE ONLY

SECTION A-A

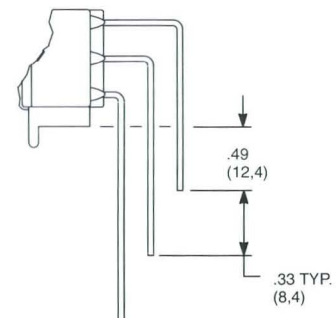
Part No. Shown: E201J1AV2BE2

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV5 EXTENDED

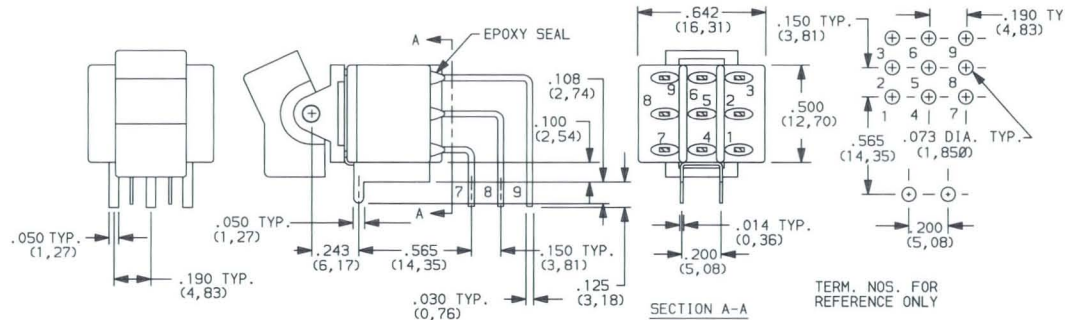


\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

### AV2

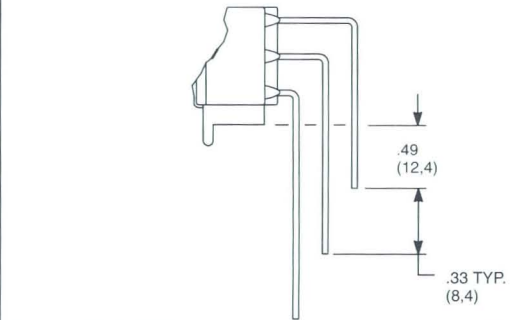
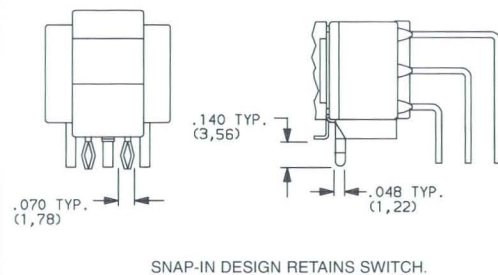
### P.C. MOUNTING



Part No. Shown: E301J1AV2BE2

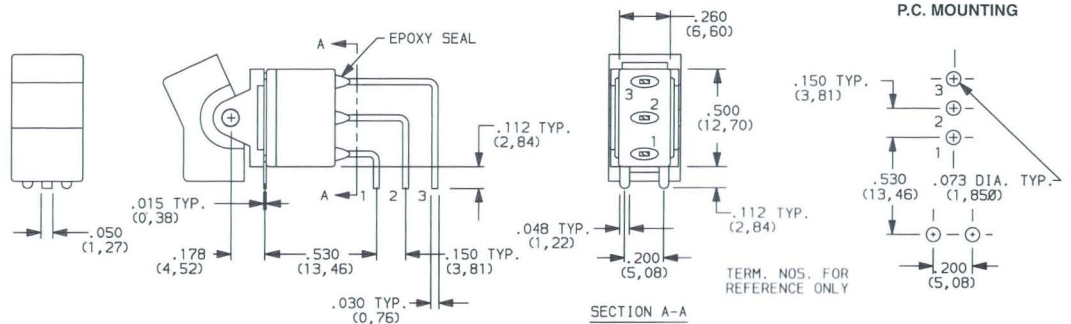
### AV3 SNAP-IN

### AV5 EXTENDED



### V5

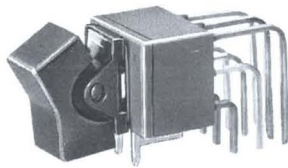
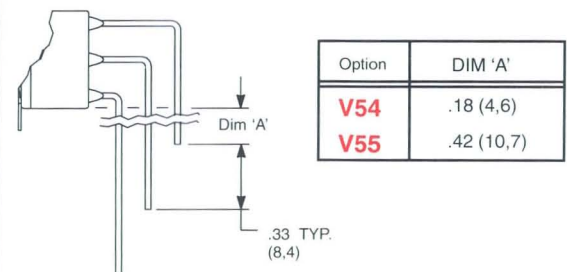
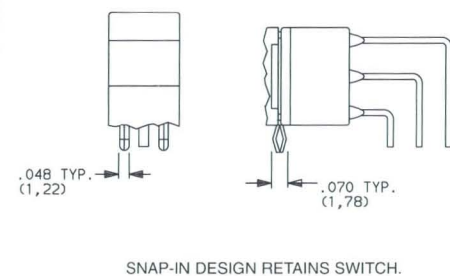
### P.C. MOUNTING



Part No. Shown: E101J1V5BE2

### V51 SNAP-IN

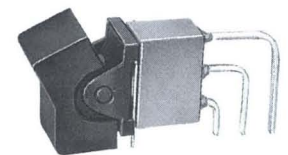
### V54-V55 EXTENDED



AV2

3PDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.



V5

SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.



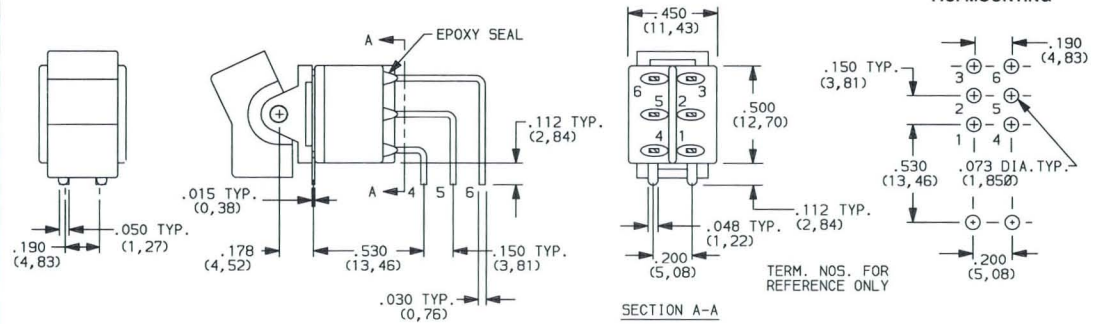
E Series

# Sealed\* Anti-Static Rocker and Lever Handle Switches

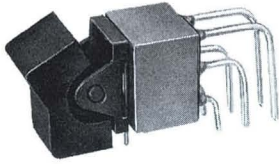
\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

### V5



Part No. Shown: E201J1V5BE2

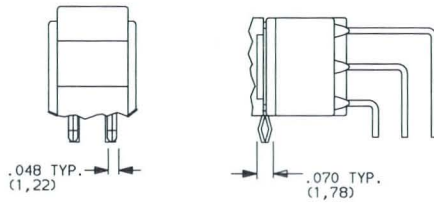


V5

DPDT

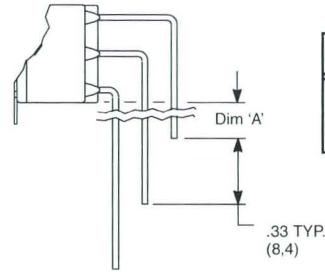
Term. bend radi and lead-in mfg. option.  
Actuator shown in pos. 1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

### V51 SNAP-IN



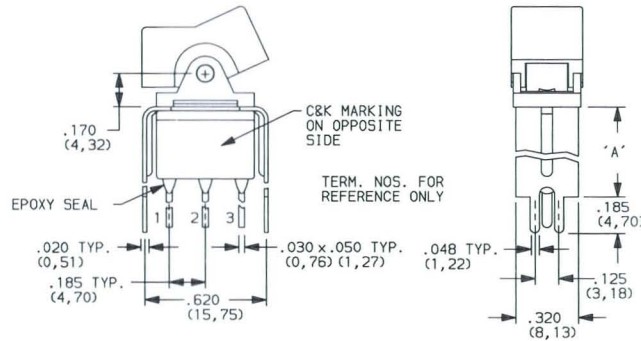
SNAP-IN DESIGN RETAINS SWITCH.

### V54-V55 EXTENDED



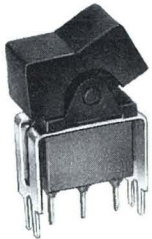
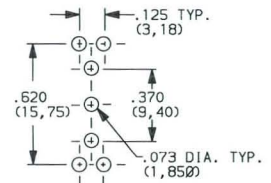
| Option | DIM 'A'    |
|--------|------------|
| V54    | .18 (4,6)  |
| V55    | .42 (10,7) |

### V3-V4-V9



Part No. Shown: E101J1V\_\_BE2

### P.C. MOUNTING

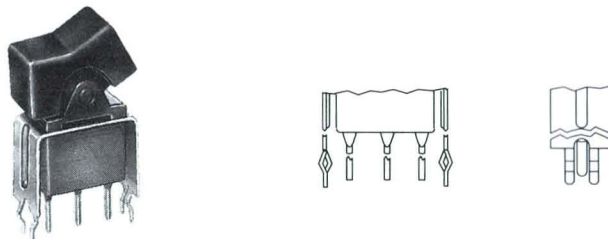


V3

SPDT

Actuator shown in pos. 1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

### V31-V41-V91 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

| Option  | DIM 'A'       |
|---------|---------------|
| V3, V31 | .460 (11,68)  |
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

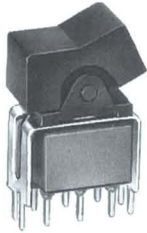
V31



\*Process sealed—withstands soldering and cleaning processes.

**TERMINATIONS**

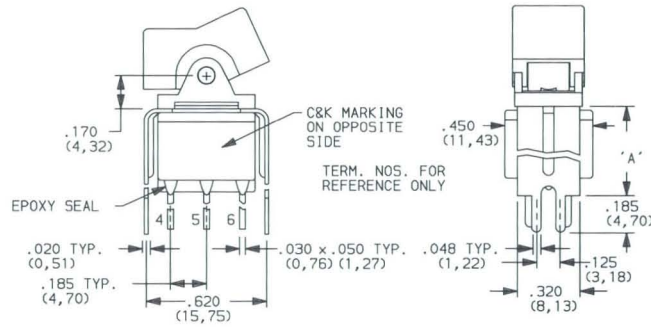
**V3-V4-V9**



**V3**

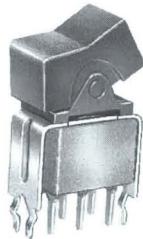
**DPDT**

Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

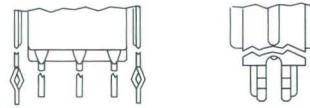


Part No. Shown: E201J1V\_BE2

**V31-V41-V91** SNAP-IN

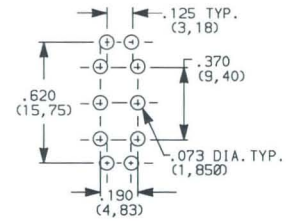


**V31**



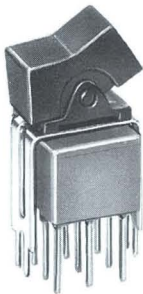
SNAP-IN DESIGN RETAINS SWITCH.

**P.C. MOUNTING**



| Option         | DIM 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

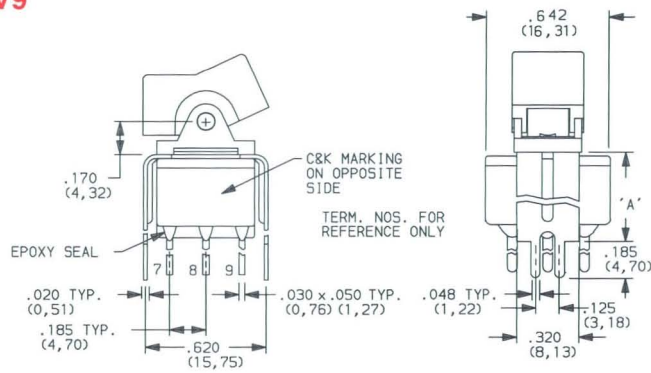
**V4-V9**



**V4**

**3PDT**

Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16  
and C-17.

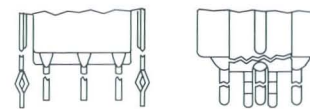


Part No. Shown: E301J1V\_BE2

**V41-V91** SNAP-IN

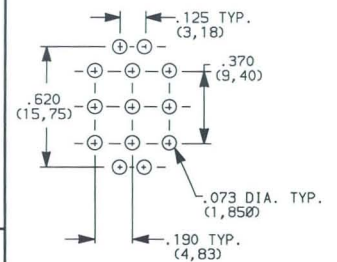


**V41**



SNAP-IN DESIGN RETAINS SWITCH.

**P.C. MOUNTING**



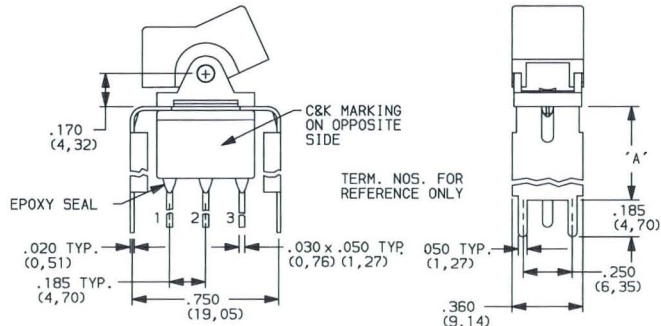
| Option         | DIM 'A'       |
|----------------|---------------|
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |



\*Process sealed—withstands soldering and cleaning processes.

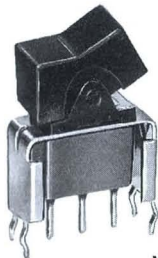
## TERMINATIONS

### V2-V6-V7-V8

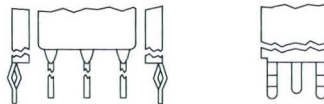


Part No. Shown: E101J1V\_\_BE2

### V21-V61-V71-V81 SNAP-IN

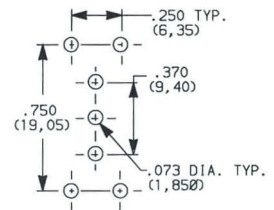


V61

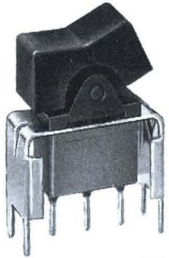


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option         | DIM 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

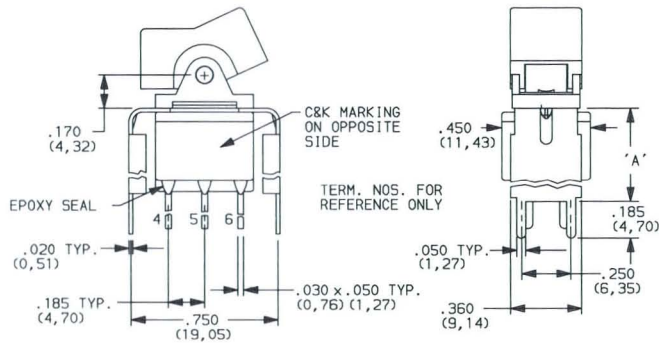


V6

SPDT

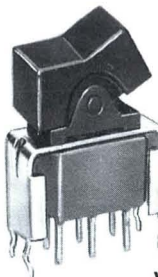
Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16 and C-17.

### V2-V6-V7-V8

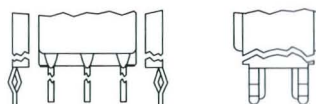


Part No. Shown: E201J1V\_\_BE2

### V21-V61-V71-V81 SNAP-IN

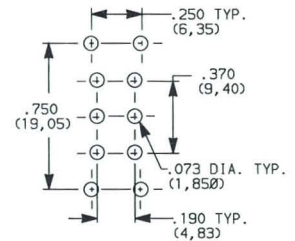


V61

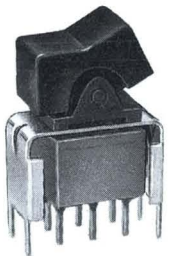


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option         | DIM 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |



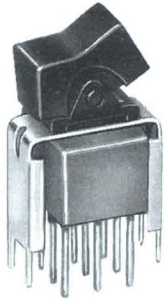
V6

DPDT

Actuator shown in pos.1.  
B contact material std.  
Available actuators, see pages C-16 and C-17.

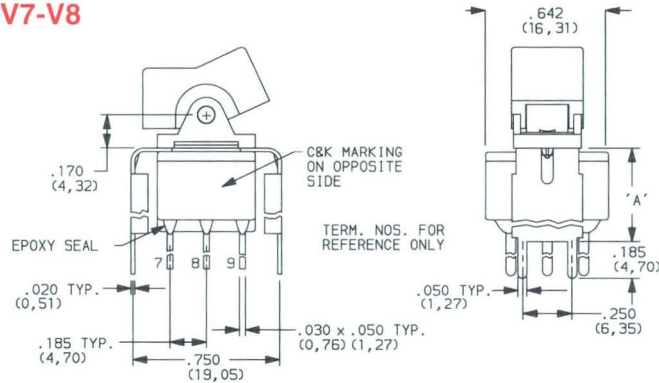
\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS



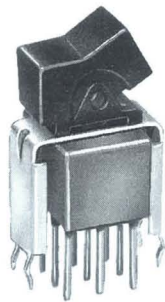
V7

### V2-V7-V8

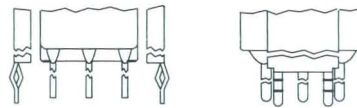


Part No. Shown: E301J1V\_BE2

### V21-V71-V81 SNAP-IN

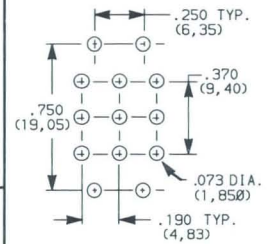


V71



SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option  | DIM 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

### 3PDT

Actuator shown in pos. 1.  
B contact material std.  
Available actuators, see pages C-16 and C-17.

## CONTACT MATERIAL

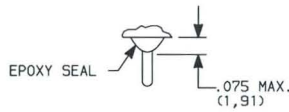
| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| B<br>K      | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
|             |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| Q<br>M      | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.<br>E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.  |
|             |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| G<br>L      | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | E1XX AND E2XX MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.<br>E3XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC. |
|             |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

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

All models with all options when ordered with G, L, M or Q contact material.  
See pages B-20 and VIII.

B contact material standard with all terminations.  
K, L, M contact materials not available with Z terminations.

**SEAL** **E** (STD.)

## HOW TO ORDER

All available E SERIES SEALED ANTI-STATIC ROCKER AND LEVER HANDLE SWITCH options are listed on page B-18, and are described on pages C-13 thru C-26. Switches with standard options are shown on page C-13. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.  models available, see page C-13.

Hardware: two each—mounting screws, nuts, lockwashers and standoffs for 1/8 in. thk. panel are supplied standard on switches with panel mounting bracket. Hardware for other panel thicknesses also available. Actuators, frames and mounting hardware are available separately, see catalog section H.

## SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact material).

ELECTRICAL LIFE: E1XX and E2XX models: 40,000 make-and-break cycles at full load. E3XX models: 30,000 cycles.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE:  $10^9$  ohms min.

ELECTROSTATIC DISCHARGE (ESD) RESISTANCE: All actuator options: 15,000 V DC min. @ sea level, actuator to terminals.

DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

## MATERIALS

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

ACTUATOR: Nylon, black standard Internal o-ring seal standard with all actuators.

FRAME: Spring steel, black standard.

SWITCH SUPPORT: Brass or steel, tin plated.

ACTUATOR PIVOT & MOUNTING BRACKET: Nylon.

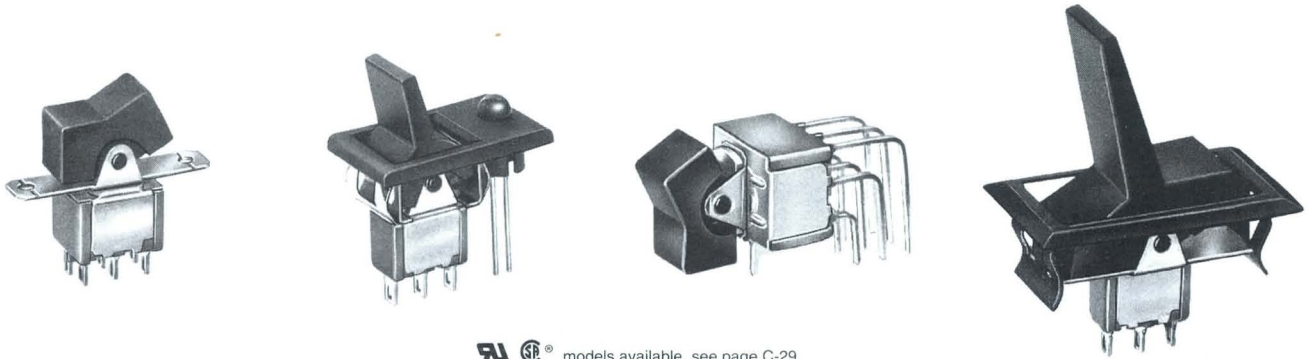
ACTUATOR PIVOT RETAINER: Stainless steel.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut, Screw, & Lockwasher—Stainless steel.  
Standoff—Nylon standard Aluminum available, consult factory.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

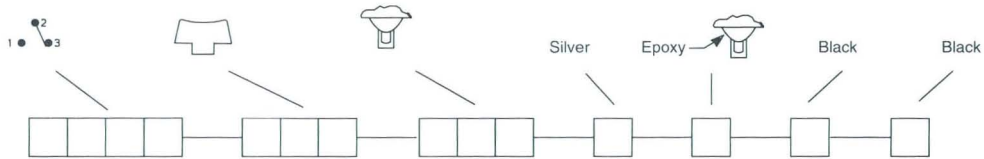


RU SF® models available, see page C-29.

**Easy Build-A-Switch:**

Below is a complete listing of available options for 7000 SERIES ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-28; all available options are shown and described on pages C-29 thru C-48. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-48. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

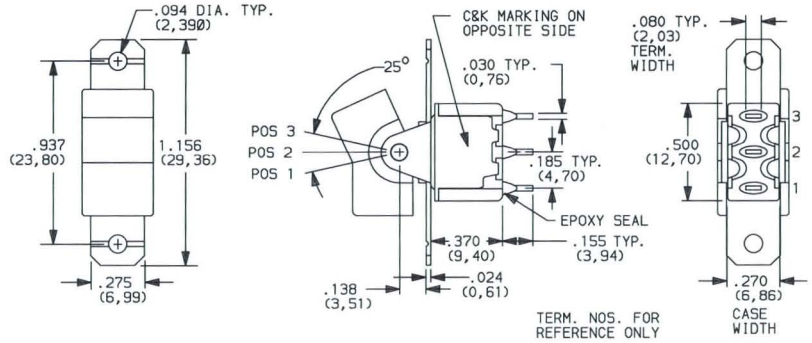
SWITCH FUNCTION      ACTUATOR      TERMINATIONS      CONTACT MATERIAL      SEAL      ACTUATOR COLOR      FRAME COLOR



| SWITCH FUNCTION | ACTUATOR | TERMINATIONS | CONTACT MATERIAL | SEAL | ACTUATOR COLOR | FRAME COLOR |   |        |
|-----------------|----------|--------------|------------------|------|----------------|-------------|---|--------|
| 7101            | U11      | J1           | A                | W    | B              | E           | 1 | (NONE) |
| 7103            | U13      | J2           | A3               | W1   | G              | I           | 2 | 1      |
| 7105            | U15      | J3           | AV2              | W3   | K              |             | 3 | 2      |
| 7107            | U17      | J4           | AV3              | W4   | L              |             | 4 | 3      |
| 7108            | U18      | J5           | AV5              | W5   | M              |             | 5 | 4      |
| 7109            | U19      | J10          | AW               | Z    | Q              |             | 6 | 5      |
| 7201            | U21      | J11          | AW1              | Z3   |                |             | 7 | 6      |
| 7203            | U23      | J15          | AW3              |      |                |             | 8 | 7      |
| 7205            | U25      | J16          | AW4              |      |                |             | 9 | 8      |
| 7207            | U27      | J19          | AW5              |      |                |             |   | 9      |
| 7208            | U28      | J21          | C                |      |                |             |   | C      |
| 7209            | U29      | J25          | V2               |      |                |             |   | S      |
| 7211            | U211     | J26          | V3               |      |                |             |   |        |
| 7213            | U213     | J37          | V4               |      |                |             |   |        |
| 7215            | U215     | J47          | V5               |      |                |             |   |        |
| 7301            | U31      | J50          | V6               |      |                |             |   |        |
| 7303            | U33      | J51          | V7               |      |                |             |   |        |
| 7305            | U35      | J52          | V8               |      |                |             |   |        |
| 7307            | U37      | J53          | V9               |      |                |             |   |        |
| 7308            | U38      | J54          | V21              |      |                |             |   |        |
| 7309            | U39      | J57          | V31              |      |                |             |   |        |
| 7401            | U41      | J60          | V41              |      |                |             |   |        |
| 7403            | U43      | J61          | V51              |      |                |             |   |        |
| 7405            | U45      | J62          | V54              |      |                |             |   |        |
| 7407            | U47      | J63          | V55              |      |                |             |   |        |
| 7408            | U48      | J64          | V61              |      |                |             |   |        |
| 7409            | U49      | J90          | V71              |      |                |             |   |        |
| 7411            | U411     | J91          | V81              |      |                |             |   |        |
| 7413            | U413     | J92          | V91              |      |                |             |   |        |
| 7415            | U415     | J93          |                  |      |                |             |   |        |
|                 |          | J94          |                  |      |                |             |   |        |

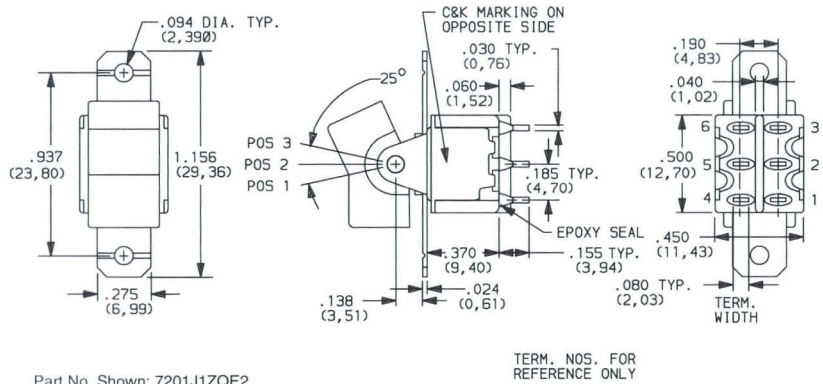
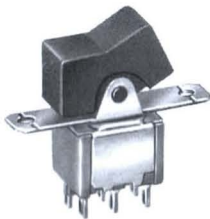


SWITCHES WITH STANDARD OPTIONS



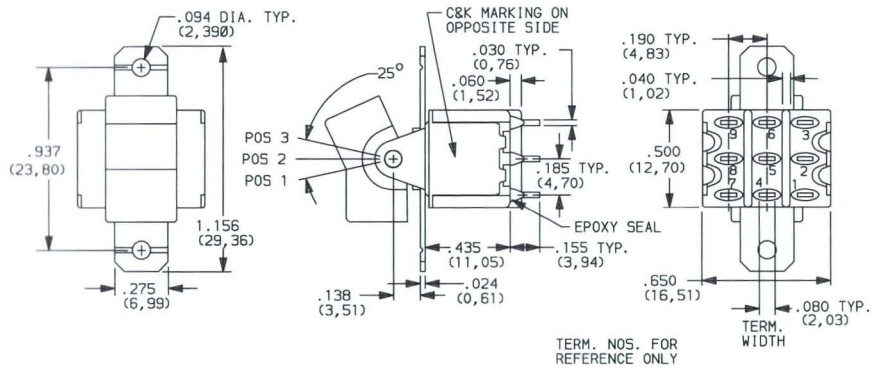
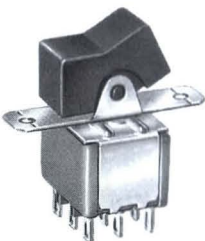
SPDT

Part No. Shown: 7101J1ZQE2



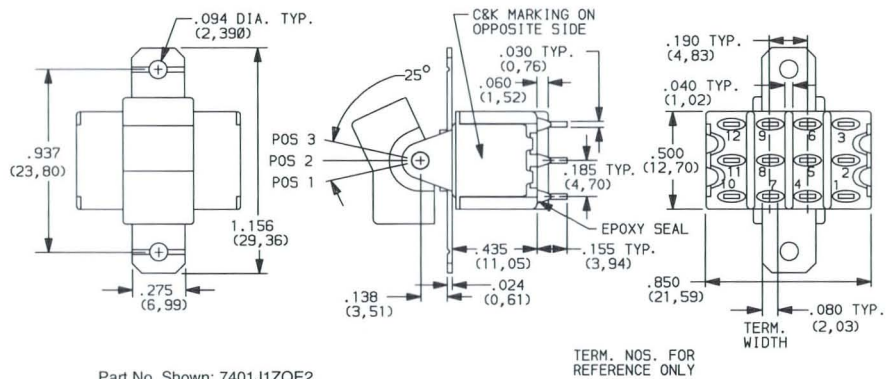
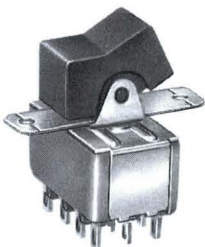
DPDT

Part No. Shown: 7201J1ZQE2



3PDT

Part No. Shown: 7301J1ZQE2



4PDT

Part No. Shown: 7401J1ZQE2



SWITCH FUNCTION

| NO. POLES | MODEL NO. | UL/CSA** MODEL NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS  |        |                      | SCHEMATIC |                      |                      |                      |
|-----------|-----------|--------------------|-----------------|--------|--------|----------------------|--------|----------------------|-----------|----------------------|----------------------|----------------------|
|           |           |                    | POS. 1          | POS. 2 | POS. 3 | POS. 1               | POS. 2 | POS. 3               |           |                      |                      |                      |
|           |           |                    |                 |        |        |                      |        |                      |           |                      |                      |                      |
| SP        | 7101      | U11                | ON              | NONE   | ON     | 2-3                  | OPEN   | 2-1                  |           |                      |                      |                      |
|           | 7103      | U13                | ON              | OFF    | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7105      | U15                | MOM.            | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7107      | U17                | ON              | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7108      | U18                | ON              | NONE   | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7109      | U19                | NONE            | ON     | MOM.   |                      |        |                      |           | N/A                  | 2-3                  | 2-1                  |
| DP        | 7201      | U21                | ON              | NONE   | ON     | 2-3, 5-6             | OPEN   | 2-1, 5-4             |           |                      |                      |                      |
|           | 7203      | U23                | ON              | OFF    | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7205      | U25                | MOM.            | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7207      | U27                | ON              | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7208      | U28                | ON              | NONE   | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7209      | U29                | NONE            | ON     | MOM.   |                      |        |                      |           | N/A                  | 2-3, 5-6             | 2-1, 5-4             |
|           | 7211*     | U211*              | ON              | ON     | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7213*     | U213*              | ON              | ON     | MOM.   |                      |        |                      |           | 2-3, 5-6             | 2-3, 5-4             | 2-1, 5-4             |
| 7215*     | U215*     | MOM.               | ON              | MOM.   |        |                      |        |                      |           |                      |                      |                      |
| 3P        | 7301      | U31                | ON              | NONE   | ON     | 2-3, 5-6, 8-9        | OPEN   | 2-1, 5-4, 8-7        |           |                      |                      |                      |
|           | 7303      | U33                | ON              | OFF    | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7305      | U35                | MOM.            | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7307      | U37                | ON              | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7308      | U38                | ON              | NONE   | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7309      | U39                | NONE            | ON     | MOM.   |                      |        |                      |           | N/A                  | 2-3, 5-6, 8-9        | 2-1, 5-4, 8-7        |
| 4P        | 7401      | U41                | ON              | NONE   | ON     | 2-3, 5-6, 8-9, 11-12 | OPEN   | 2-1, 5-4, 8-7, 11-10 |           |                      |                      |                      |
|           | 7403      | U43                | ON              | OFF    | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7405      | U45                | MOM.            | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7407      | U47                | ON              | OFF    | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7408      | U48                | ON              | NONE   | MOM.   |                      |        |                      |           |                      |                      |                      |
|           | 7409      | U49                | NONE            | ON     | MOM.   |                      |        |                      |           | N/A                  | 2-3, 5-6, 8-9, 11-12 | 2-1, 5-4, 8-7, 11-10 |
|           | 7411*     | U411*              | ON              | ON     | ON     |                      |        |                      |           |                      |                      |                      |
|           | 7413*     | U413*              | ON              | ON     | MOM.   |                      |        |                      |           | 2-3, 5-6, 8-9, 11-12 | 2-3, 5-4, 8-9, 11-10 | 2-1, 5-4, 8-7, 11-10 |
| 7415*     | U415*     | MOM.               | ON              | MOM.   |        |                      |        |                      |           |                      |                      |                      |

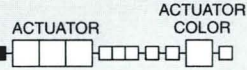
MOM. = MOMENTARY

\*\* U11-U415 model numbers with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

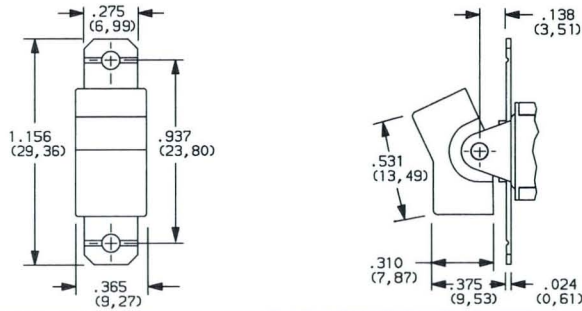
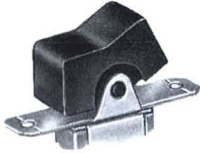
\* Wiring for 3-way switch, see page X.



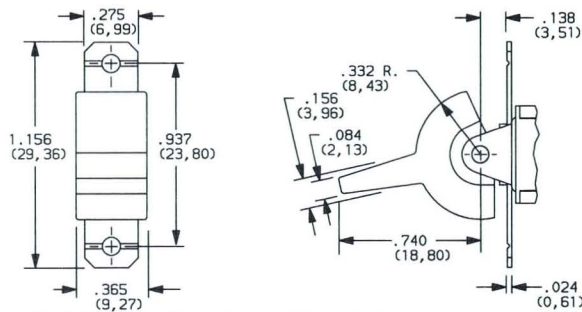
ACTUATORS—PANEL REAR MOUNT



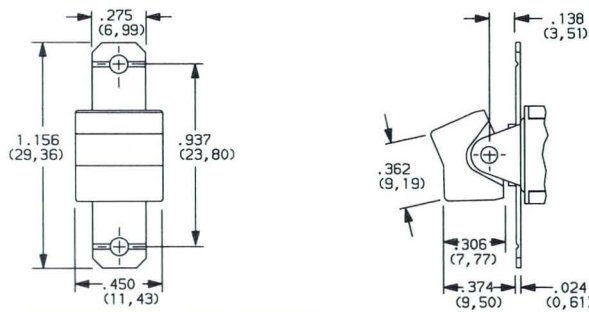
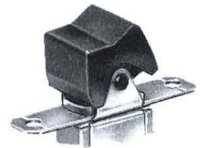
J1 (STD.)



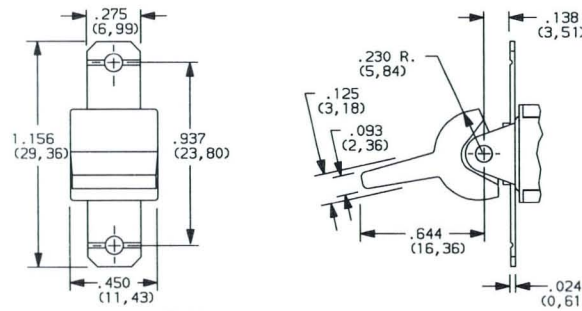
J2



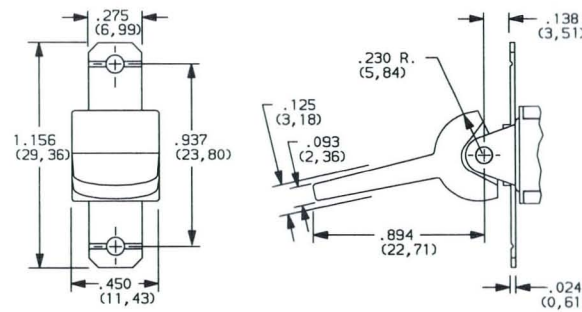
J54



J64



J94



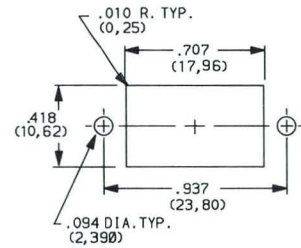
ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLORS |
|-------------|-----------------|
| 1           | WHITE           |
| 2           | BLACK (std.)    |
| 3           | RED             |
| 4           | ORANGE          |
| 5           | YELLOW          |
| 6           | GREEN           |
| 7           | BLUE            |
| 8           | BROWN           |
| 9           | GRAY            |

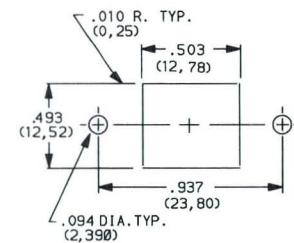
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

PANEL MOUNTING J1 - J2

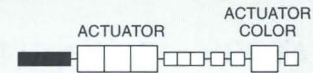


PANEL MOUNTING J54 - J64 - J94

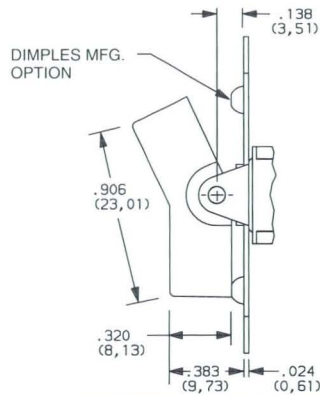
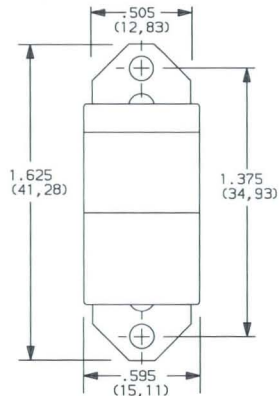
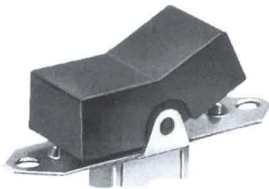




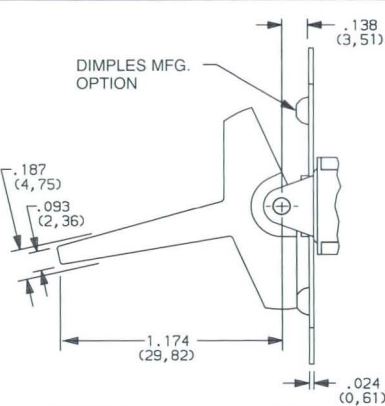
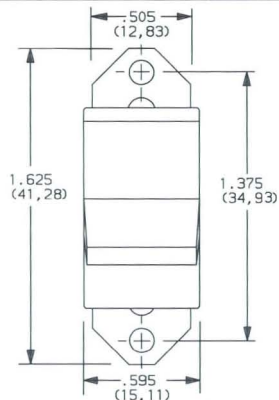
## ACTUATORS—PANEL REAR MOUNT



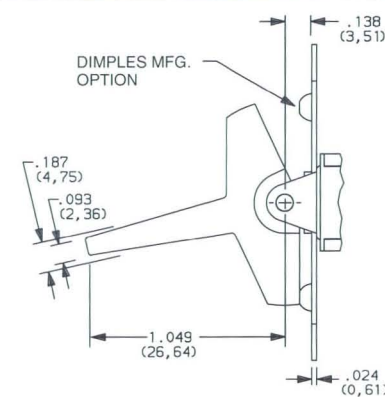
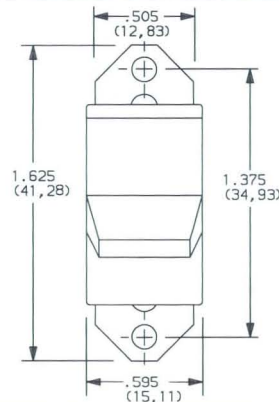
**J3**



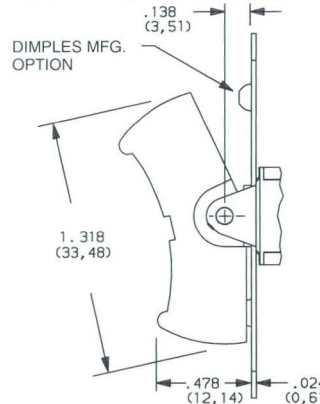
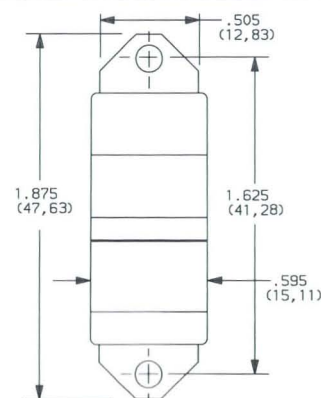
**J4**



**J5**



**J10**



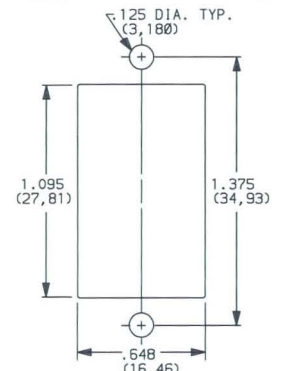
## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLORS |
|-------------|-----------------|
| 1           | WHITE           |
| 2           | BLACK (std.)    |
| 3           | RED             |
| 4           | ORANGE          |
| 5           | YELLOW          |
| 6           | GREEN           |
| 7           | BLUE            |
| 8           | BROWN           |
| 9           | GRAY            |

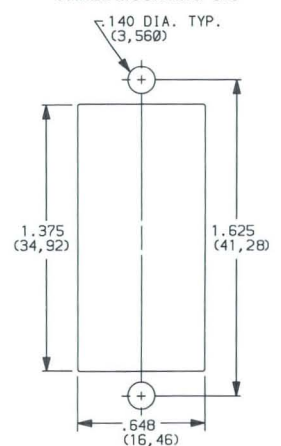
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

### PANEL MOUNTING J3 - J4 - J5

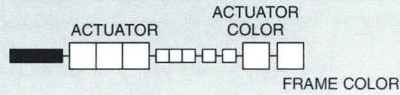


### PANEL MOUNTING J10

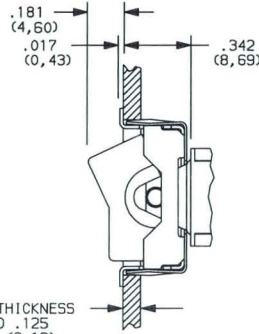
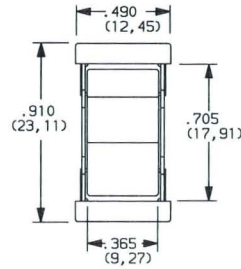




ACTUATORS — SNAP-IN FRONT MOUNT



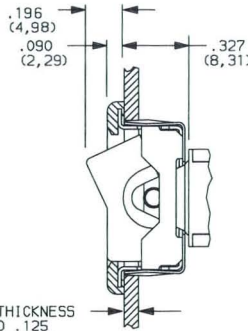
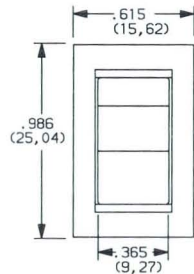
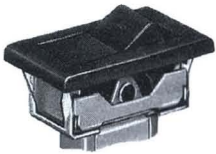
J15



PANEL THICKNESS .047 TO .125 (1,19) (3,18)

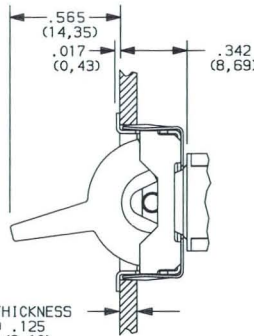
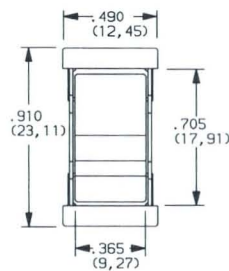
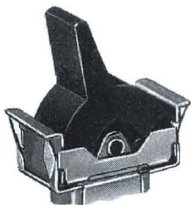
No frame color choice required.

J16



PANEL THICKNESS .047 TO .125 (1,19) (3,18)

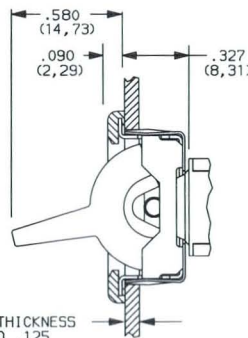
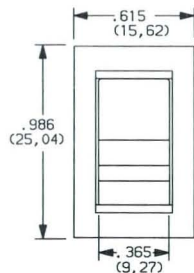
J25



PANEL THICKNESS .047 TO .125 (1,19) (3,18)

No frame color choice required.

J26



PANEL THICKNESS .047 TO .125 (1,19) (3,18)

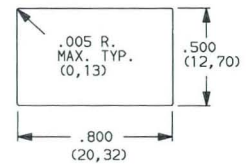
ACTUATOR AND FRAME COLORS

| OPTION CODE | ACTUATOR AND FRAME COLORS |
|-------------|---------------------------|
| 1           | WHITE                     |
| 2           | BLACK (std.)              |
| 3           | RED                       |
| 4           | ORANGE                    |
| 5           | YELLOW                    |
| 6           | GREEN                     |
| 7           | BLUE                      |
| 8           | BROWN                     |
| 9           | GRAY                      |

Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

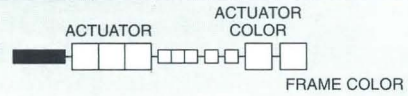
Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING

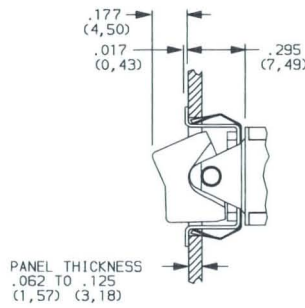
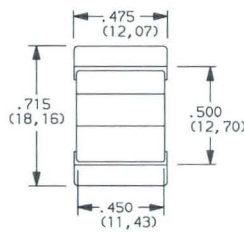
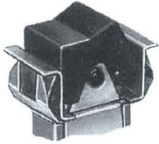




ACTUATORS — SNAP-IN FRONT MOUNT

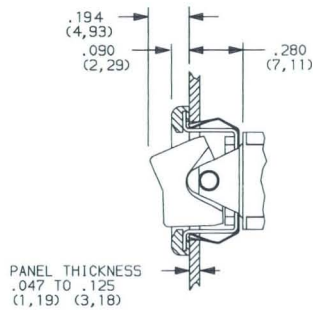
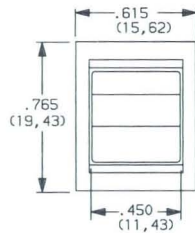


J50

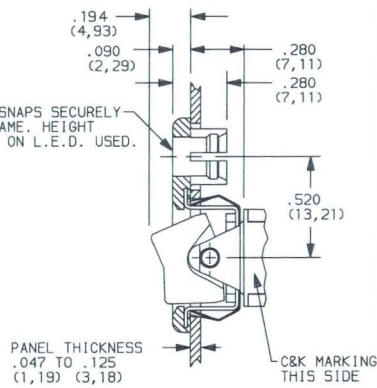
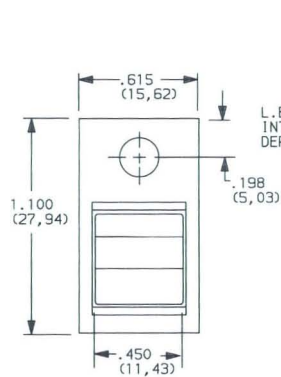


No frame color choice required.

J51

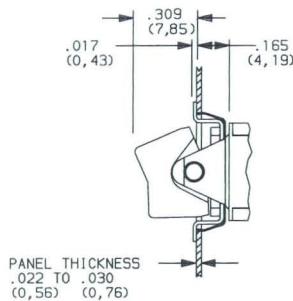
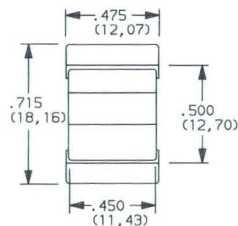


J52



U.S. Patent No. 4,004, 120. LED not included. See page IX for LED information.

J53



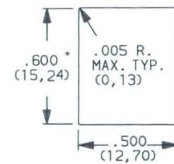
ACTUATOR AND FRAME COLORS

| OPTION CODE | ACTUATOR AND FRAME COLORS |
|-------------|---------------------------|
| 1           | WHITE                     |
| 2           | BLACK (std.)              |
| 3           | RED                       |
| 4           | ORANGE                    |
| 5           | YELLOW                    |
| 6           | GREEN                     |
| 7           | BLUE                      |
| 8           | BROWN                     |
| 9           | GRAY                      |

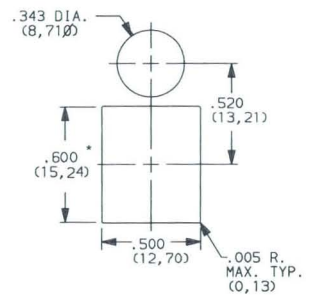
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING — J50, J51, J53



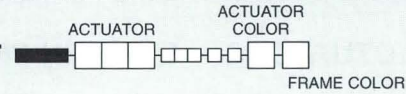
PANEL MOUNTING — J52



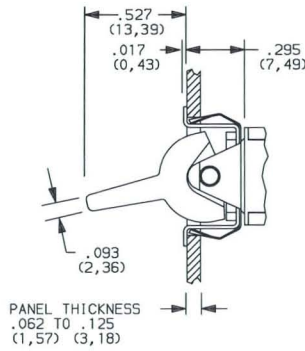
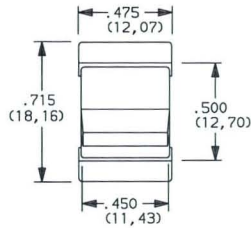
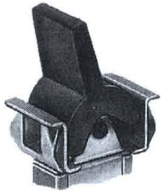
\* For J50: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels. For J51, J52: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.

No frame color choice required.

## ACTUATORS — SNAP-IN FRONT MOUNT

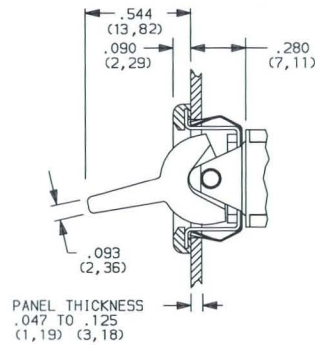
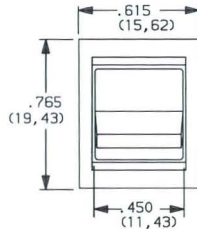


### J60

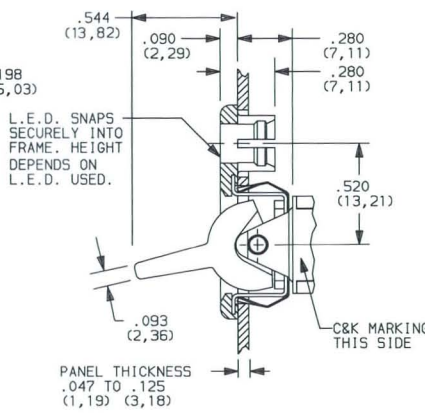
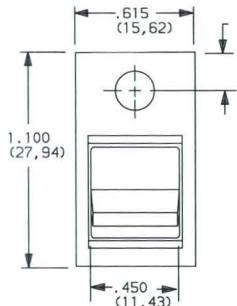


No frame color choice required.

### J61

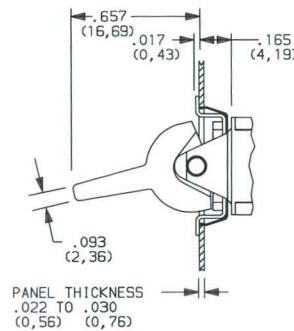
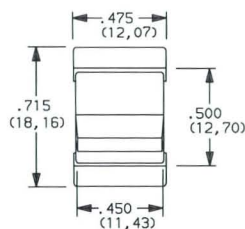
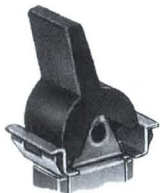


### J62



U.S. Pat. No. 4,004, 120.  
LED not included.  
See page IX for LED information.

### J63



No frame color choice required.

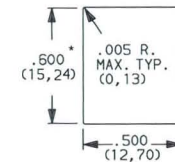
## ACTUATOR AND FRAME COLORS

| OPTION CODE | ACTUATOR AND FRAME COLORS |
|-------------|---------------------------|
| 1           | WHITE                     |
| 2           | BLACK (std.)              |
| 3           | RED                       |
| 4           | ORANGE                    |
| 5           | YELLOW                    |
| 6           | GREEN                     |
| 7           | BLUE                      |
| 8           | BROWN                     |
| 9           | GRAY                      |

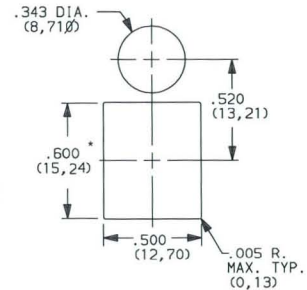
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

### PANEL MOUNTING — J60, J61, J63



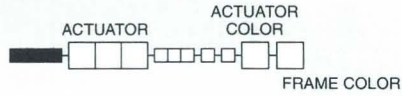
### PANEL MOUNTING — J62



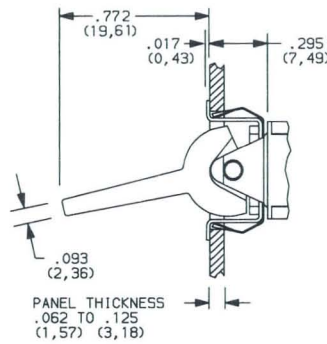
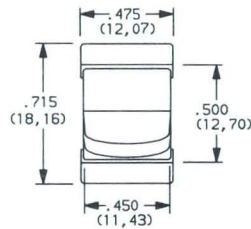
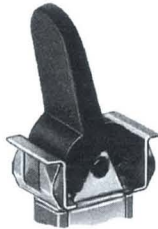
\* For J60: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.  
For J61, J62: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.



ACTUATORS — SNAP-IN FRONT MOUNT

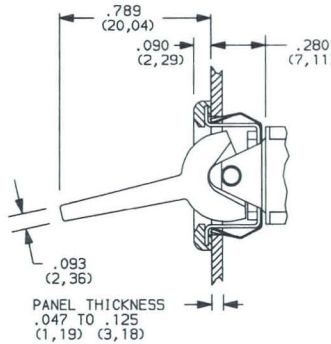
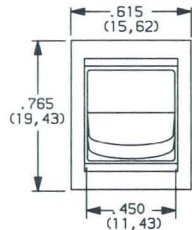


J90

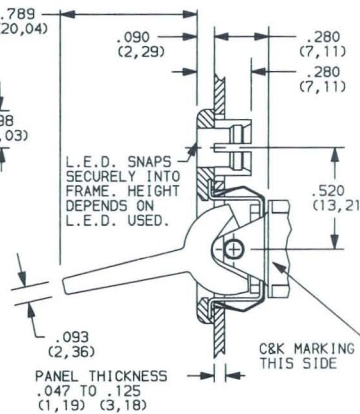
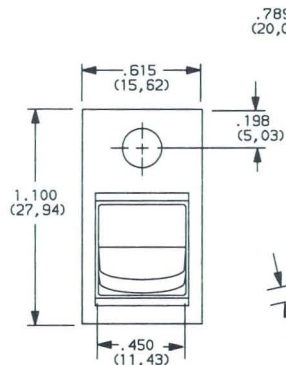


No frame color choice required.

J91

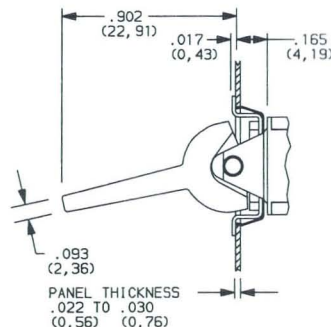
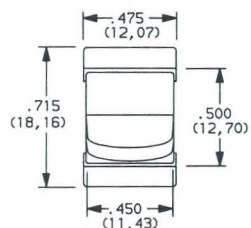


J92



U.S. Pat. No 4, 004, 120. LED not included. See page IX for LED information.

J93



No frame color choice required.

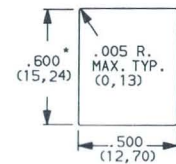
ACTUATOR AND FRAME COLORS

| OPTION CODE | ACTUATOR AND FRAME COLORS |
|-------------|---------------------------|
| 1           | WHITE                     |
| 2           | BLACK (std.)              |
| 3           | RED                       |
| 4           | ORANGE                    |
| 5           | YELLOW                    |
| 6           | GREEN                     |
| 7           | BLUE                      |
| 8           | BROWN                     |
| 9           | GRAY                      |

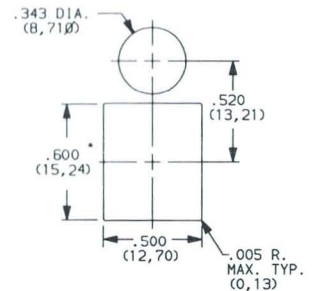
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING — J90, J91, J93



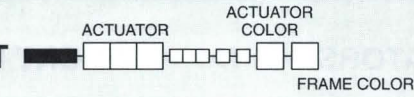
PANEL MOUNTING — J92



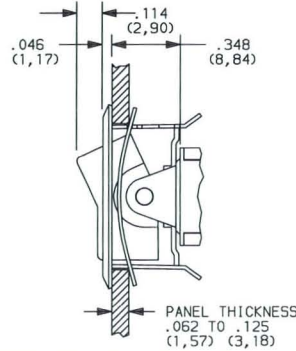
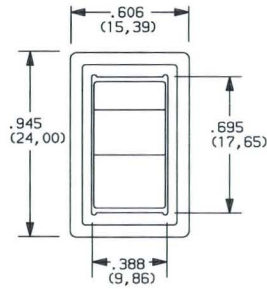
\* For J90: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels. For J91, J92: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.



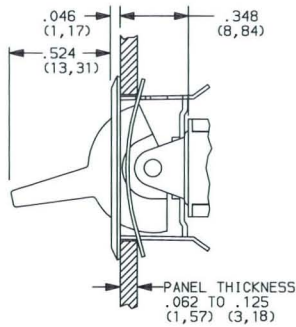
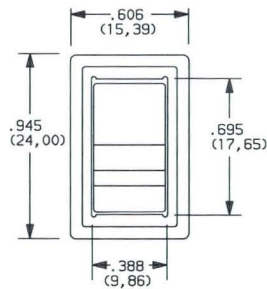
ACTUATORS — REAR MOUNT



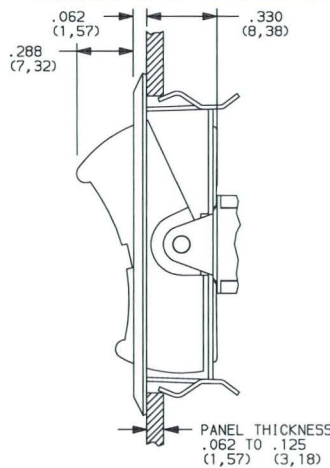
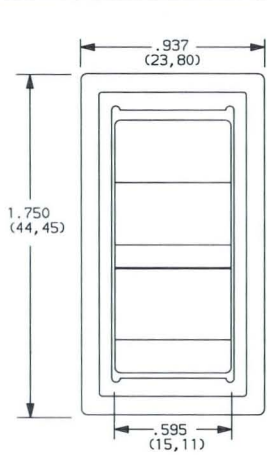
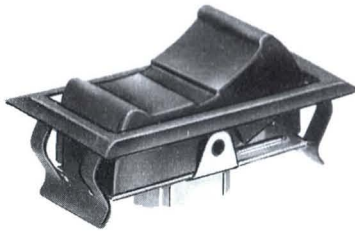
J11



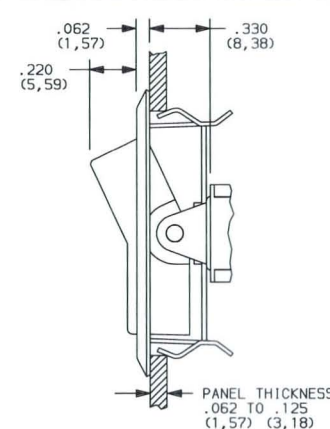
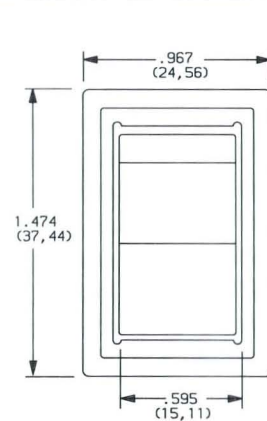
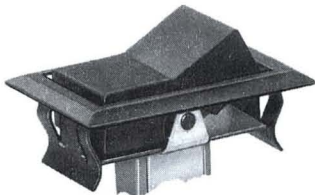
J21



J19



J37



ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

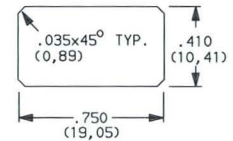
FRAME COLOR

| OPTION CODE | FRAME COLOR   |
|-------------|---------------|
| 1           | WHITE         |
| 2           | BLACK (std.)  |
| C           | BRIGHT CHROME |
| S           | SATIN CHROME  |

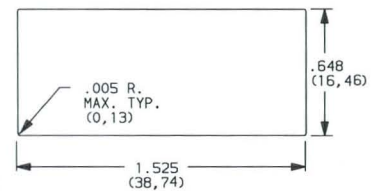
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte. Frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with Z, C, Z3, or W-W5 terminations.

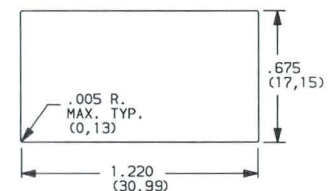
PANEL MOUNTING — J11, J21



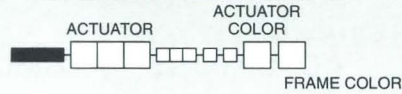
PANEL MOUNTING — J19



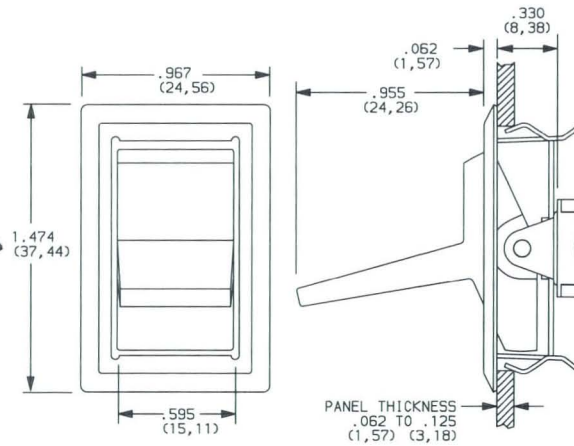
PANEL MOUNTING — J37



ACTUATORS—REAR MOUNT



J47



ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

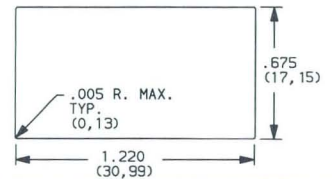
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

FRAME COLOR

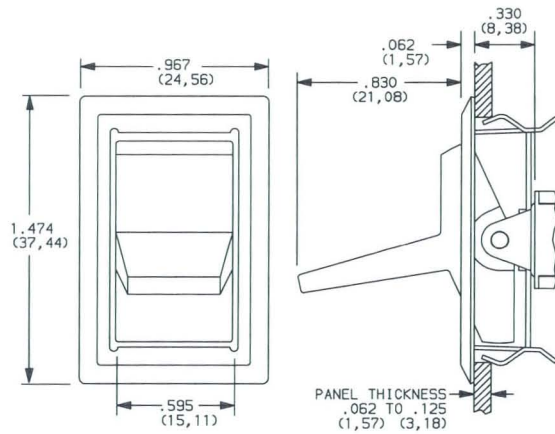
| OPTION CODE | FRAME COLOR   |
|-------------|---------------|
| 1           | WHITE         |
| 2           | BLACK (std.)  |
| C           | BRIGHT CHROME |
| S           | SATIN CHROME  |

J47, J57 actuators available with Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING J47 - J57



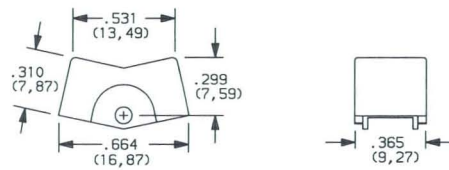
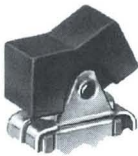
J57



ACTUATORS—P.C. MOUNT



J1

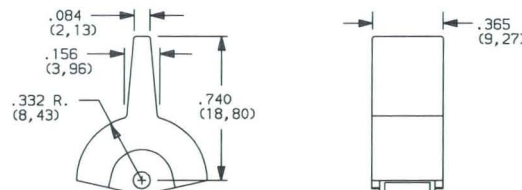


ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

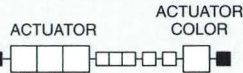
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Actuators available separately, see catalog section H.

J2

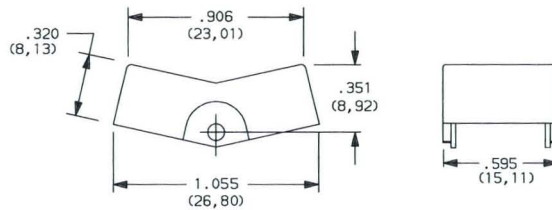
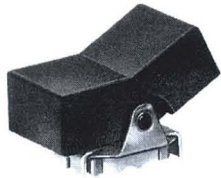


J1, J2 actuators available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between act. and P.C. board, and care must be exercised to accommodate this condition.

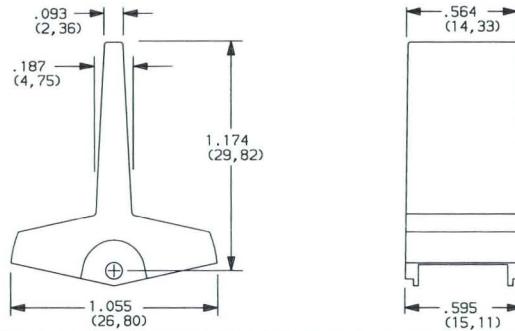
## ACTUATORS—P.C. MOUNT



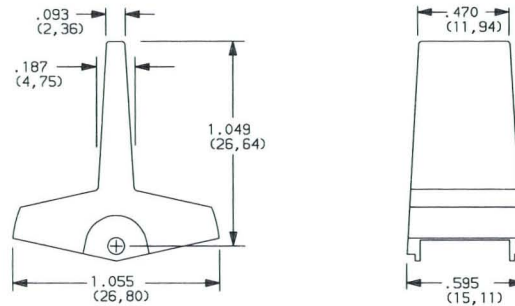
**J3**



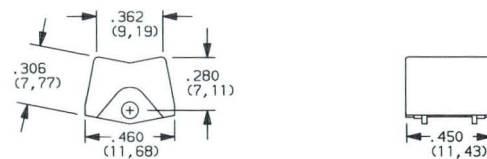
**J4**



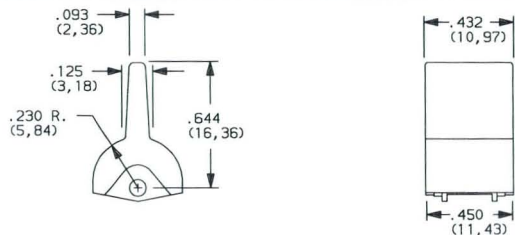
**J5**



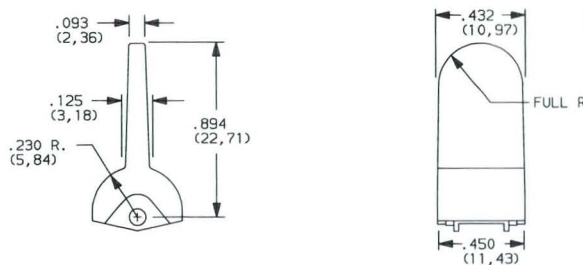
**J50**



**J60**



**J90**



## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Actuators are available separately, see catalog section H.

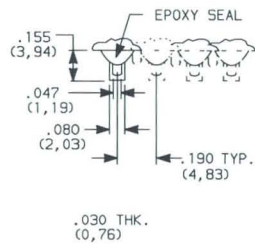
J3, J4, & J5 actuators available with AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between actuator and P.C. board, and care must be exercised to accommodate this condition.

J50, J60, & J90 actuators available with A, A3, AW-AW5, AV2-AV5, & V2-V91 terminations.



## TERMINATIONS

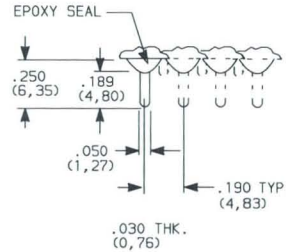
**Z** (STD.)



SPDT thru  
4PDT

Q contact material std.  
Not avail. with K, L, or M contact material.  
Available actuators, see pages C-30 thru C-37.

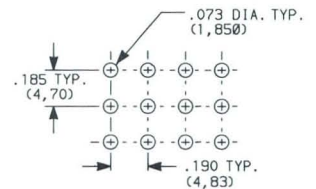
**C**



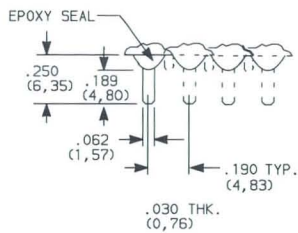
SPDT thru  
4PDT

Q contact material std.  
Available actuators, see pages C-30 thru C-37.

P.C. MOUNTING



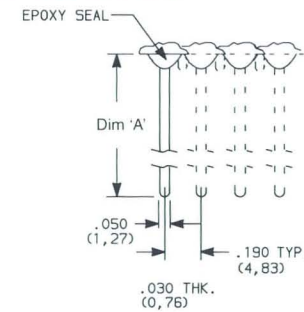
**Z3** QUICK CONNECT



SPDT thru  
4PDT

Q contact material std.  
Available actuators, see pages C-30 thru C-37.  
Mating quick connector available; order part no. 530100000.

**W-W1-W3-W4-W5** WIRE WRAP

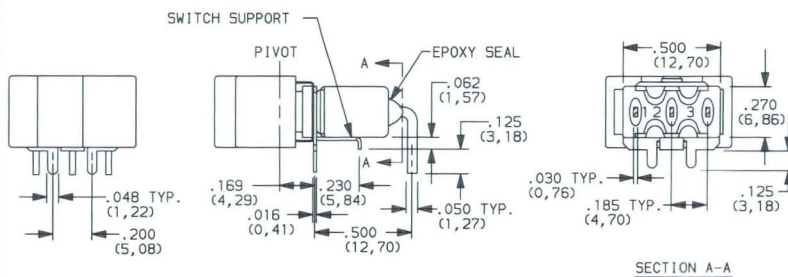


SPDT thru  
4PDT

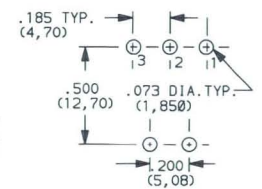
B contact material std.  
Available actuators, see pages C-30 thru C-37.

| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

**A**



P.C. MOUNTING



TERM. NOS. FOR  
REFERENCE ONLY

Part No. Shown: 7101J1ABE2

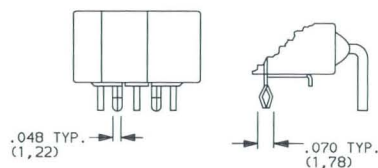


**A**

SPDT

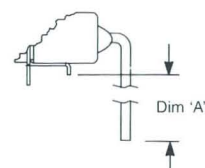
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Note: P.C. pattern must clear switch support leg. Available actuators, see pages C-37 and C-38.

**A3** SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

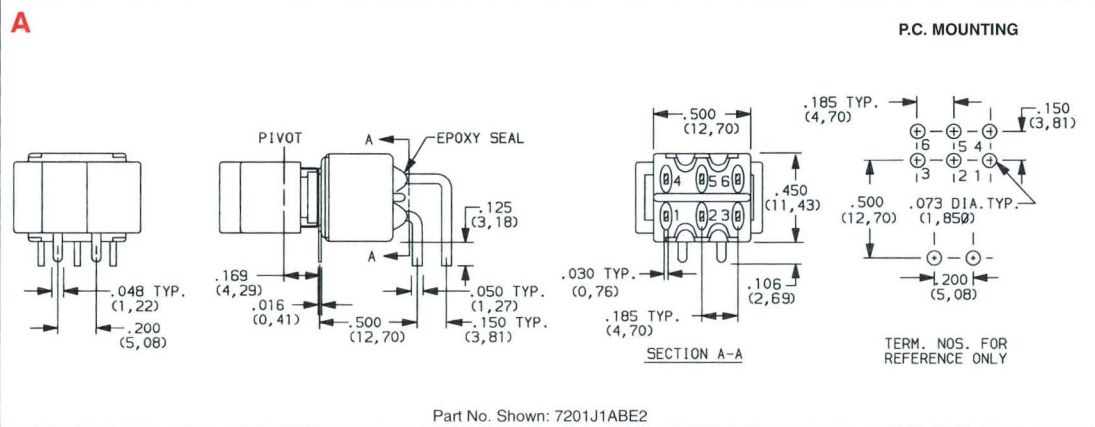
**AW-AW1-AW3-AW4-AW5** EXTENDED



| Option     | Dim 'A'     |
|------------|-------------|
| <b>AW</b>  | .44 (11,2)  |
| <b>AW1</b> | .66 (16,8)  |
| <b>AW3</b> | .14 (3,6)   |
| <b>AW4</b> | .77 (19,6)  |
| <b>AW5</b> | 1.02 (25,9) |



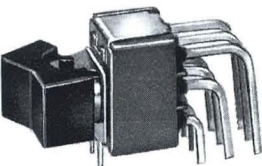
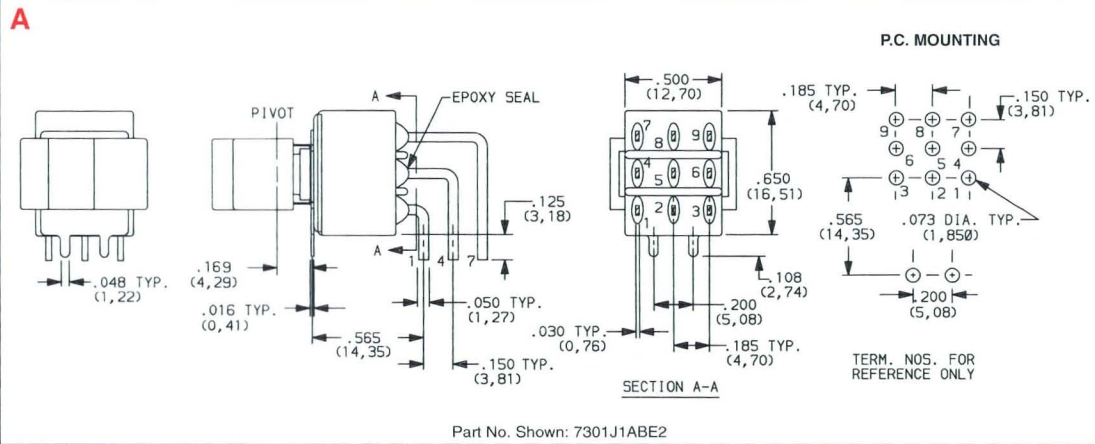
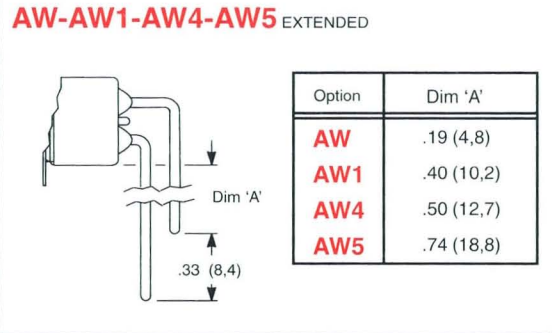
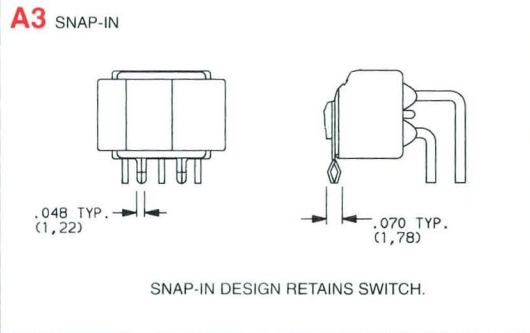
TERMINATIONS



A

DPDT

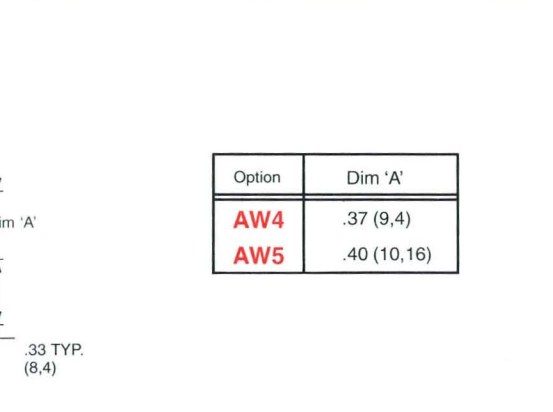
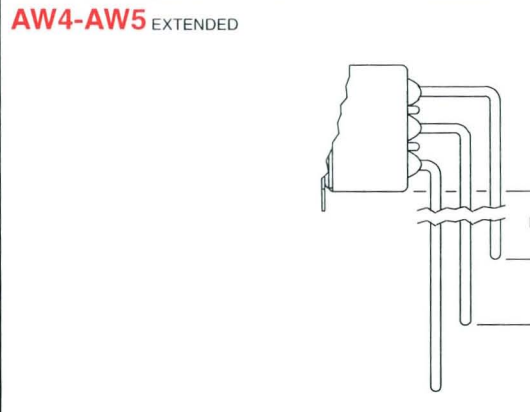
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.



A

3PDT

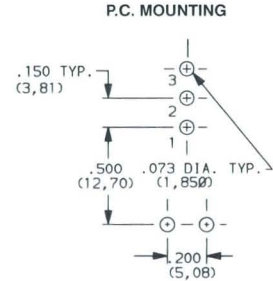
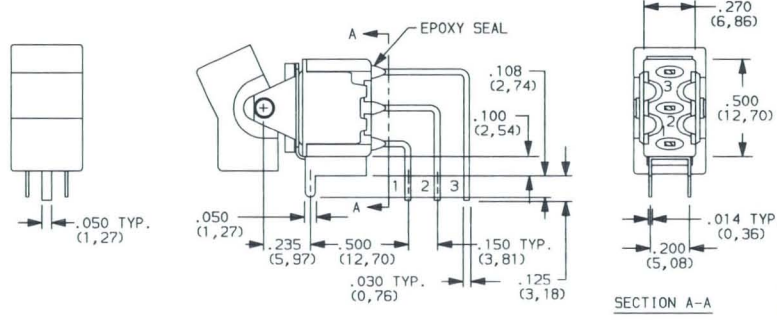
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.





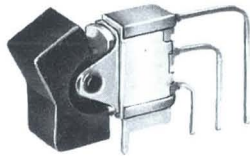
TERMINATIONS

AV2



TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 7101J1AV2BE2

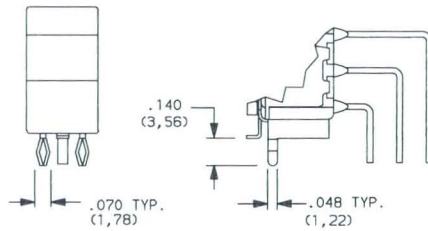


AV2

SPDT

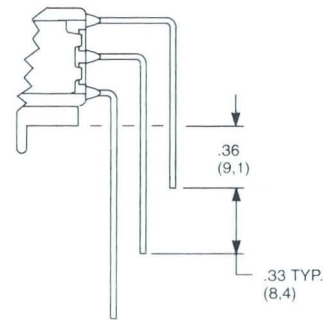
Term. bend radii and lead-in mfg. option.  
 Actuator shown in pos.1.  
 B contact material std.  
 Not available with I seal option.  
 Available actuators, see pages C-37  
 and C-38.

AV3 SNAP-IN

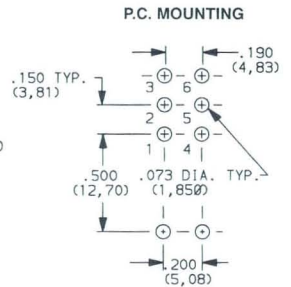
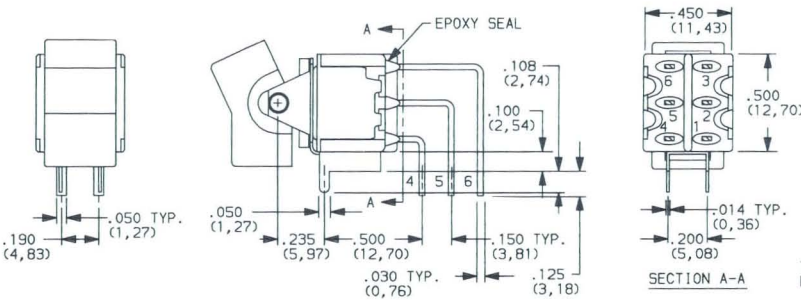


SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

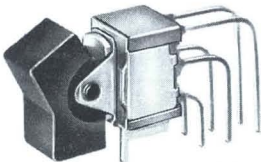


AV2



TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 7201J1AV2BE2

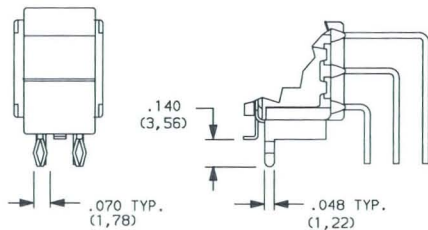


AV2

DPDT

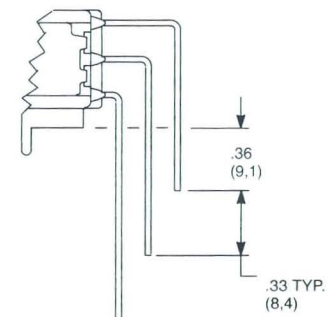
Term. bend radii and lead-in mfg. option.  
 Actuator shown in pos.1.  
 B contact material std.  
 Not available with I seal option.  
 Available actuators, see pages C-37  
 and C-38.

AV3 SNAP-IN

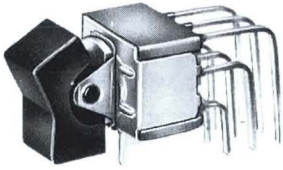
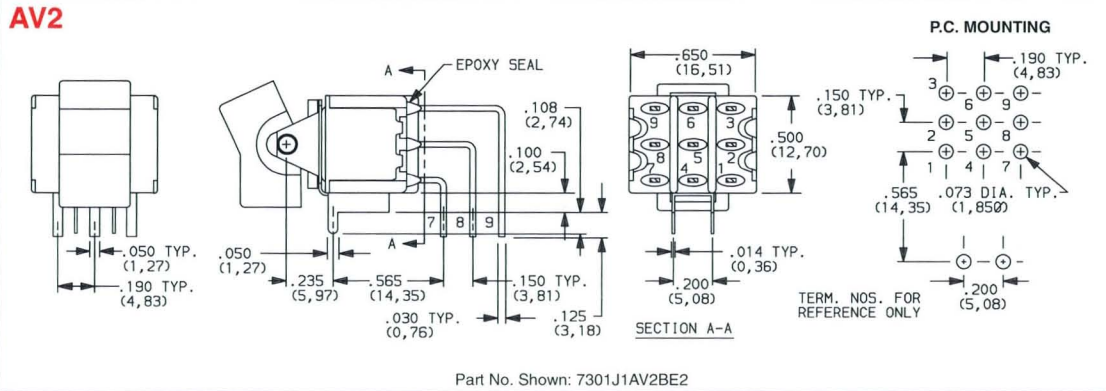


SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED



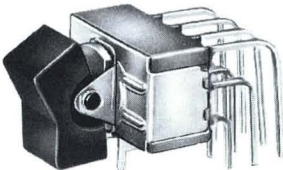
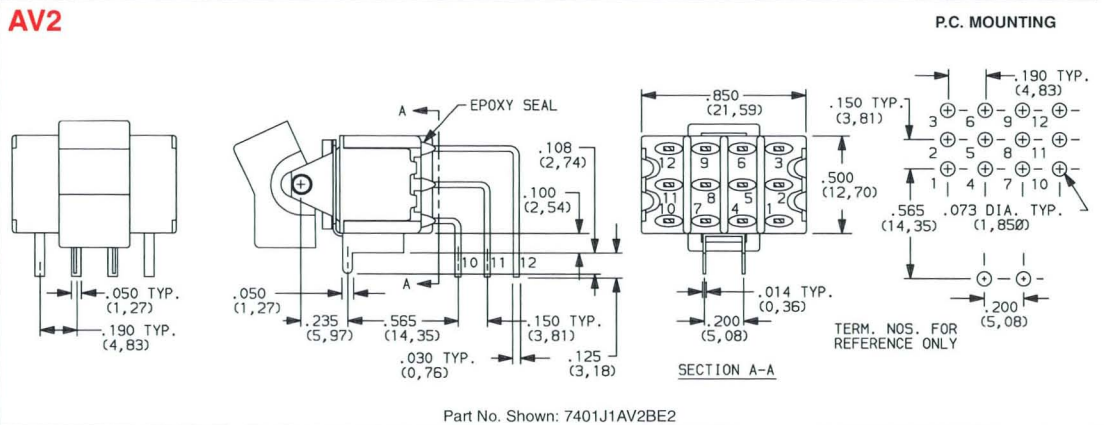
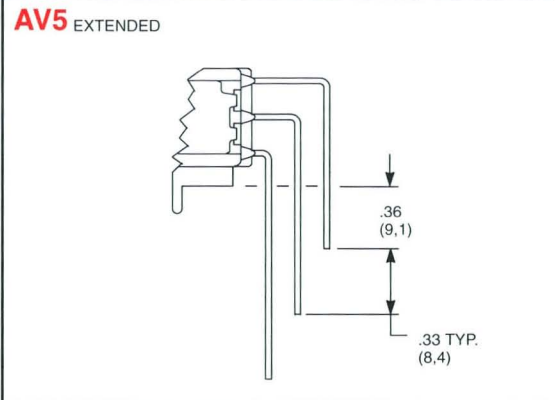
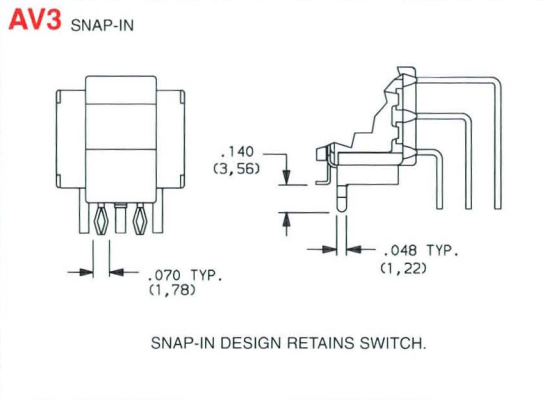
TERMINATIONS



AV2

3PDT

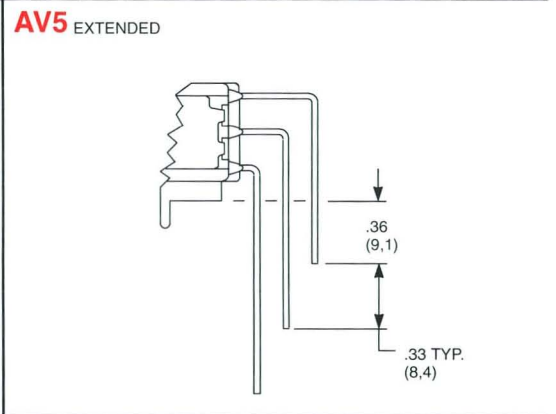
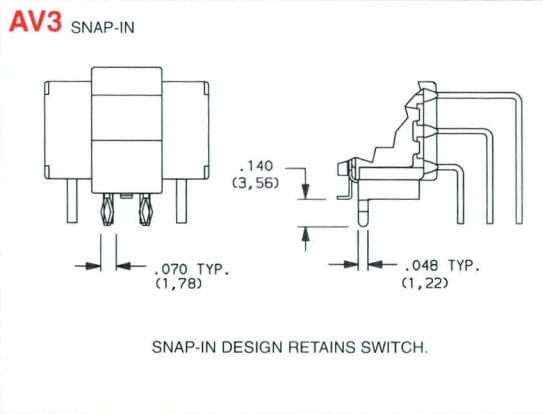
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.



AV2

4PDT

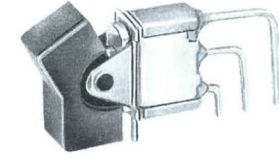
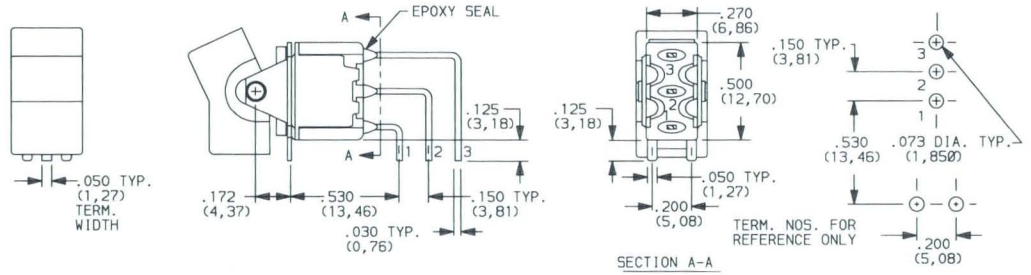
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.





TERMINATIONS

V5

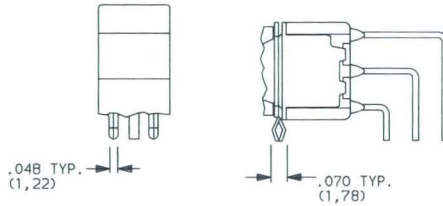


V5

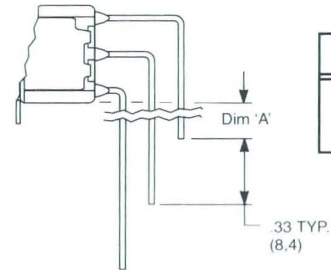
SPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

V51 SNAP-IN

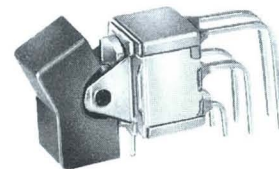
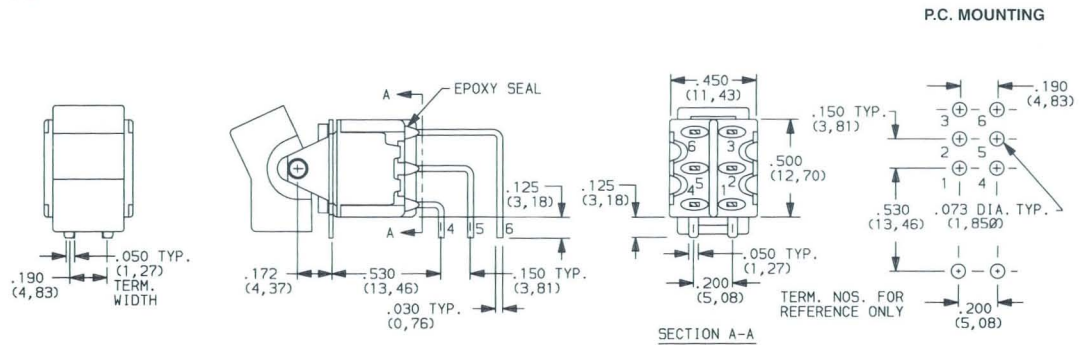


V54-V55 EXTENDED



| Option | Dim 'A'    |
|--------|------------|
| V54    | .24 (6,1)  |
| V55    | .48 (12,2) |

V5

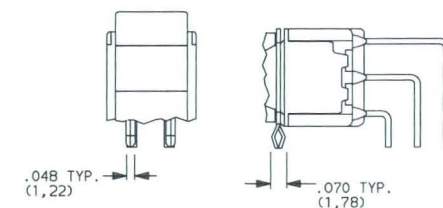


V5

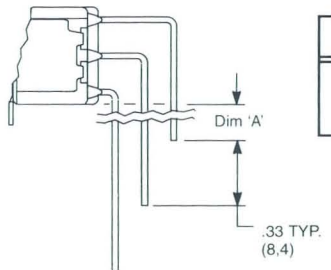
DPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

V51 SNAP-IN



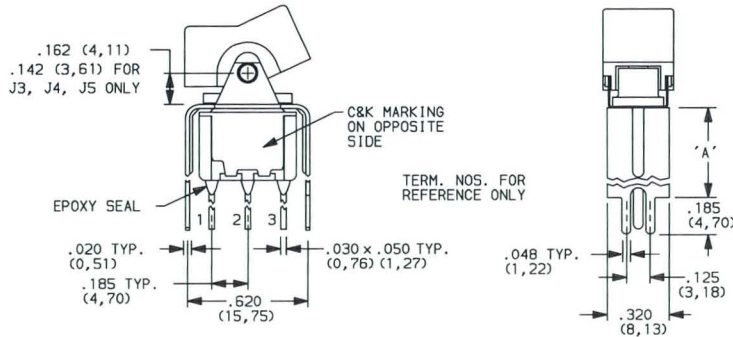
V54-V55 EXTENDED



| Option | Dim 'A'    |
|--------|------------|
| V54    | .24 (6,1)  |
| V55    | .48 (12,2) |

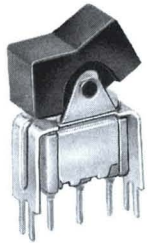
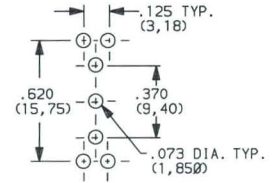
## TERMINATIONS

### V3-V4-V9



Part No. Shown: 7101J1V\_BE2

### P.C. MOUNTING

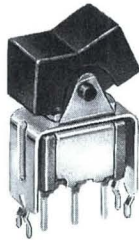


V3

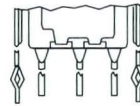
SPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

### V31-V41-V91 SNAP-IN



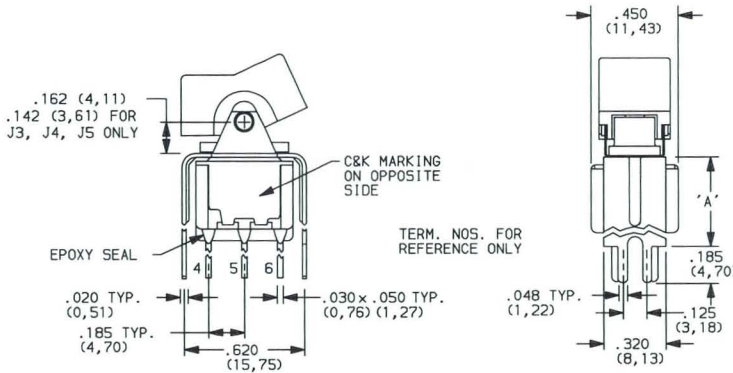
V31



SNAP-IN DESIGN RETAINS SWITCH.

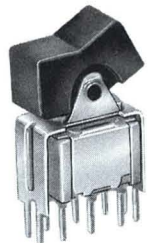
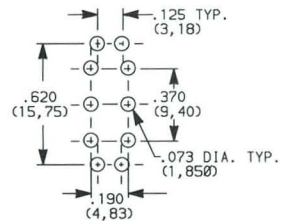
| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

### V3-V4-V9



Part No. Shown: 7201J1V\_BE2

### P.C. MOUNTING

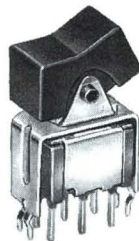


V3

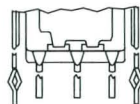
DPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

### V31-V41-V91 SNAP-IN



V31

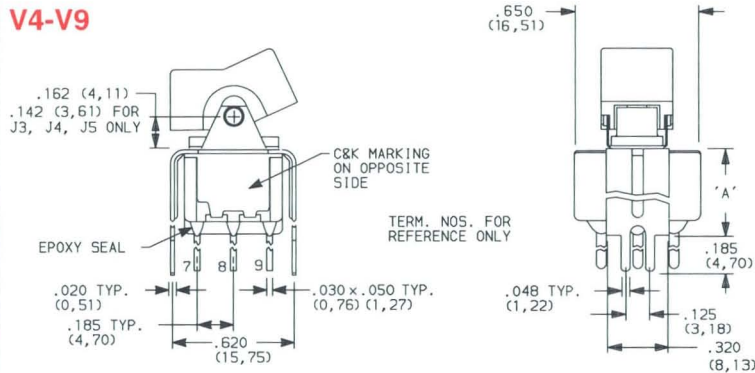


SNAP-IN DESIGN RETAINS SWITCH.

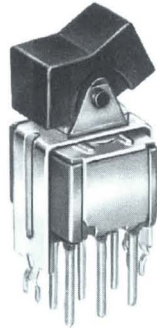
| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

## TERMINATIONS

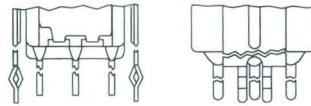
### V4-V9



### V41-V91 SNAP-IN

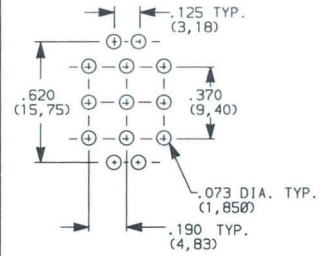


V41

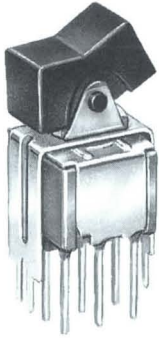


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option  | Dim 'A'       |
|---------|---------------|
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

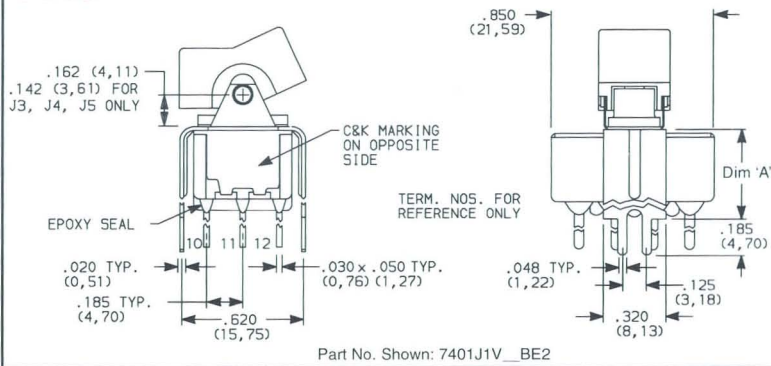


V4

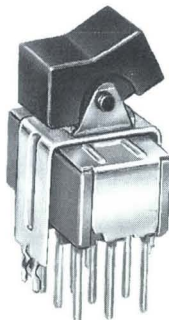
3PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37 and C-38.

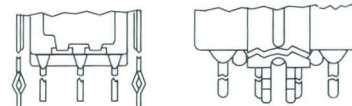
### V4-V9



### V41-V91 SNAP-IN

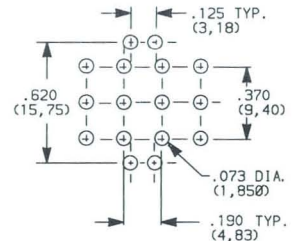


V41

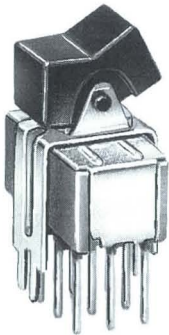


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option  | Dim 'A'       |
|---------|---------------|
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |



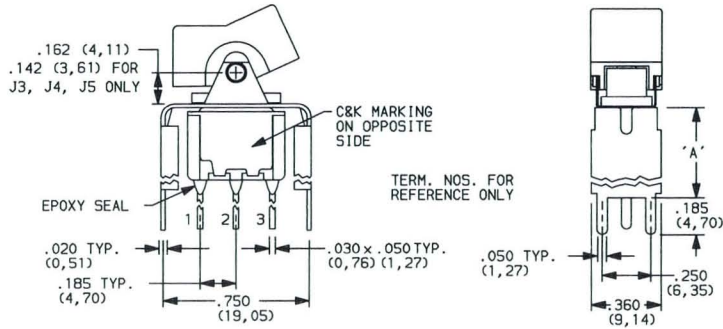
V4

4PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37 and C-38.

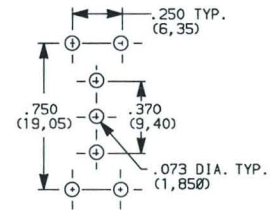
TERMINATIONS

V2-V6-V7-V8

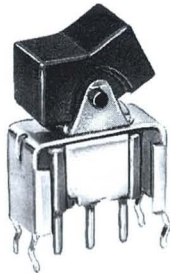


Part No. Shown: 7101J1V\_\_BE2

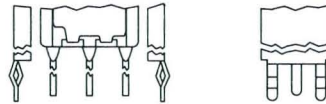
P.C. MOUNTING



V21-V61-V71-V81 SNAP-IN

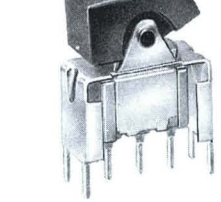


V61



SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V2, V21</b> | .555 (14,10)  |
| <b>V6, V61</b> | .460 (11, 68) |
| <b>V7, V71</b> | .630 (16, 00) |
| <b>V8, V81</b> | .953 (24, 21) |

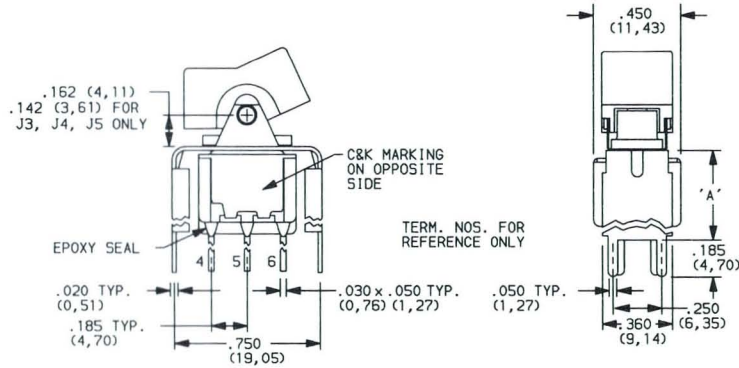


V6

SPDT

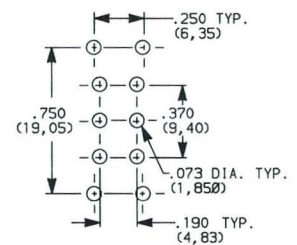
Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

V2-V6-V7-V8

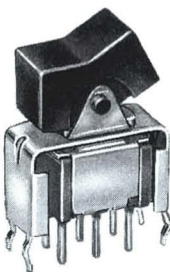


Part No. Shown: 7201J1V\_\_BE2

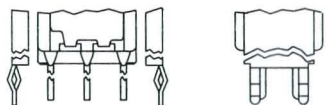
P.C. MOUNTING



V21-V61-V71-V81 SNAP-IN

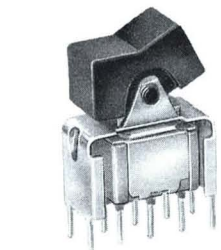


V61



SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V2, V21</b> | .555 (14,10)  |
| <b>V6, V61</b> | .460 (11, 68) |
| <b>V7, V71</b> | .630 (16, 00) |
| <b>V8, V81</b> | .953 (24, 21) |



V6

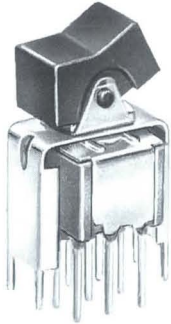
DPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

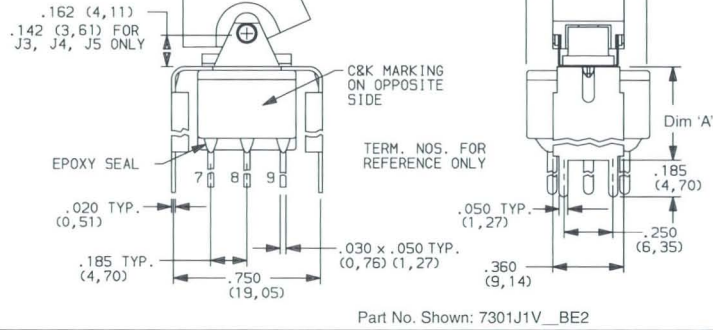


## TERMINATIONS

### V2-V7-V8

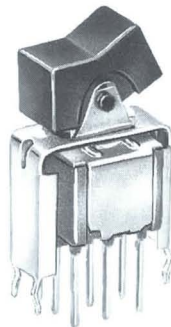


V7



Part No. Shown: 7301J1V\_BE2

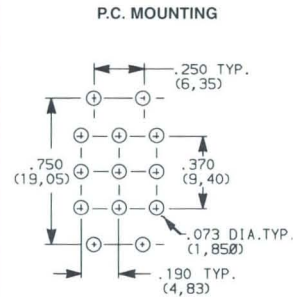
### V21-V71-V81 SNAP-IN



V71



SNAP-IN DESIGN RETAINS SWITCH.

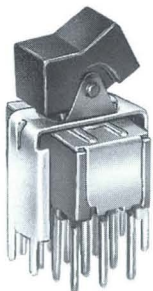


| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

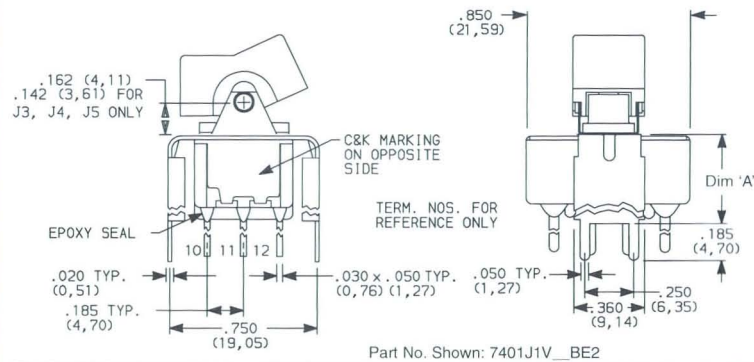
3PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

### V2-V7-V8

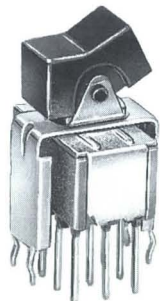


V7

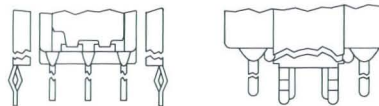


Part No. Shown: 7401J1V\_BE2

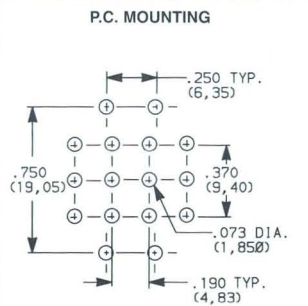
### V21-V71-V81 SNAP-IN



V71



SNAP-IN DESIGN RETAINS SWITCH.



| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

3PDT

Actuator shown in pos.1.  
B contact material std.  
Not available with I seal option.  
Available actuators, see pages C-37  
and C-38.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.                                     |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

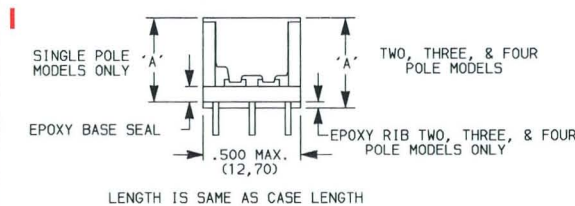
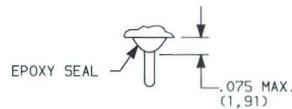
- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

U11-U415 model numbers with all options when ordered with G, L, M or Q contact material. See pages B-32 and VIII.

B contact material standard with all terminations except Z, C, Z3.  
Q contact material standard with Z, C, Z3 terminations.  
K, L, M contact materials not available with Z terminations.

## SEAL

**E** (STD.)



| Poles | Dim 'A'      |
|-------|--------------|
| SP    | .410 (10,41) |
| DP    | .440 (11,18) |
| 3P    | .505 (12,83) |
| 4P    | .505 (12,83) |

Available with Z, C, Z3, W-W5 terminations only.

## HOW TO ORDER

All available 7000 SERIES ROCKER AND LEVER HANDLE SWITCH options are listed on page C-27, and are described on pages C-28 thru C-48. Switches with standard options are shown on page C-28. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page C-29.

Hardware: two each—mounting screws, nuts, lockwashers and standoffs for 1/8 in. thick panel are supplied standard on switches with panel mounting brackets. Hardware for other panel thicknesses also available. Actuators, frames and mounting hardware are available separately, see catalog section H.

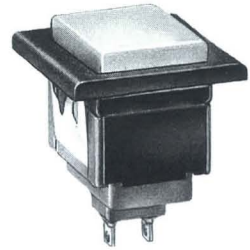
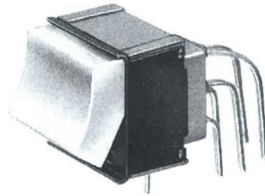
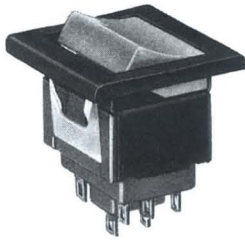
## SPECIFICATIONS

- CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC (Q contact material).
- ELECTRICAL LIFE: 7X01 and UX1 MODELS: 100,000 make-and-break cycles at full load. All other models, 40,000 cycles.
- CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

## MATERIALS

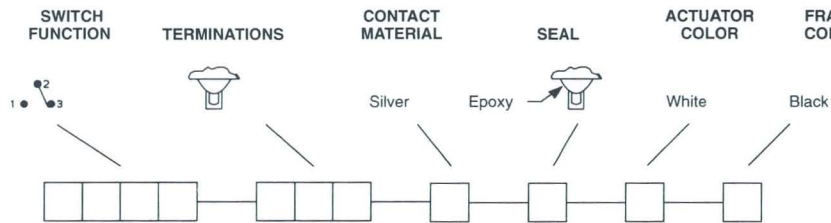
- CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
- ACTUATOR: Nylon, black standard.
- FRAME—FRONT MOUNT: Nylon, black standard.  
REAR MOUNT: Spring steel, black standard.
- BUSHING: Brass or zinc, nickel plated.
- HOUSING: Stainless steel.
- SWITCH SUPPORT: Brass or steel, tin plated.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy
- HARDWARE: Nut, Screw, & Lockwasher—Stainless steel.  
Standoff—Nylon standard. Aluminum available, consult factory.



UL® models available, see page C-50.

Easy Build-A-Switch:

Below is a complete listing of available options for 5000 SERIES ILLUMINATED ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-50; all available options are shown and described on pages C-50 thru C-53. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-52. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



| SWITCH FUNCTION | TERMINATIONS | CONTACT MATERIAL | SEAL | ACTUATOR COLOR | FRAME COLOR |
|-----------------|--------------|------------------|------|----------------|-------------|
| 1               | AV2          | B                | E    | 1              | (NONE)      |
| 2               | C            | G                |      | 3              | 1           |
| 3               | W            | Q                |      | 4              | 2           |
| 4               | W1           |                  |      | 5              | 3           |
| 5               | W3           |                  |      | 6              | 4           |
| 6               | W4           |                  |      |                | 5           |
| 7               | Z            |                  |      |                | 6           |
| 8               | Z3           |                  |      |                | 7           |
| 9               |              |                  |      |                | 8           |
| 10              |              |                  |      |                | 9           |
| 11              |              |                  |      |                |             |
| 12              |              |                  |      |                |             |
| 13              |              |                  |      |                |             |
| 14              |              |                  |      |                |             |
| 15              |              |                  |      |                |             |
| 16              |              |                  |      |                |             |
| 17              |              |                  |      |                |             |
| 18              |              |                  |      |                |             |
| 19              |              |                  |      |                |             |
| 20              |              |                  |      |                |             |
| 21              |              |                  |      |                |             |
| 22              |              |                  |      |                |             |
| 23              |              |                  |      |                |             |
| 24              |              |                  |      |                |             |
| 25              |              |                  |      |                |             |
| 26              |              |                  |      |                |             |
| 27              |              |                  |      |                |             |
| 28              |              |                  |      |                |             |

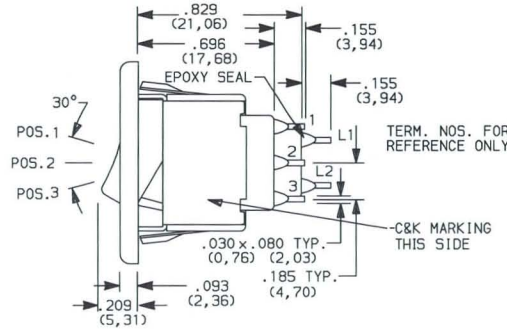


SWITCHES WITH STANDARD OPTIONS

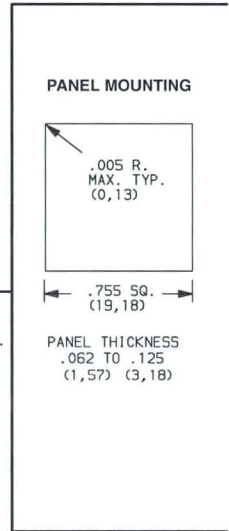
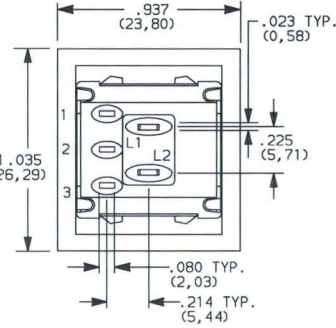


SPDT

Actuator and frame supplied not installed.

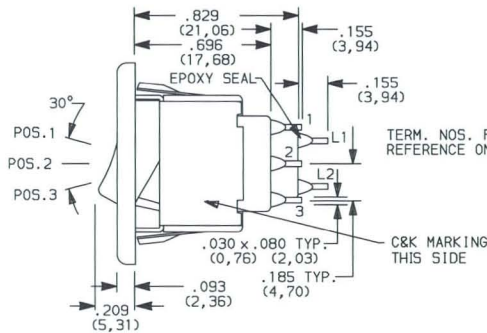


Part No. Shown: 5101ZQE12

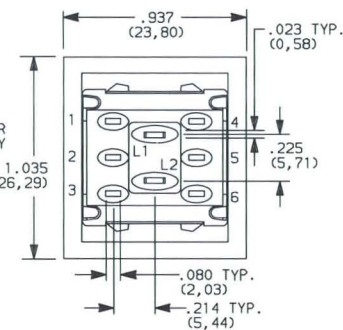


DPDT

Actuator and frame supplied not installed.



Part No. Shown: 5201ZQE12



SWITCH FUNCTION

| NO. POLES | MODEL NO. | UL/CSA** MODEL NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |         | SCHEMATIC |
|-----------|-----------|--------------------|-----------------|--------|--------|---------------------|--------|---------|-----------|
|           |           |                    | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3  |           |
| SP        | 5101      | L11                | ON              | NONE   | ON     | 2-3                 | OPEN   | 2-1     |           |
|           | 5103      | L13                | ON              | OFF    | ON     |                     |        |         |           |
|           | 5105      | L15                | MOM.            | OFF    | MOM.   |                     |        |         |           |
|           | 5107      | L17                | ON              | OFF    | MOM.   |                     |        |         |           |
|           | 5108      | L18                | ON              | NONE   | MOM.   |                     |        |         |           |
| DP        | 5201      | L21                | ON              | NONE   | ON     | 2-3,5-6             | OPEN   | 2-1,5-4 |           |
|           | 5203      | L23                | ON              | OFF    | ON     |                     |        |         |           |
|           | 5205      | L25                | MOM.            | OFF    | MOM.   |                     |        |         |           |
|           | 5207      | L27                | ON              | OFF    | MOM.   |                     |        |         |           |
|           | 5208      | L28                | ON              | NONE   | MOM.   |                     |        |         |           |
|           | 5211*     | 5211*              | ON              | ON     | ON     |                     |        |         |           |
|           | 5213*     | 5213*              | ON              | ON     | MOM.   |                     |        |         |           |
| 5215*     | 5215*     | MOM.               | ON              | MOM.   |        |                     |        |         |           |

MOM. = MOMENTARY

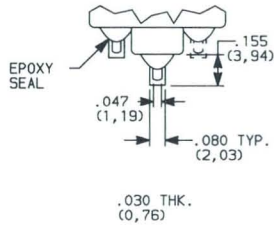
\* Wiring for 3-way switch, see page X.

\*\* L11-L28, 5211-5215 model numbers with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.



TERMINATIONS

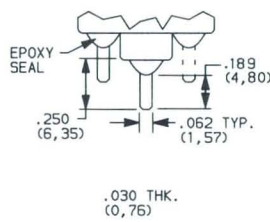
Z (STD.)



SPDT and DPDT

Q contact material std.

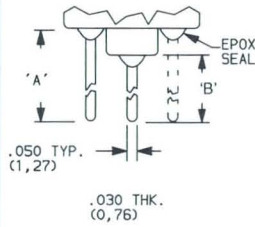
Z3 QUICK CONNECT



SPDT and DPDT

Q contact material std. Mating quick connector available; order part no. 530100000.

W-W1-W3-W4 WIRE-WRAP



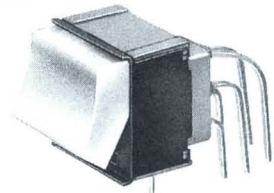
SPDT and DPDT

| Option    | Dim 'A'       | Dim 'B'      |
|-----------|---------------|--------------|
| <b>W</b>  | .750 (19,05)  | .612 (15,54) |
| <b>W1</b> | .964 (24,48)  | .826 (20,98) |
| <b>W3</b> | .425 (10,80)  | .287 (7,29)  |
| <b>W4</b> | 1.062 (26,97) | .924 (23,47) |

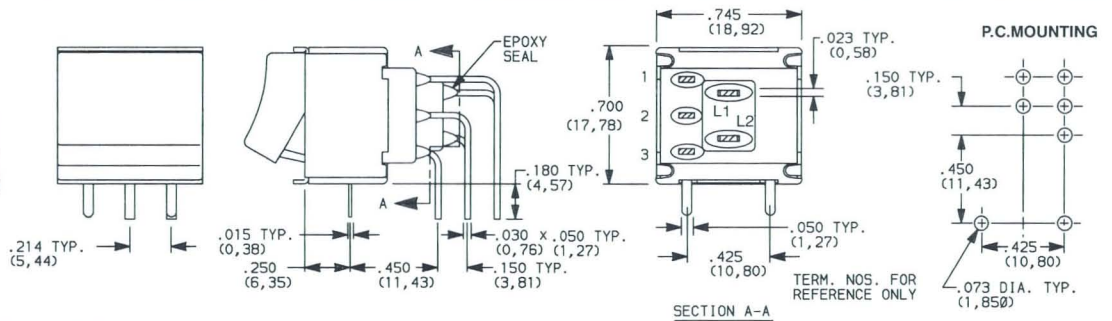
NOTE: W3 replaces C1.

B contact material std.

AV2



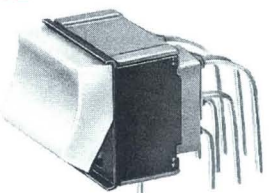
SPDT



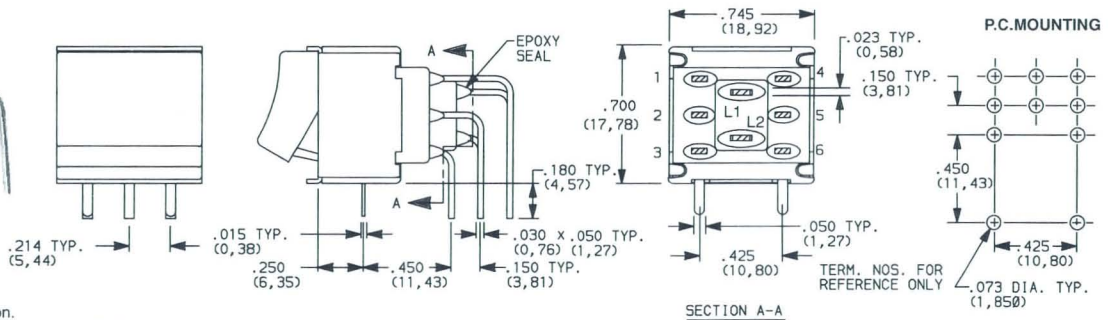
Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1, actuator supplied not installed. B contact material std.

Part No. Shown: 5101AV2BE1

AV2



DPDT



Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1, actuator supplied not installed. B contact material std.

Part No. Shown: 5201AV2BE1

CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING    | RATINGS                         |  |
|-------------|---------------------------------|---------------------|---------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>   | LOW LEVEL/ DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup> | POWER                           | 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.                                     |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>   | LOW LEVEL/ DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC. |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

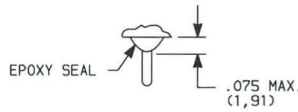
L11-L28, 5211-5215 model numbers with all options when ordered with G or Q contact material. See pages C-50 and VIII.

Q contact material standard with Z, Z3 terminations. B contact material standard with AV2, W-W4 terminations.



## SEAL

**E** (STD.)



## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR | OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|-------------|----------------|
| <b>1</b>    | WHITE (std.)   | <b>5</b>    | YELLOW         |
| <b>3</b>    | RED            | <b>6</b>    | GREEN          |
| <b>4</b>    | ORANGE (AMBER) |             |                |

Select actuator color from chart. Place option code in appropriate box of ordering format. Actuator finish: gloss. Custom markings and legends available, consult factory. Actuators supplied not installed. Actuators are available separately, see catalog section H.



## FRAME COLOR

| OPTION CODE   | FRAME COLOR    | OPTION CODE | FRAME COLOR |
|---------------|----------------|-------------|-------------|
| <b>(NONE)</b> | WITH AV2 TERM. | <b>5</b>    | YELLOW      |
| <b>1</b>      | WHITE          | <b>6</b>    | GREEN       |
| <b>2</b>      | BLACK (std.)   | <b>7</b>    | BLUE        |
| <b>3</b>      | RED            | <b>8</b>    | BROWN       |
| <b>4</b>      | ORANGE         | <b>9</b>    | GRAY        |

Select frame color (if required) from chart. Place option code in appropriate box of ordering format. Frame finish: matte. Custom markings and legends available, consult factory. Frames supplied not installed. Frames are available separately, see catalog section H.

### HOW TO ORDER

All available 5000 SERIES ILLUMINATED ROCKER SWITCH options are listed on page C-49, and are described on pages C-50 thru C-52. Switches with standard options are shown on page C-50. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' P.C. board cleaning methods.   models available, see page C-50. Actuators and frames are available separately, see catalog section H.

### SPECIFICATIONS

- CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC. (Q contact material).
- ELECTRICAL LIFE: 100,000 make -and-break cycles at full load on 5X01 and LX1 models. All other models, 40,000 cycles.
- CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

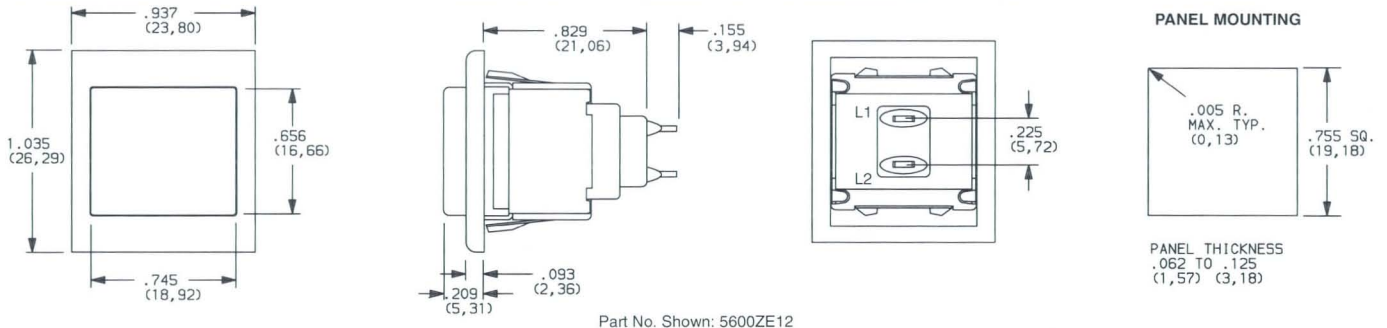
### MATERIALS

- CASE: Diallyl phthalate (DAP) (UL 94V-0).
- ACTUATOR: Translucent polycarbonate, white standard.
- FRAME: Nylon, black standard.
- HOUSING: Stainless steel, black passivate.
- MOUNTING SPRING: Spring steel, nickel plated.
- END CONTACTS: Coin silver, silver plated. (Q contact material).
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- LAMP SOCKET TERMINALS: Copper alloy, tin plated.
- TERMINAL SEAL: Epoxy

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

### LAMP INFORMATION

Lamps are not supplied. Midget screw base lamps sizes T 1 1/2 and T 1 3/4 are recommended. Suggested spherical candlepower range is .34-.75 M.S.C.P. Instrument grade lamps are recommended for dimensional consistency. Max. overall length = .635 (16,13), max. OD = .230 (5,84). Lamps are easily replaceable from front, no special tools are required.



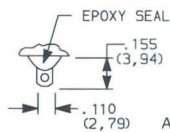
Part No. Shown: 5600ZE12

| INDICATOR LIGHT | TERMINATIONS                        | SEAL      | LENS COLOR            | FRAME COLOR                               |
|-----------------|-------------------------------------|-----------|-----------------------|---|
| L1<br>L2        |                                     | Epoxy<br> | White                 | Black                                     |
| 5600            | C<br>W<br>W1<br>W3<br>W4<br>Z<br>Z3 | E         | 1<br>3<br>4<br>5<br>6 | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9 |

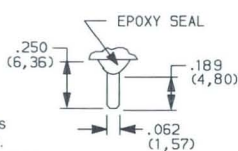
Shown is a complete listing of available options for 5600 SERIES INDICATOR LIGHTS. Build-A-Switch allows you to mix and match options to create the indicator you need— simply select desired termination, lens color and frame color below. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Lens and frame are available separately, see catalog section H. Bulbs not furnished. See lamp information page C-52. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

TERMINATIONS

Z SOLDER

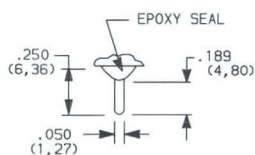


Z3 QUICK CONNECT

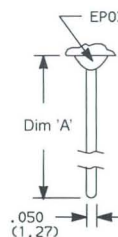


All terminations .030 (0,76) thk. All terminals copper alloy, tin plated.

C P.C.



W-W1-W3-W4 WIRE WRAP



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

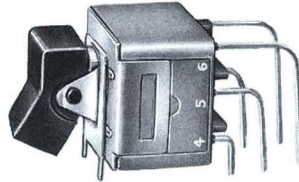
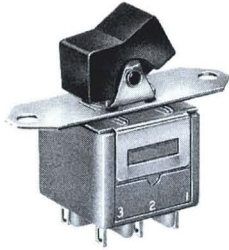
LENS COLOR

| OPTION CODE | LENS COLOR     | OPTION CODE | LENS COLOR |
|-------------|----------------|-------------|------------|
| 1           | WHITE (std.)   | 5           | YELLOW     |
| 3           | RED            | 6           | GREEN      |
| 4           | ORANGE (AMBER) |             |            |

FRAME COLOR

| OPTION CODE | FRAME COLOR  | OPTION CODE | FRAME COLOR |
|-------------|--------------|-------------|-------------|
| 1           | WHITE        | 6           | GREEN       |
| 2           | BLACK (std.) | 7           | BLUE        |
| 3           | RED          | 8           | BROWN       |
| 4           | ORANGE       | 9           | GRAY        |
| 5           | YELLOW       |             |             |

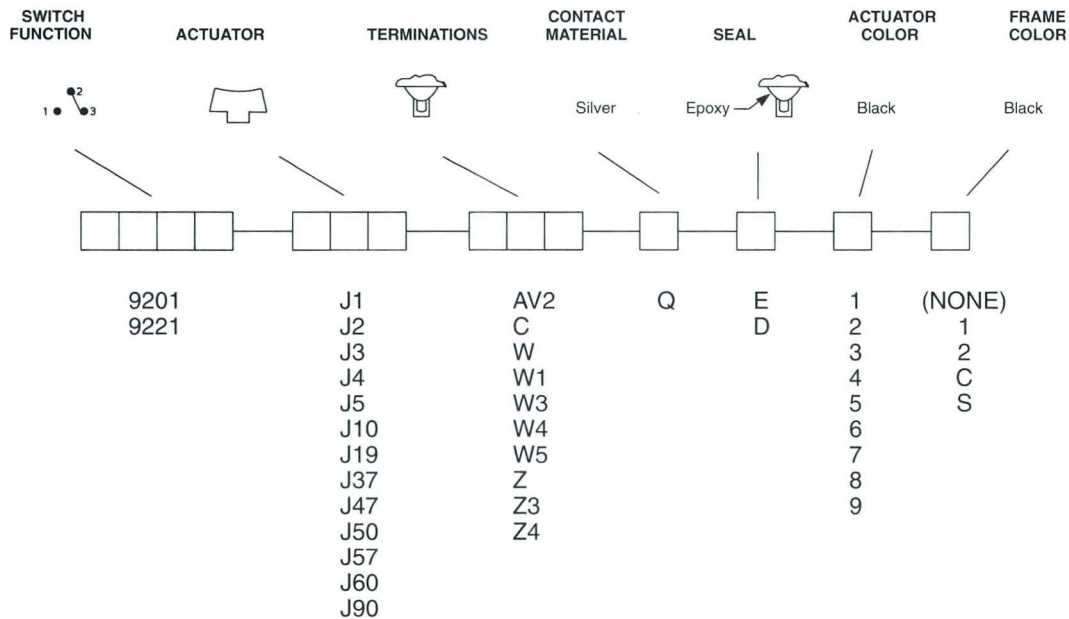
Lens and frame supplied not installed.



All 9000 Series models meet international dimensional and electrical requirements.

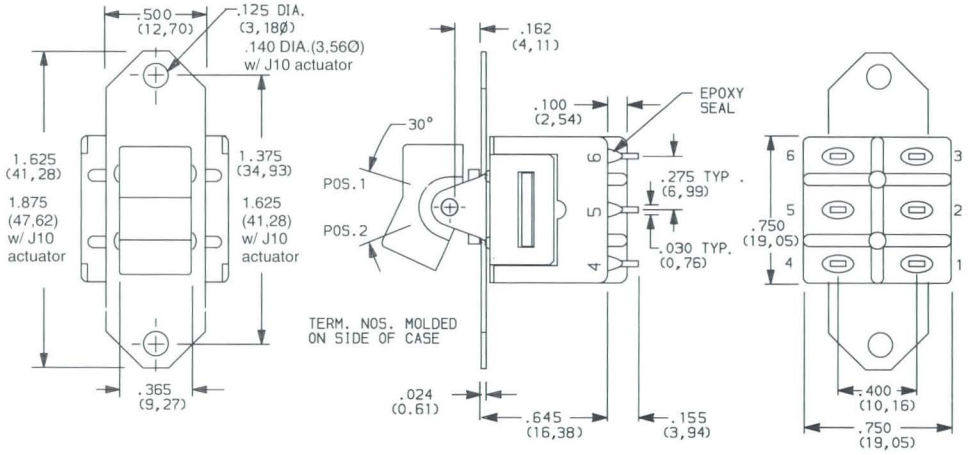
Easy Build-A-Switch:

Below is a complete listing of available options for 9000 SERIES POWER ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-55; all available options are shown and described on pages C-55 thru C-60. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-60. Hardware and accessories are available separately, see catalog section H.



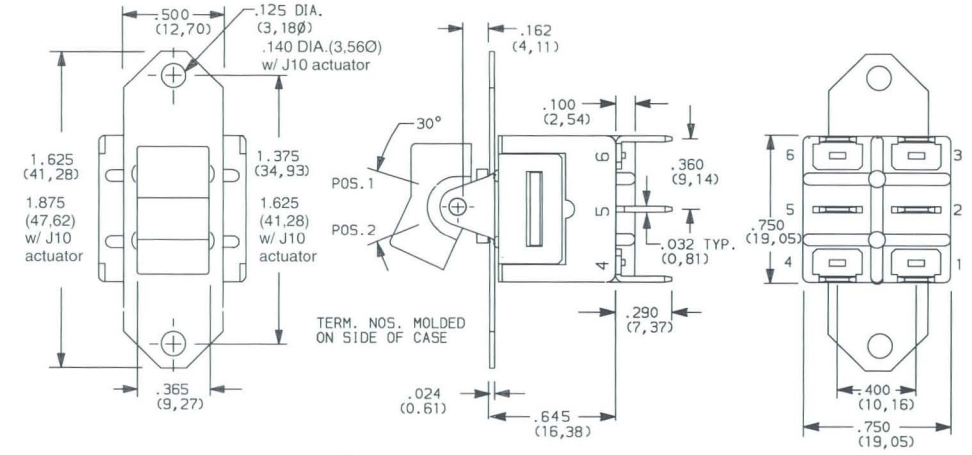
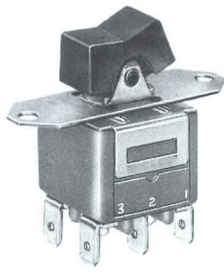


## SWITCHES WITH STANDARD OPTIONS



**DPDT  
6 AMP MODEL**

Part No. Shown: 9201J1ZQE2



**DPDT  
10 AMP MODEL**

Part No. Shown: 9221J1Z4QD2

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | RATING* | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|-----------|---------|-----------------|--------|---------------------|---------|-----------|
|           |           |         | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
|           |           |         |                 |        |                     |         |           |
| DP        | 9201      | 6 AMPS  | ON              | ON     | 2-3,5-6             | 2-1,5-4 |           |
|           | 9221      | 10 AMPS | ON              | ON     |                     |         |           |

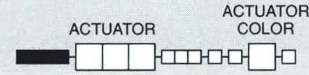


All 9000 Series models meet international dimensional and electrical requirements. See AGENCY APPROVALS, page VIII. 9221 model must be ordered with Z4 terminations and D seal option.

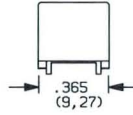
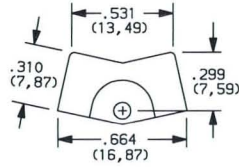
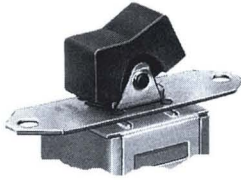
\* See CONTACT MATERIAL, page C-60, for complete ratings.



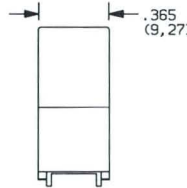
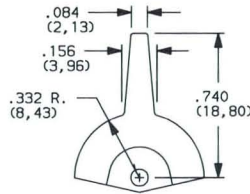
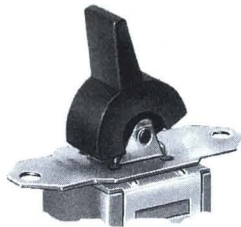
## ACTUATORS—PANEL MOUNT



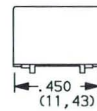
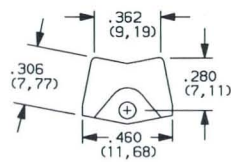
### J1 (STD.)



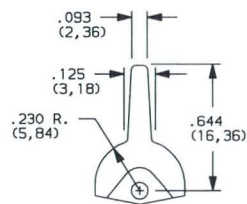
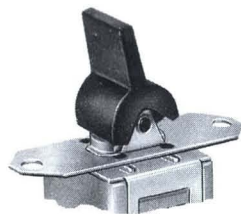
### J2



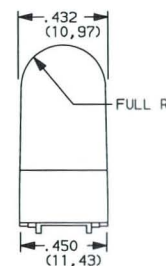
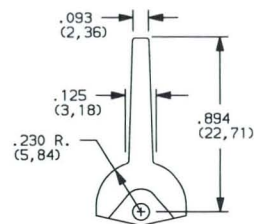
### J50



### J60



### J90

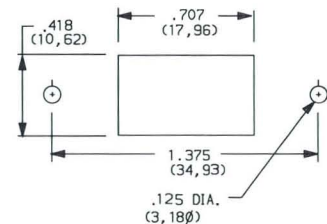


## ACTUATOR COLOR

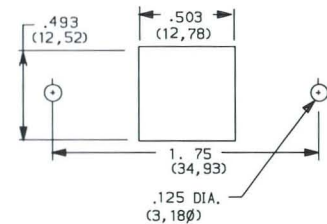
| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-60. Hardware is available separately, see catalog section H.

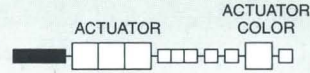
### PANEL MOUNTING J1 - J2



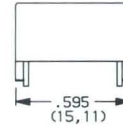
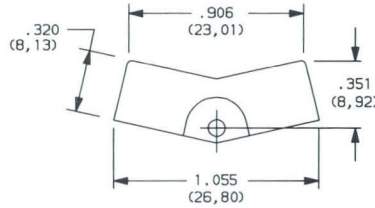
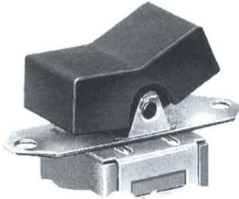
### PANEL MOUNTING J50 - J60 - J90



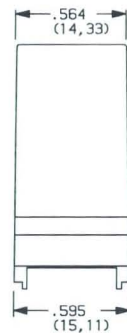
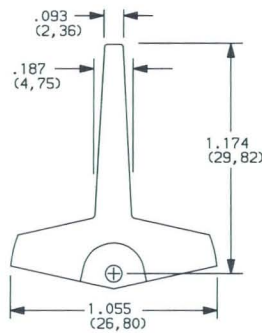
**ACTUATORS—PANEL MOUNT**



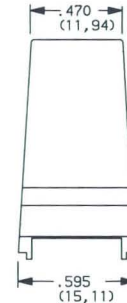
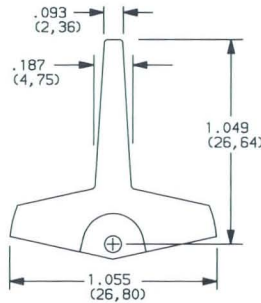
**J3**



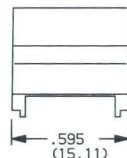
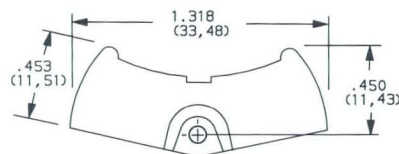
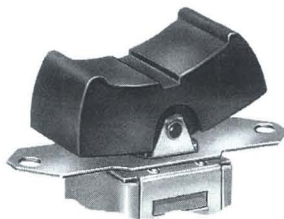
**J4**



**J5**



**J10**

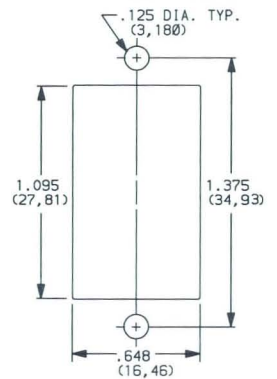


**ACTUATOR COLOR**

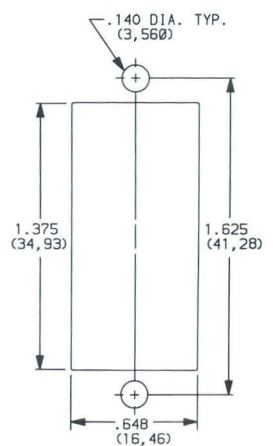
| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-60. Hardware is available separately, see catalog section H.

**PANEL MOUNTING J3 - J4 - J5**

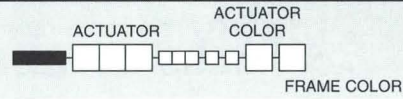


**PANEL MOUNTING J10**

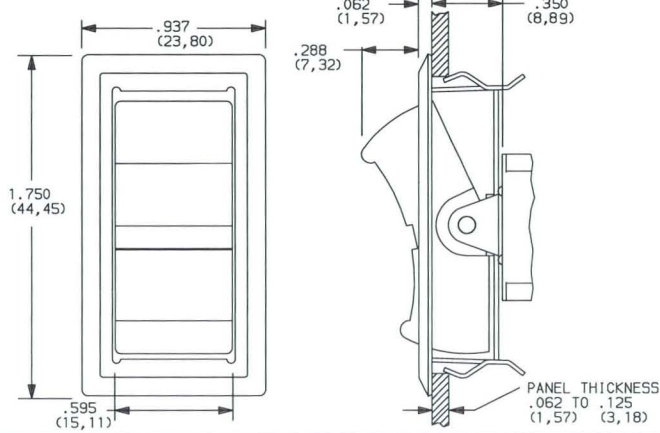
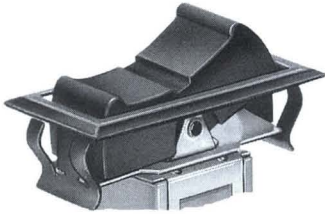




ACTUATORS—REAR MOUNT



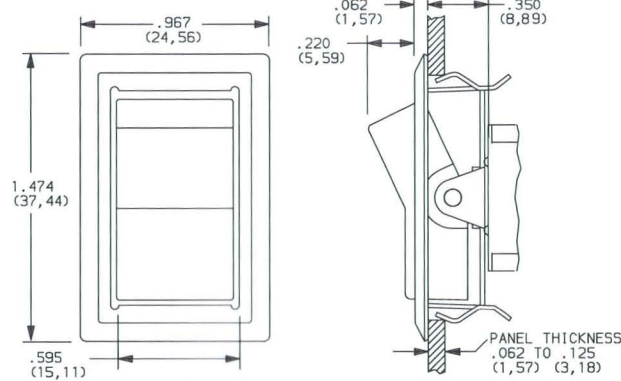
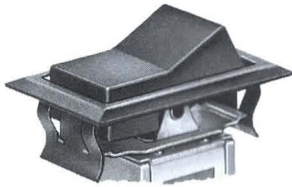
J19



ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

J37

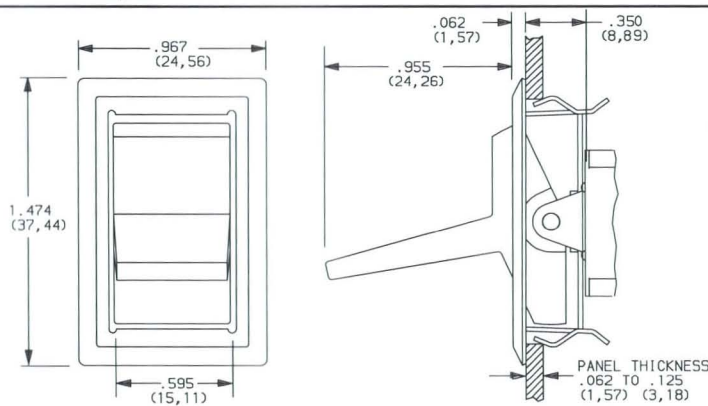


FRAME COLOR

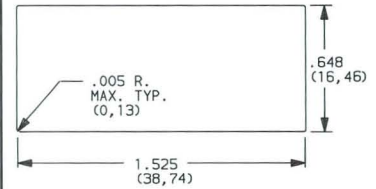
| OPTION CODE | FRAME COLOR   |
|-------------|---------------|
| 1           | WHITE         |
| 2           | BLACK (std.)  |
| C           | BRIGHT CHROME |
| S           | SATIN CHROME  |

Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte. Frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

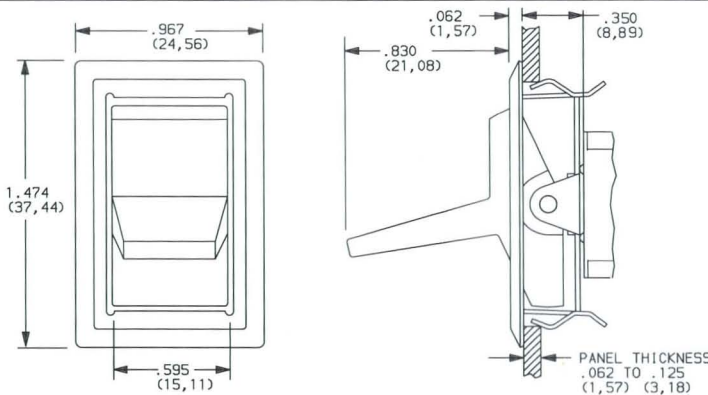
J47



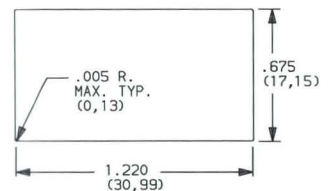
PANEL MOUNTING—J19



J57

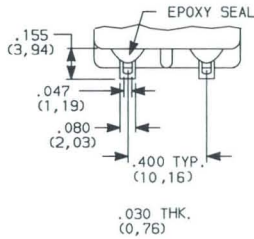


PANEL MOUNTING—J37—J47—J57



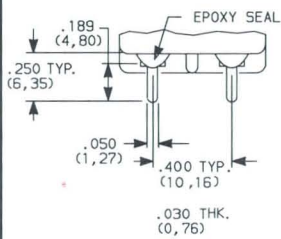
## TERMINATIONS

**Z** (STD.)



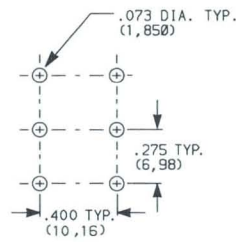
**9201 MODEL ONLY**

**C**

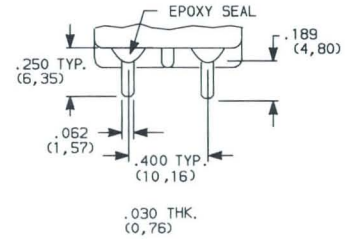


**9201 MODEL ONLY**

P.C. MOUNTING



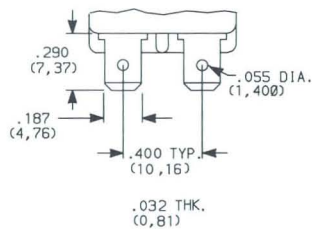
**Z3** QUICK CONNECT



**9201 MODEL ONLY**

Mating quick connector available; order part no. 53010000.

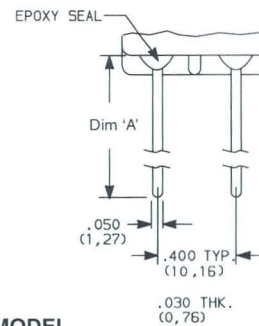
**Z4** QUICK CONNECT



Only termination available with 9221 model. Must be ordered with D seal option. Mating quick connector available from: Hollingsworth Solderless Terminals, Phoenixville, PA 19460 or AMP Special Industries, Harrisburg, PA 17105

**9201 and 9221**

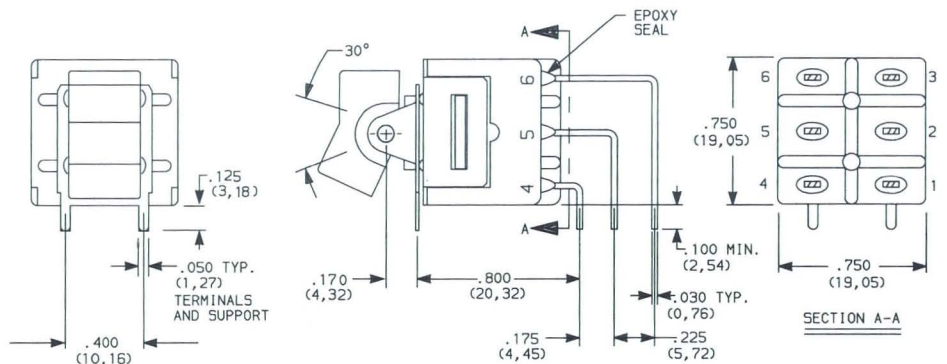
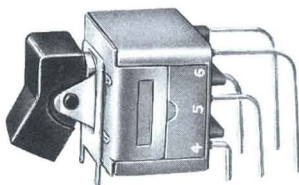
**W-W1-W3-W4-W5** WIRE WRAP



**9201 MODEL ONLY**

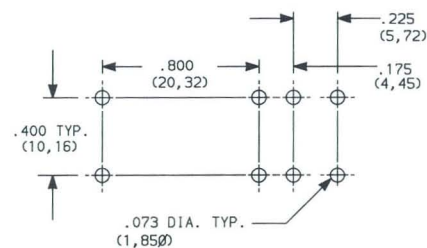
| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

**AV2**



TERM. NOS. MOLDED ON SIDE OF CASE

P.C. MOUNTING



**9201 MODEL ONLY**

Term. bend radii and lead-in mfg. option. Term spacing greater than 3mm at all points. Actuator shown in pos. 1.

Part No. Shown: 9201J1AV2QE2



## CONTACT MATERIAL

| OPTION CODE | MODEL | CONTACT MATERIAL                    | TERMINAL PLATING              | RATINGS |   |
|-------------|-------|-------------------------------------|-------------------------------|---------|---|
| Q           | 9201  | SILVER <sup>1,2</sup>               | SILVER OR TIN <sup>2, 5</sup> | POWER   | 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.  |
|             | 9221  | SILVER CADMIUM OXIDE <sup>3,4</sup> | TIN <sup>5</sup>              |         | 10 AMPS @ 125 V AC OR 28 V DC; 5 AMPS @ 250 V AC. |

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

<sup>1</sup> END CONTACTS: Coin silver, silver plated.

<sup>2</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.

<sup>3</sup> END CONTACTS: Silver cadmium oxide.

<sup>4</sup> CENTER CONTACT: Copper alloy, silver plated.

<sup>5</sup> Z4 TERMINALS ONLY: Copper alloy, tin plated.

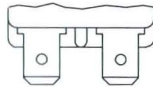


All 9000 Series models meet international dimensional and electrical requirements. See pages C-55 and VIII.

9221 model must be ordered with Z4 terminations and D seal option.

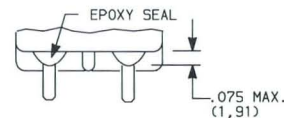
## SEAL

**D** NO SEAL



Must be ordered with 9221 model and Z4 terminations. Not available with any other terminations.

**E**



Must be ordered with all terminations except Z4. Not available with 9221 model or Z4 terminations.

### HOW TO ORDER

All available 9000 SERIES POWER ROCKER AND LEVER HANDLE SWITCH options are listed on page C-54, and are described on pages C-55 thru C-60. Switches with standard options are shown on page C-55. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All 9000 Series models meet international dimensional and electrical requirements.

Hardware: two each—mounting screws, nuts, lockwashers and standoffs for 1/8 in. thick panel are supplied standard on switches with panel mounting bracket. Hardware and accessories available separately, see catalog section H.

### SPECIFICATIONS

#### CONTACT RATING:

9201 MODEL: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC.

9221 MODEL: 10 AMPS @ 125 V AC or 28 V DC; 5 AMPS @ 250 V AC.

ELECTRICAL LIFE: 25,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 2,500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

### MATERIALS

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

ACTUATOR: Nylon, black standard.

FRAME—REAR MOUNT OPTIONS: Spring steel, black standard.

BUSHING: Brass, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

MOUNTING BRACKET: Stainless steel.

#### END CONTACTS:

9201 MODEL: Coin silver, silver plated.

9221 MODEL: Silver cadmium oxide.

CENTER CONTACTS: Copper alloy, silver plated.

#### ALL TERMINALS:

9201 MODEL: Copper alloy, silver plated.

9221 MODEL: Copper alloy, tin plated.

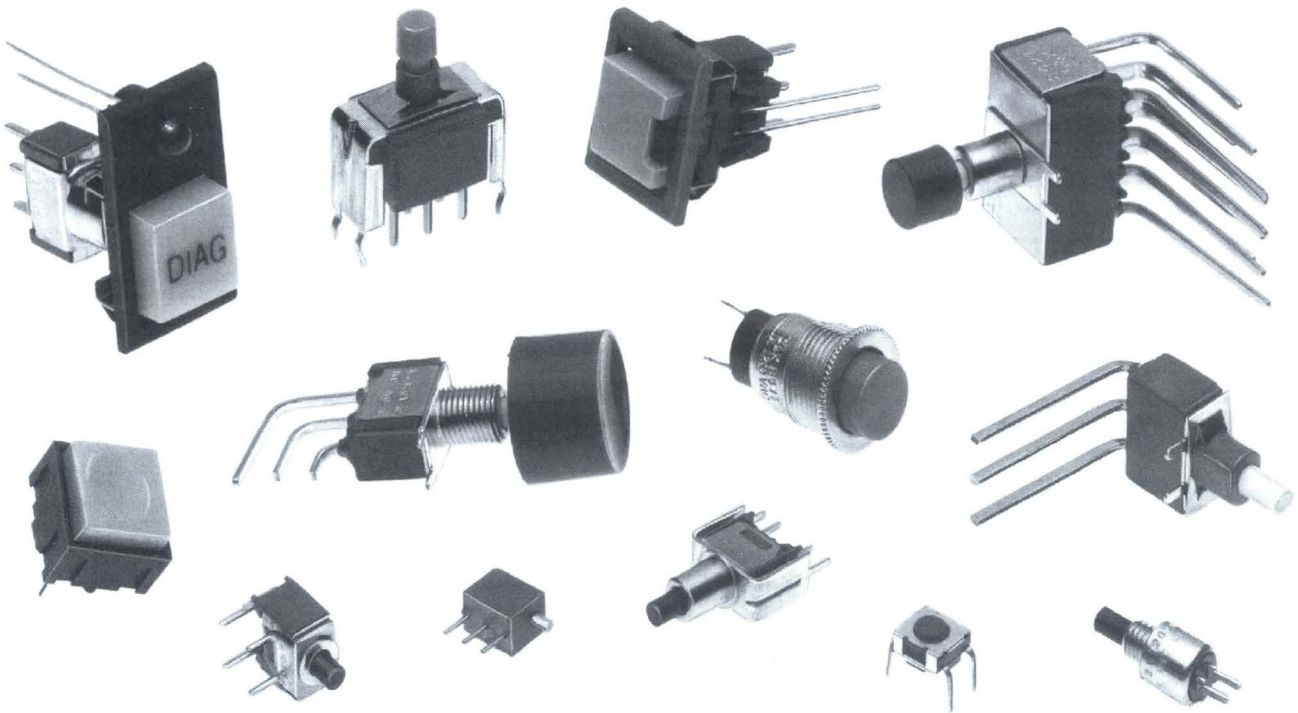
TERMINAL SEAL: Epoxy.

HARDWARE: Nut, Screw, & Lockwasher—Stainless Steel.

Standoff—Nylon standard Aluminum available, consult factory.

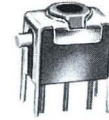
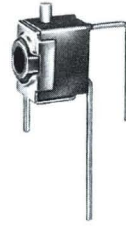
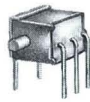
## SECTION D

### PUSHBUTTON SWITCHES



|             |  |                |
|-------------|--|----------------|
| GP Series   | Sealed Ultra-Miniature Pushbutton Switches         | D-2 thru D-3   |
| EP Series   | Sealed Tiny Pushbutton Switches                    | D-4 thru D-9   |
| TP Series   | Tiny Pushbutton Switches                           | D-10 thru D-16 |
| E010 Series | Sealed Momentary Pushbutton Switches               | D-17 thru D-22 |
| E020 Series | Sealed Snap-Acting Momentary Pushbutton Switches   | D-23 thru D-30 |
| 8020 Series | Snap-Acting Momentary Pushbutton Switches          | D-31 thru D-46 |
| 8060 Series | Alternate Action and Momentary Pushbutton Switches | D-47 thru D-56 |
| 8600 Series | Microminiature Pushbutton Switches                 | D-57 thru D-58 |
| 8500 Series | Subminiature Pushbutton Switches                   | D-59 thru D-62 |
| KT Series   | Sealed Miniature Key Switches                      | D-63 thru D-64 |
| KA Series   | Sealed Half-Inch Dome Pushbutton Switches          | D-65 thru D-66 |
| KS Series   | Pushbutton Key Switches                            | D-67 thru D-69 |
| KP Series   | Piezo Pluse Momentary Pushbutton Switches          | D-70 thru D-73 |

\*Process sealed—withstands soldering and cleaning processes.



- FOUR P.C. TERMINAL STYLES— .100 IN. TERMINAL SPACING
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- SPST AND SPDT MOMENTARY MODELS AVAILABLE

- PROCESS COMPATIBLE— WITHSTANDS MACHINE SOLDERING TEMPERATURES AND PRESSURE WASH CLEANING METHODS—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL

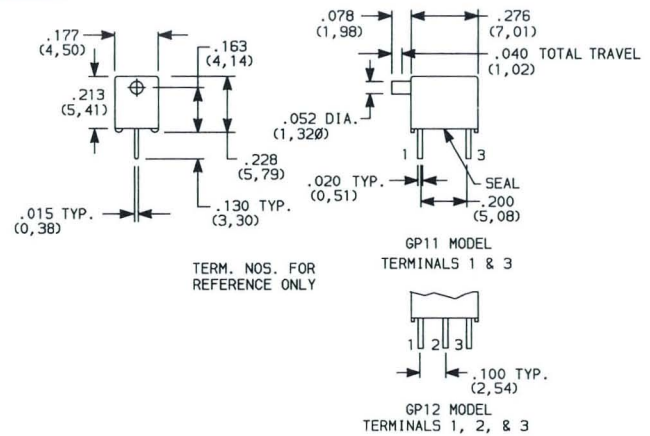
| PART NO.        | SWITCH FUNCTION |        |
|-----------------|-----------------|--------|
|                 | POS. 1          | POS. 2 |
| <b>GP11MCKE</b> | OFF             | MOM.   |
| Conn. Terms.    | OPEN            | 1-3    |
| Schematic       |                 |        |
| SPST            |                 |        |
| <b>GP12MCKE</b> | ON              | MOM.   |
| Conn. Terms.    | 2-1             | 2-3    |
| Schematic       |                 |        |
| SPDT            |                 |        |

MOM.=MOMENTARY

### SP MODELS WITH C TERMINALS



SPST and SPDT



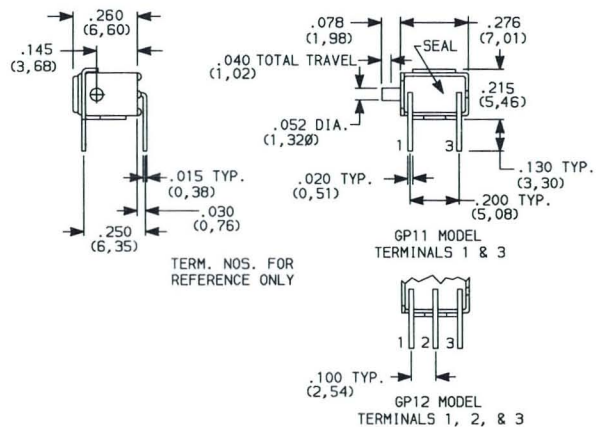
| PART NO.        | SWITCH FUNCTION |        |
|-----------------|-----------------|--------|
|                 | POS. 1          | POS. 2 |
| <b>GP11MAKE</b> | OFF             | MOM.   |
| Conn. Terms.    | OPEN            | 1-3    |
| Schematic       |                 |        |
| SPST            |                 |        |
| <b>GP12MAKE</b> | ON              | MOM.   |
| Conn. Terms.    | 2-1             | 2-3    |
| Schematic       |                 |        |
| SPDT            |                 |        |

MOM.=MOMENTARY

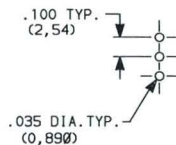
### SP MODELS WITH A TERMINALS



SPST and SPDT



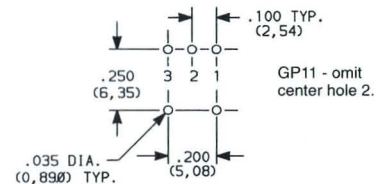
### C TERMINAL STYLE



GP11 - omit center hole.

### P.C. MOUNTING

### A TERMINAL STYLE



GP11 - omit center hole 2.



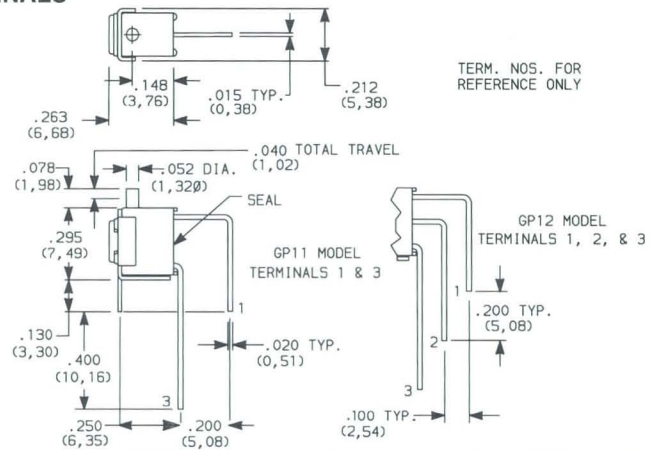
\*Process sealed—withstands soldering and cleaning processes.

## SP MODELS WITH AV TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GP11MAVKE</b> | OFF             | MOM.   |
| Conn. Terms.     | OPEN            | 1-3    |
| Schematic        |                 |        |
| SPST             |                 |        |
| <b>GP12MAVKE</b> | ON              | MOM.   |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |



SPST and SPDT



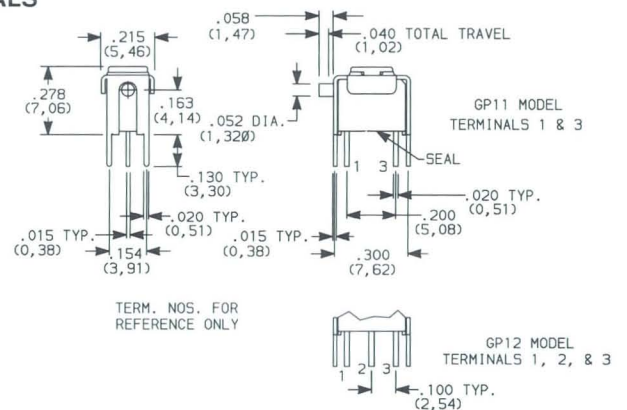
MOM.=MOMENTARY

## SP MODELS WITH V3 TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GP11MV3KE</b> | OFF             | MOM.   |
| Conn. Terms.     | OPEN            | 1-3    |
| Schematic        |                 |        |
| SPST             |                 |        |
| <b>GP12MV3KE</b> | ON              | MOM.   |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |

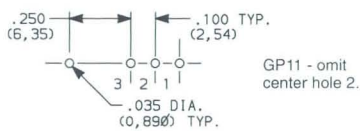


SPST and SPDT



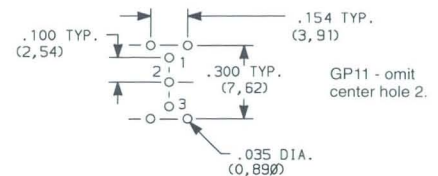
MOM.=MOMENTARY

### AV TERMINAL STYLE



### P.C. MOUNTING

### V3 TERMINAL STYLE



## HOW TO ORDER

Complete part numbers for GP SERIES SEALED ULTRA-MINIATURE PUSHBUTTON SWITCHES are shown on pages D-2 and D-3. GP Series surface mount models also available—see catalog section A, pages A-8 thru A-10.

## SPECIFICATIONS

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
- MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.
- CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

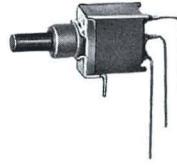
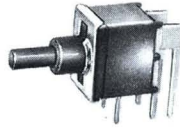
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

## MATERIALS

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



\*Process sealed—withstands soldering and cleaning processes.

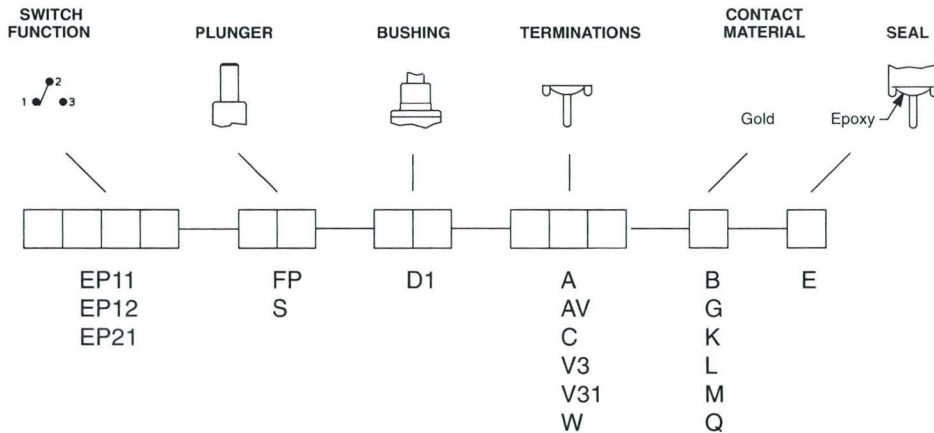


models available, see page D-5.

**Easy Build-A-Switch:**

Below is a complete listing of available options for EP SERIES SEALED TINY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-5; all available options are shown and described on pages D-5 thru D-9. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-9. Actuator caps available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. EP Series surface mount models also available—see catalog section A, page A-16 and A-17.

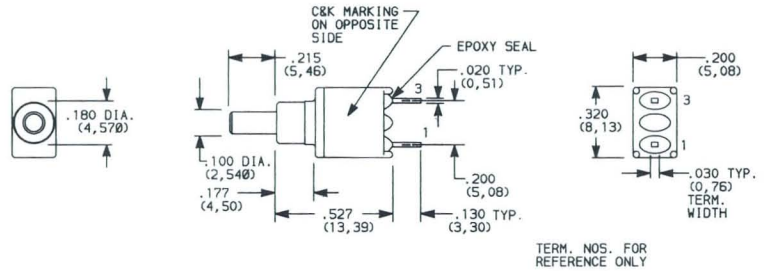
D





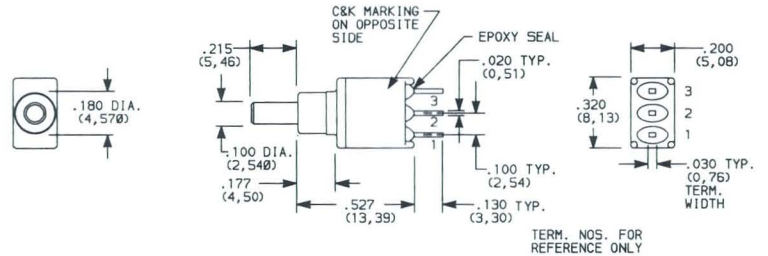
\*Process sealed—withstands soldering and cleaning processes.

SWITCHES WITH STANDARD OPTIONS



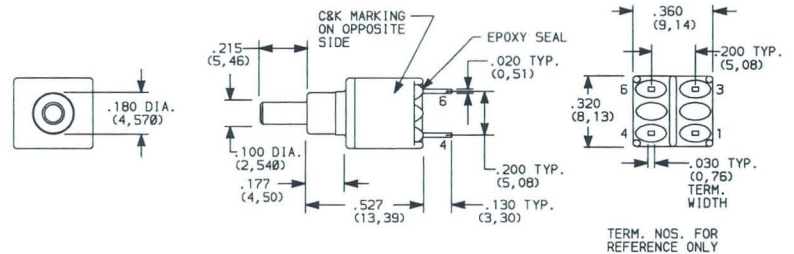
SPST

Part No. Shown: EP11SD1CBE



SPDT

Part No. Shown: EP12SD1CBE



DPST

Part No. Shown: EP21SD1CBE

SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|-----------|-----------------|--------|---------------------|---------|-----------|
|           |           | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP        | EP11      | OFF             | MOM.   | OPEN                | 1-3     | SPST      |
|           | EP12      | ON              | MOM.   | 2-1                 | 2-3     | SPDT      |
| DP        | EP21      | OFF             | MOM.   | OPEN                | 1-3,4-6 | DPST      |

MOM. = MOMENTARY

\*\* All models when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII. (NOTE: EP12 model not CSA).

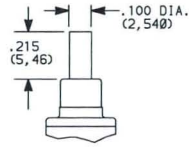
EP21 model not available with FP plunger option.



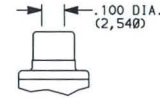
\*Process sealed-withstands soldering and cleaning processes.

PLUNGER

S (STD.)



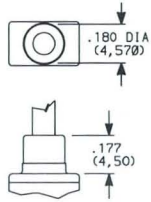
FP FLUSH PLUNGER



Not available on EP21 model.

BUSHING

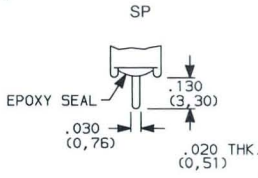
D1 (STD.)



Internal actuator o-ring std.

TERMINATIONS

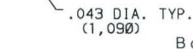
C (STD.)



P.C. MOUNTING

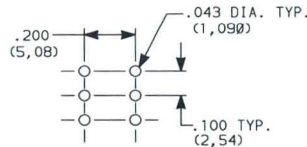
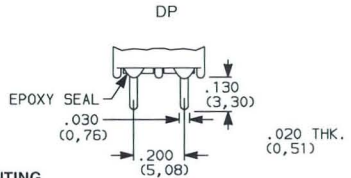


SP and DP



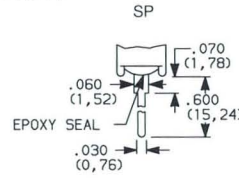
B contact material std.

DP

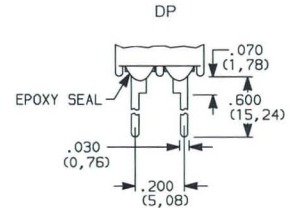


W WIRE WRAP

SP



DP

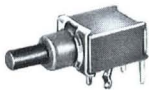


.020 THK. (0,51)

SP and DP

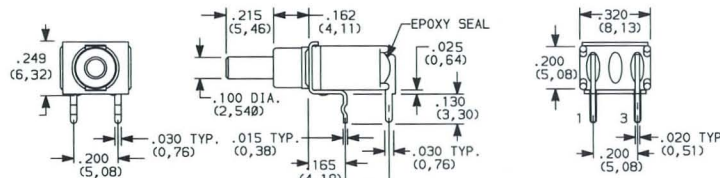
B contact material std.

A



SPST EP11 MODEL ONLY

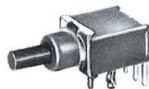
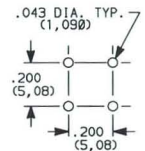
B contact material std.



TERM. NOS. FOR REFERENCE ONLY

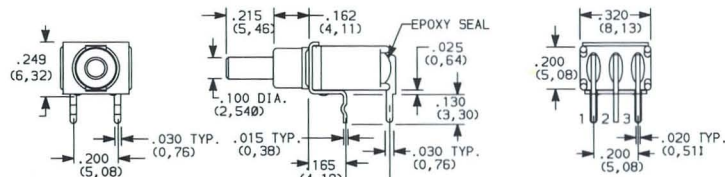
Part No. Shown: EP11SD1ABE

P.C. MOUNTING



SPDT EP12 MODEL ONLY

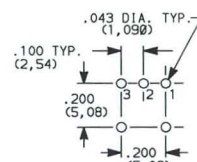
B contact material std.



TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: EP12SD1ABE

P.C. MOUNTING

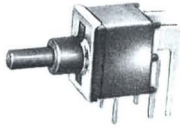




\*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

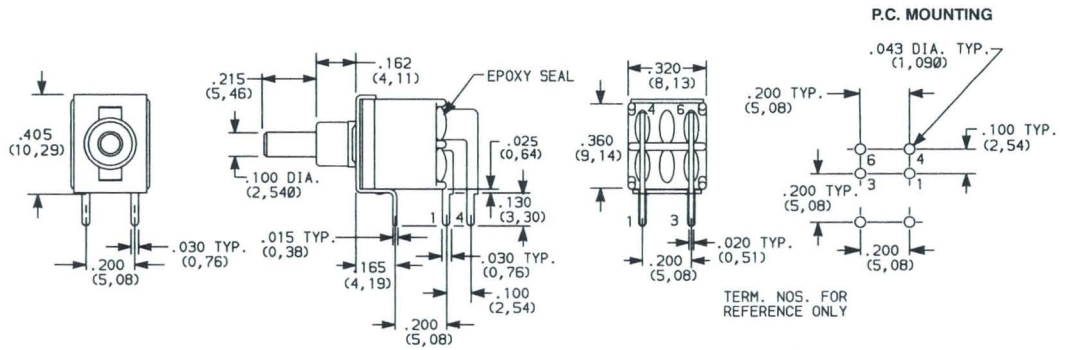
A



DPST

B contact material std.

Part No. Shown: EP21SD1ABE



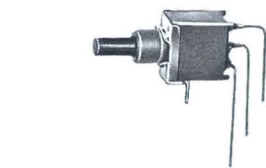
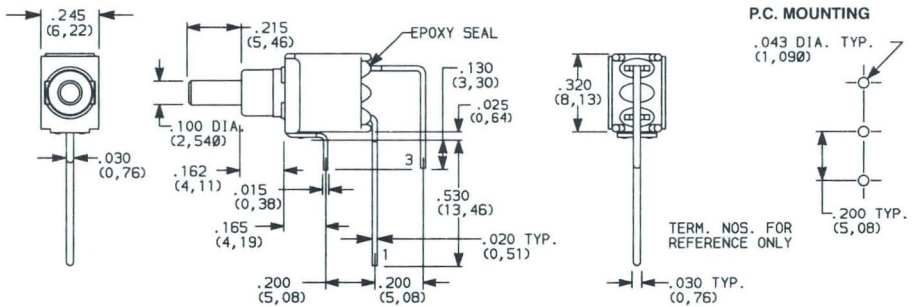
AV



SPST  
EP11 MODEL ONLY

Term. bend radii and lead-in mfg. option.  
B contact material std.

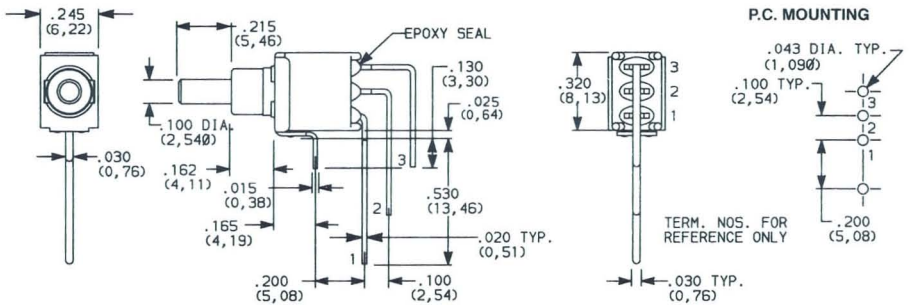
Part No. Shown: EP11SD1AVBE



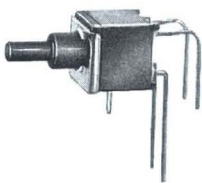
SPDT  
EP12 MODEL ONLY

Term. bend radii and lead-in mfg. option.  
B contact material std.

Part No. Shown: EP12SD1AVBE



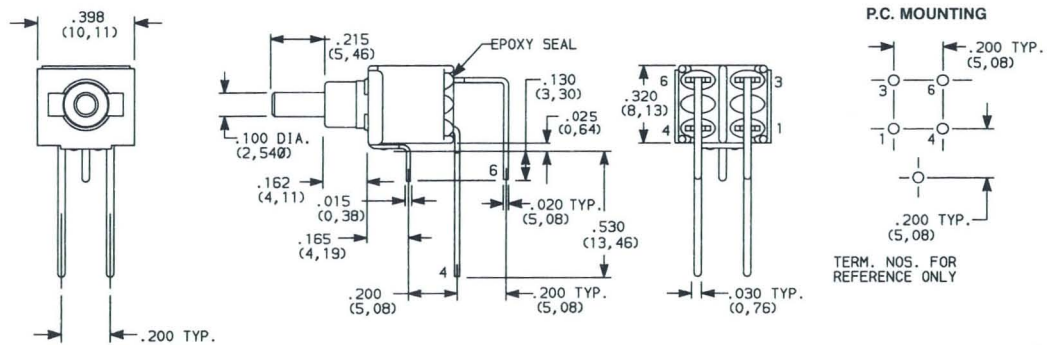
AV



DPST

Term. bend radii and lead-in mfg. option.  
B contact material std.

Part No. Shown: EP21SD1AVBE





EP Series

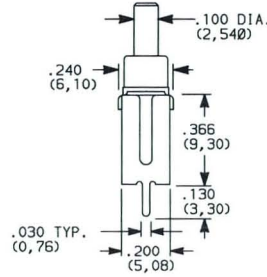
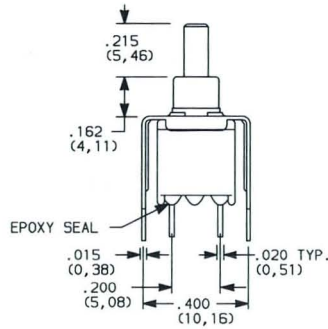
# Sealed\* Tiny Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

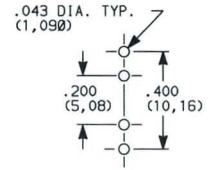
## TERMINATIONS

V3

V31 SNAP-IN **NEW**



P.C. MOUNTING



V31 SNAP-IN

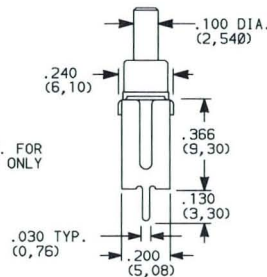
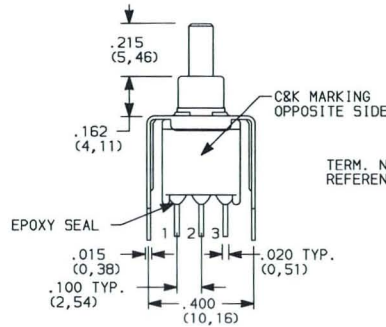


SPST  
EP11 MODELS ONLY

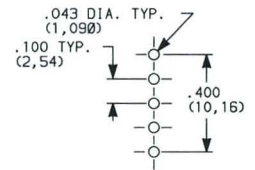
B contact material std.

Part No. Shown: EP11SD1V3BE

D



P.C. MOUNTING



V31 SNAP-IN

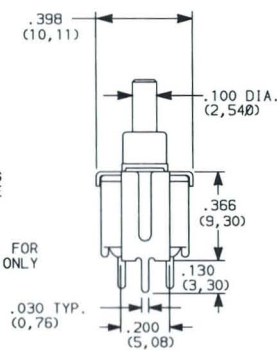
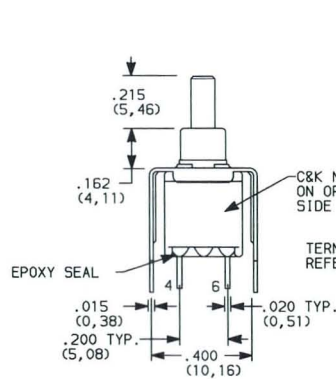


SPDT  
EP12 MODELS ONLY

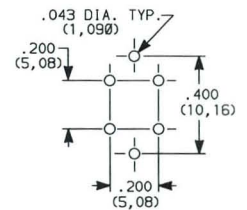
B contact material std.

Part No. Shown: EP12SD1V3BE

V3



P.C. MOUNTING



DPST

B contact material std.

Part No. Shown: EP21SD1V3BE





CONTACT MATERIAL 

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

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models   with all options when ordered with G, L, M or Q contact material. (NOTE: EP21 model not CSA). See pages D-5 and VIII.

B contact material standard with all terminations.

SEAL 

**E** (STD.)



HOW TO ORDER

All available EP SERIES SEALED TINY PUSHBUTTON SWITCH options are listed on page D-4, and are described on pages D-5 thru D-9. Switches with standard options are shown on page D-5. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.   models available, see page D-5. EP Series surface mount models also available—see catalog section A, pages A-16 and A-17. Actuator caps available separately, see catalog section H.

SPECIFICATIONS

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact material).
- ELECTRICAL LIFE: EP11, EP21 MODELS: 60,000 make-and-break cycles at full load.  
EP12 MODEL: 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

MATERIALS

- CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
- PLUNGER: Thermoplastic polyester or glass filled nylon (UL 94V-0), with internal o-ring seal.
- SWITCH SUPPORT: Brass, tin plated.
- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).
- TERMINAL SEAL: Epoxy.

NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



models available, see page D-11.

**Easy Build-A-Switch:**

Below is a complete listing of available options for TP SERIES TINY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-11; all available options are shown and described on pages D-11 thru D-16. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-16. Actuator caps available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

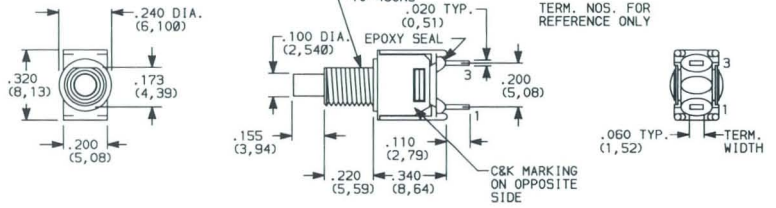
D

| SWITCH FUNCTION | ACTUATOR OR BUSHING | TERMINATIONS | CONTACT MATERIAL | SEAL | CAP COLOR | FRAME COLOR |
|-----------------|---------------------|--------------|------------------|------|-----------|-------------|
|                 |                     |              | Silver           |      | Black     | Black       |
| TP11            | J80                 | A            | B                | E    | (NONE)    | (NONE)      |
| TP12            | J81                 | AV           | G                |      | 1         | 1           |
| TP21            | J82                 | C            | K                |      | 2         | 2           |
|                 | SH                  | V3           | L                |      | 3         | 3           |
|                 | SH8                 | W            | M                |      | 4         | 4           |
|                 | SH9                 | Z            | Q                |      | 5         | 5           |
|                 | LT                  |              |                  |      | 6         | 6           |
|                 | LT9                 |              |                  |      | 7         | 7           |
|                 | MS9                 |              |                  |      | 8         | 8           |
|                 |                     |              |                  |      | 9         | 9           |



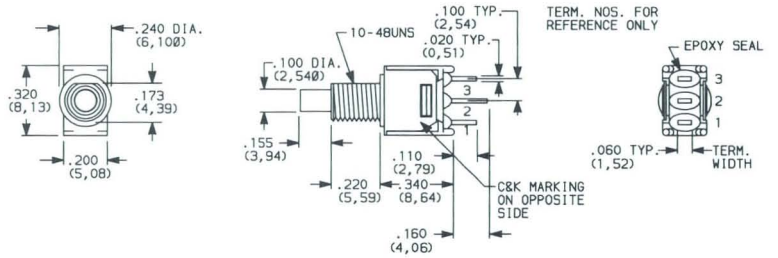


SWITCHES WITH STANDARD OPTIONS



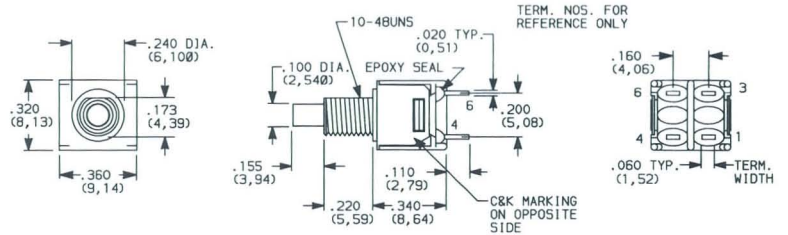
SPST

Part No. Shown: TP11SHZQE



SPDT

Part No. Shown: TP12SHZQE



DPST

Part No. Shown: TP21SHZQE

SWITCH FUNCTION

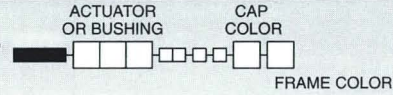
| NO. POLES | MODEL NO.* | SWITCH FUNCTION |        | CONNECTED TERMINALS |          | SCHEMATIC |
|-----------|------------|-----------------|--------|---------------------|----------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 1              | POS. 2   |           |
| SP        | TP11       | OFF             | MOM.   | OPEN                | 1-3      | SPST      |
|           | TP12       | ON              | MOM.   | 2-1                 | 2-3      | SPDT      |
| DP        | TP21       | OFF             | MOM.   | OPEN                | 1-3, 4-6 | DPST      |

MOM. = MOMENTARY

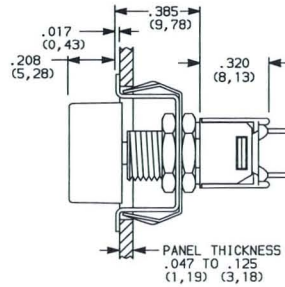
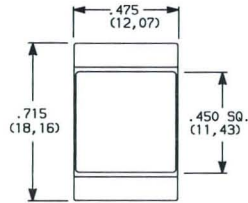
\* All models when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.



ACTUATORS — SNAP-IN FRONT MOUNT

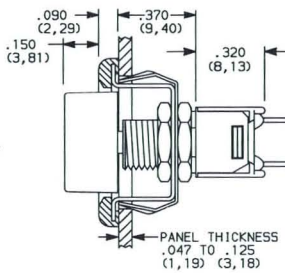
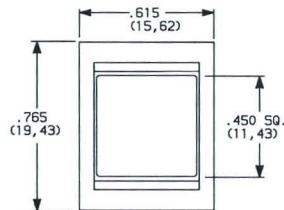


J80

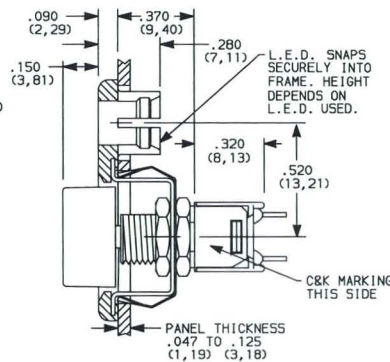
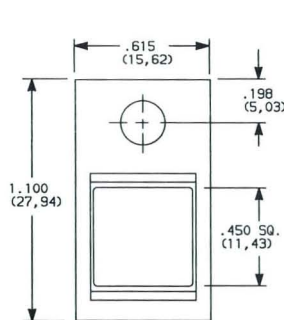
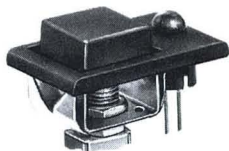


No frame color choice required.

J81



J82



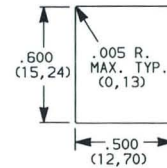
CAP AND FRAME COLORS

| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| 1           | WHITE                |
| 2           | BLACK (std.)         |
| 3           | RED                  |
| 4           | ORANGE               |
| 5           | YELLOW               |
| 6           | GREEN                |
| 7           | BLUE                 |
| 8           | BROWN                |
| 9           | GRAY                 |

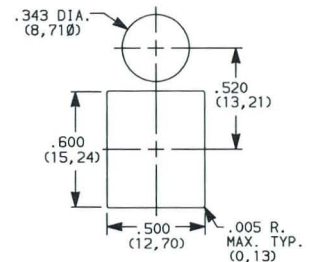
Select cap color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

Available with Z, C, or W terminations.

PANEL MOUNTING — J80, J81



PANEL MOUNTING — J82

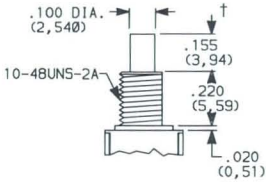
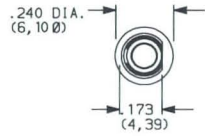


U.S. PATENT NO. 4,004,120  
LED not included.  
See page IX for LED information.



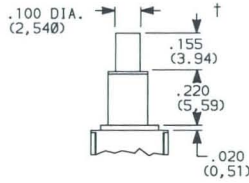
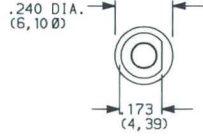
BUSHING ACTUATOR OR BUSHING

SH



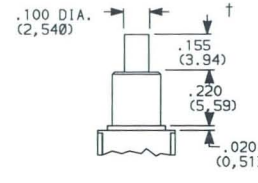
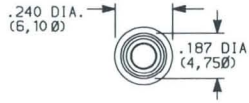
Standard with Z, C, W terminations.

SH9 UNTHREADED

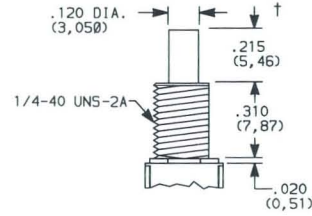
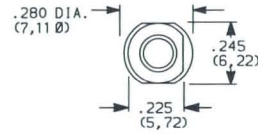


Standard with A, AV, V3 terminations.

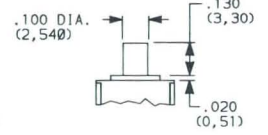
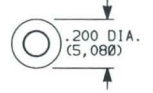
SH8 UNTHREADED



LT LT9 UNTHREADED



MS9

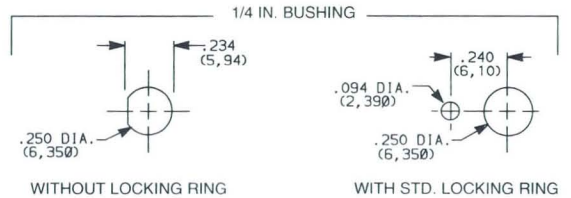
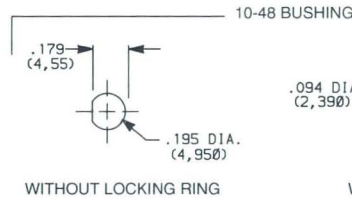


Not available with Z terminations.

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

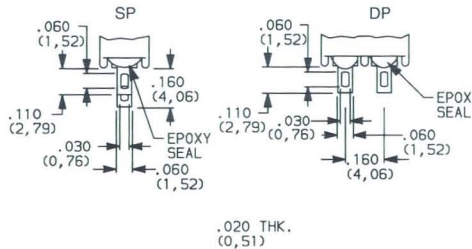
PANEL MOUNTING

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



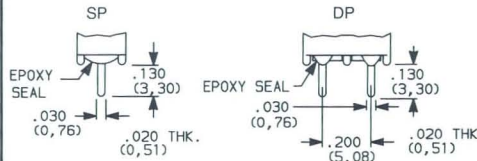
TERMINATIONS

Z (STD.)

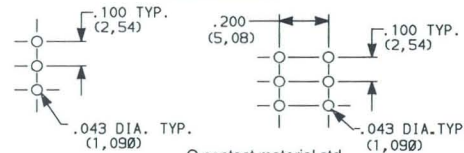


Q contact material std. Not avail. with MS9 bushing or K, L, or M contact mat'l.

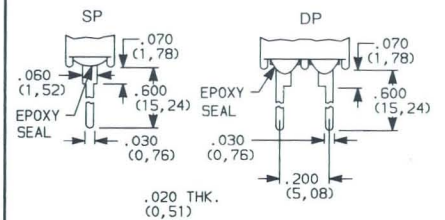
C



P.C. MOUNTING

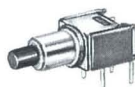


W WIRE WRAP

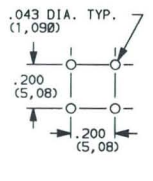
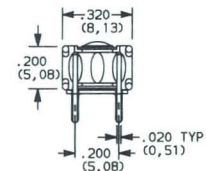
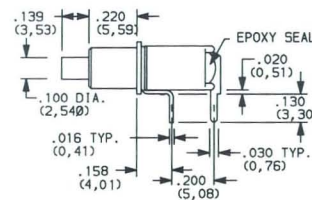
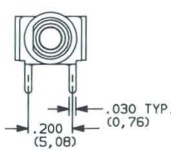


B contact material std.

A



SPST TP11 MODEL ONLY

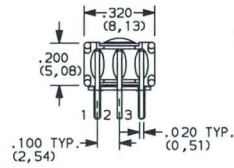
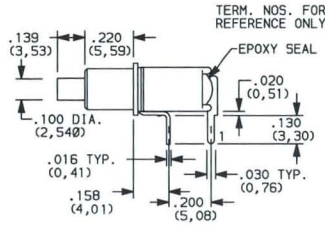


B contact material std.

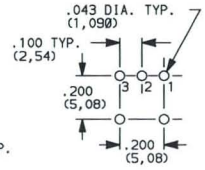
Part No. Shown: TP11SH9ABE

TERMINATIONS

A



P.C. MOUNTING

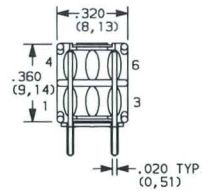
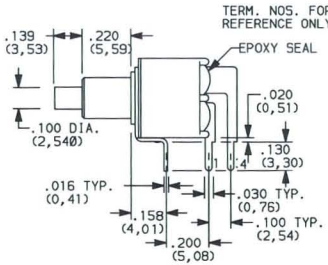
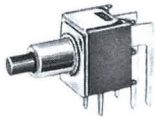


SPDT  
TP12 MODEL ONLY

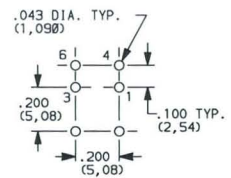
B contact material std.

Part No. Shown: TP12SH9ABE

A



P.C. MOUNTING

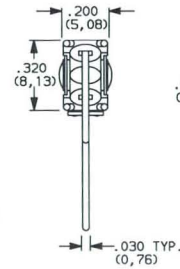
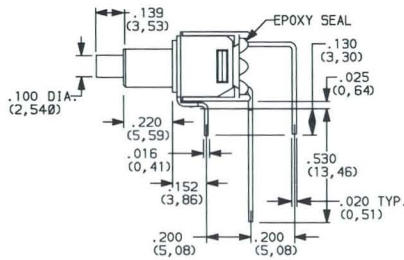
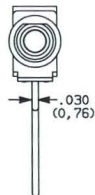


DPST

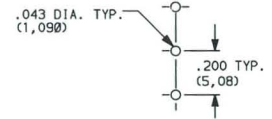
B contact material std.

Part No. Shown: TP21SH9ABE

AV



P.C. MOUNTING

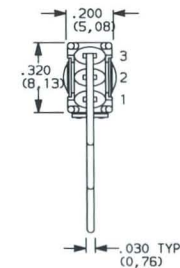
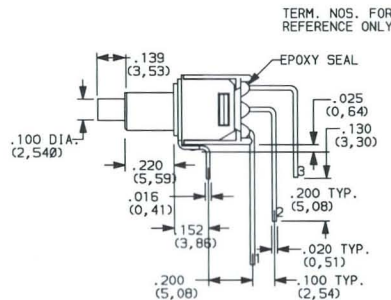
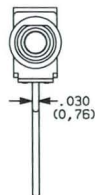


SPST  
TP11 MODEL ONLY

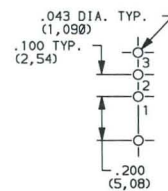
Term. bend radii and lead-in mfg. option.  
B contact material std.

Part No. Shown: TP11SH9AVBE

A



P.C. MOUNTING



SPDT  
TP12 MODEL ONLY

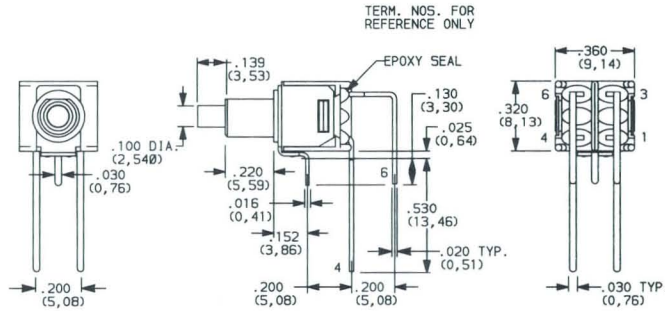
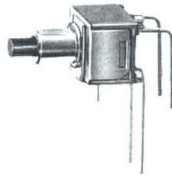
Term. bend radii and lead-in mfg. option.  
B contact material std.

Part No. Shown: TP12SH9AVBE



TERMINATIONS

AV

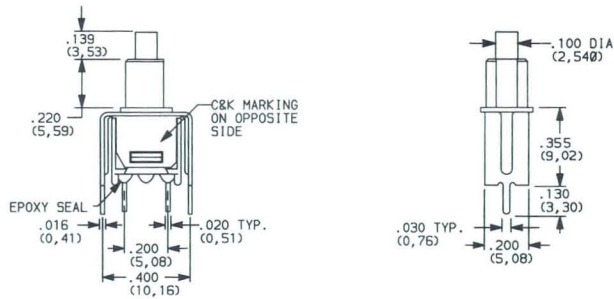


DPST

Term. bend radii and lead-in mfg. option.  
B contact material std.

Part No. Shown: TP21SH9AVBE

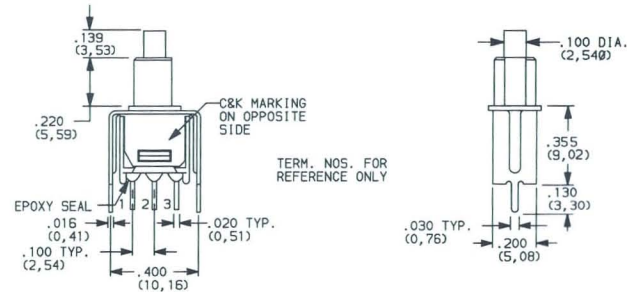
V3



SPST  
TP11 MODEL ONLY

B contact material std.

Part No. Shown: TP11SH9V3BE

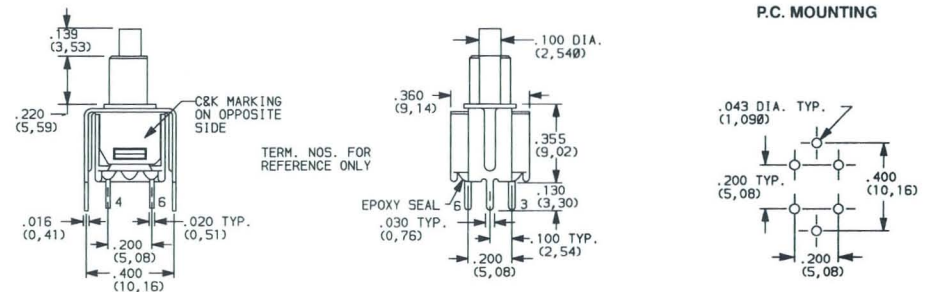


SPDT  
TP12 MODEL ONLY

B contact material std.

Part No. Shown: TP12SH9V3BE

V3



DPST

B contact material std.

Part No. Shown: TP21SH9V3BE

CONTACT MATERIAL

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

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

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

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

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

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

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

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

Q contact material standard with Z, C terminations.

All models with all options when ordered with G, L, M or Q contact material. See pages D-11 and VIII.

SEAL

**E** (STD.)



HOW TO ORDER

All available TP SERIES TINY PUSHBUTTON SWITCH options are listed on page D-10, and are described on pages D-11 thru D-16. Switches with standard options are shown on page D-11. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page D-11. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 1 AMP @ 120 V AC or 28 V DC (Q contact material).

ELECTRICAL LIFE: TP11, TP21 MODELS: 60,000 make-and-break cycles at full load.  
TP12 MODELS: 30,000 cycles.

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

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

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

CAP & FRAME: Nylon, black standard.

BUSHING: Brass, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass, tin plated.

END CONTACTS: Coin silver, silver plated (Q contact material).

CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking ring—Brass nickel plated.

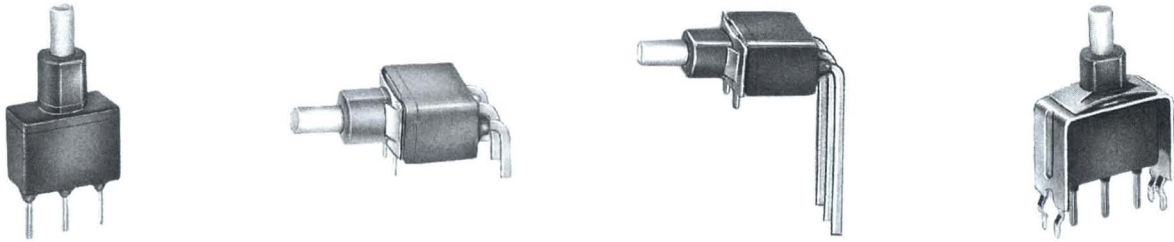
Lockwasher—Steel, nickel plated.



# E010 Series

# Sealed\* Momentary Pushbutton Switches

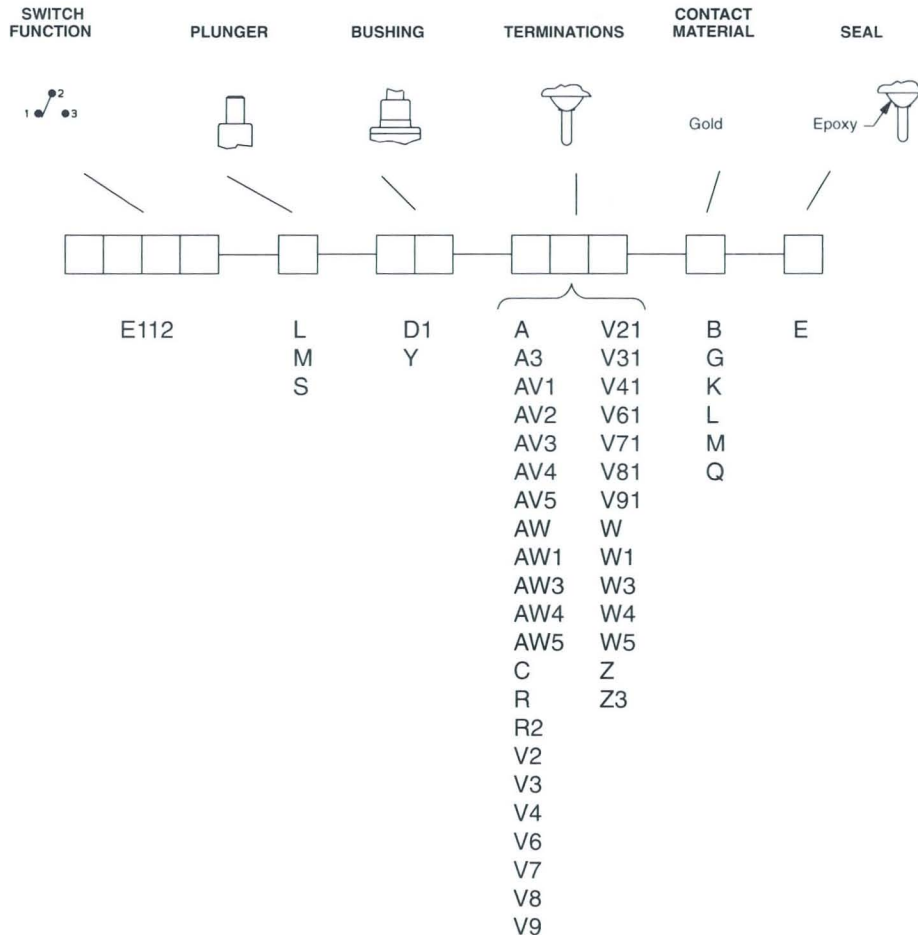
\*Process sealed—withstands soldering and cleaning processes.



models available, see page D-18.

## Easy Build-A-Switch:

Below is a complete listing of available options for E010 SERIES SEALED MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switch with standard options is shown on page D-18; all available options are shown and described on pages D-18 thru D-22. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-22. Actuator caps, hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

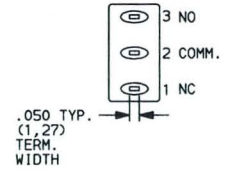
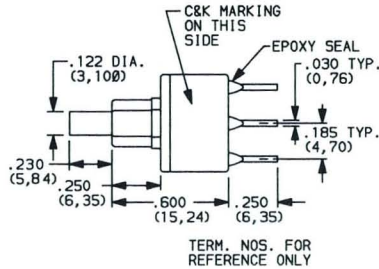
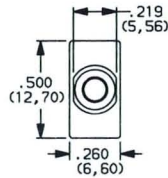


D



\*Process sealed-withstands soldering and cleaning processes.

## SWITCH WITH STANDARD OPTIONS



SPDT

Part No. Shown: E112SD1CQE

## SWITCH FUNCTION

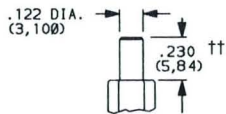
| NO. POLES | MODEL† NO.  | SWITCH FUNCTION |        | CONNECTED TERMINALS |        | SCHEMATIC |
|-----------|-------------|-----------------|--------|---------------------|--------|-----------|
|           |             | POS. 1          | POS. 2 | POS. 1              | POS. 2 |           |
| SP        | <b>E112</b> | ON              | MOM.   | 2-1                 | 2-3    |           |

MOM. = MOMENTARY

† All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

## PLUNGER

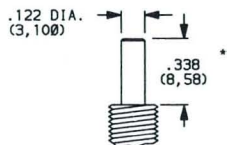
**S** (STD.)



Standard with D1 bushing (as shown).

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

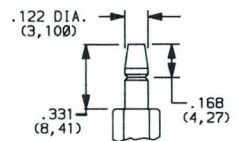
**L**



\*\* Standard with Y bushing (as shown).  
\*\* Add .100 (2,54) to plunger length when ordered with D1 bushing.

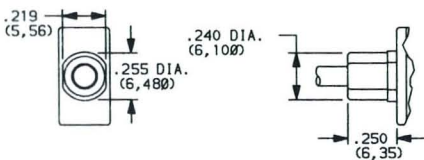
Caps available for all actuator options, see catalog section H.

**M** SNAP-FITTING



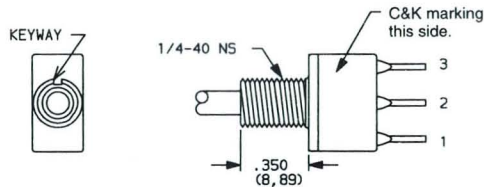
## BUSHING

**D1** (STD.)



S plunger standard with D1 bushing.

**Y**

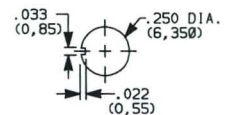


L plunger standard with Y bushing.

Available only with Z, C, Z3, W-W5 terminations.

Hardware: One dress nut P/N 780701201, one hex nut and lockwasher supplied standard.

### PANEL MOUNTING



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





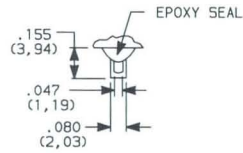
# E010 Series

# Sealed\* Momentary Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

**Z**

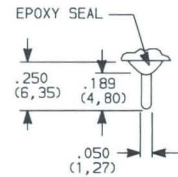


.030 THK.  
(0,76)

SPDT

Q contact material std.  
Not avail. with K, L, or M contact material.

**C** (STD.)

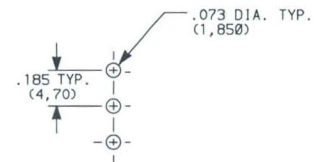


.030 THK.  
(0,76)

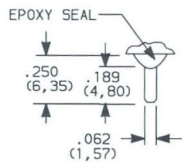
SPDT

Q contact material std.

P.C. MOUNTING



**Z3** QUICK CONNECT

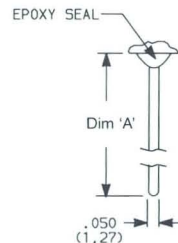


.030 THK.  
(0,76)

SPDT

Q contact material std.  
Mating quick connect available; order P/N 530100000.

**W-W1-W3-W4-W5** WIRE WRAP



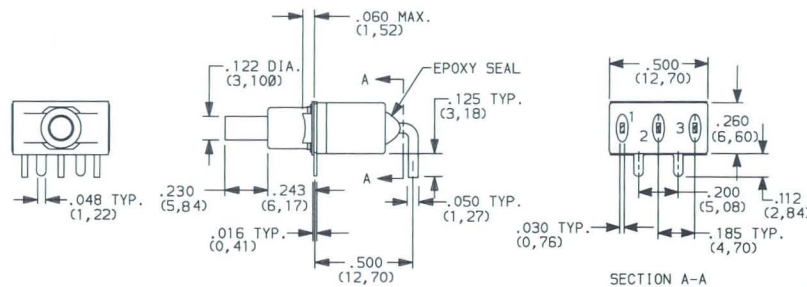
.030 THK.  
(0,76)

SPDT

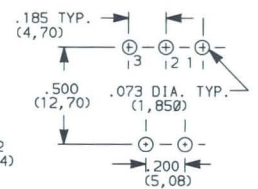
B contact material std.

| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

**A**



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: E112SD1ABE

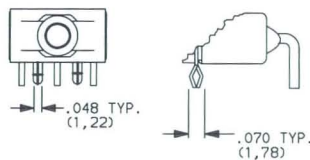


**A**

SPDT

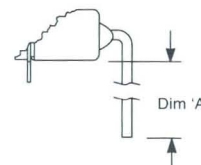
Term. bend radii and lead-in mfg. option.  
B contact material std.  
Available with D1 bushing only.

**A3** SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW3-AW4-AW5** EXTENDED



| Option     | Dim 'A'     |
|------------|-------------|
| <b>AW</b>  | .50 (12,7)  |
| <b>AW1</b> | .72 (18,3)  |
| <b>AW3</b> | .20 (5,1)   |
| <b>AW4</b> | .83 (21,1)  |
| <b>AW5</b> | 1.08 (27,4) |



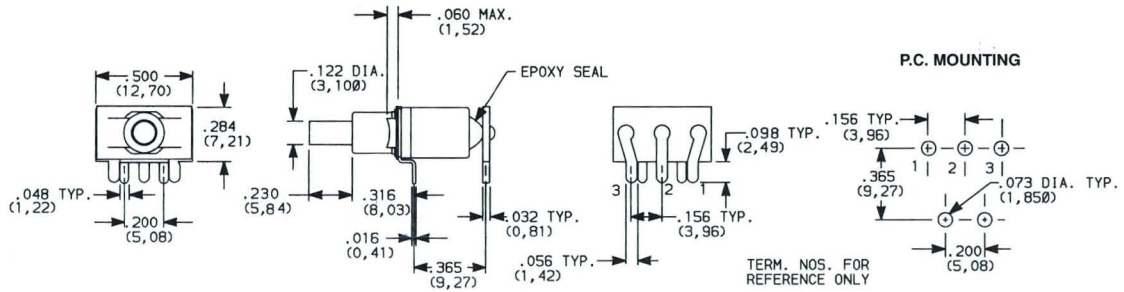
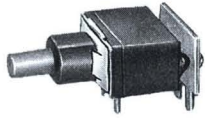
# E010 Series

# Sealed\* Momentary Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

**R**

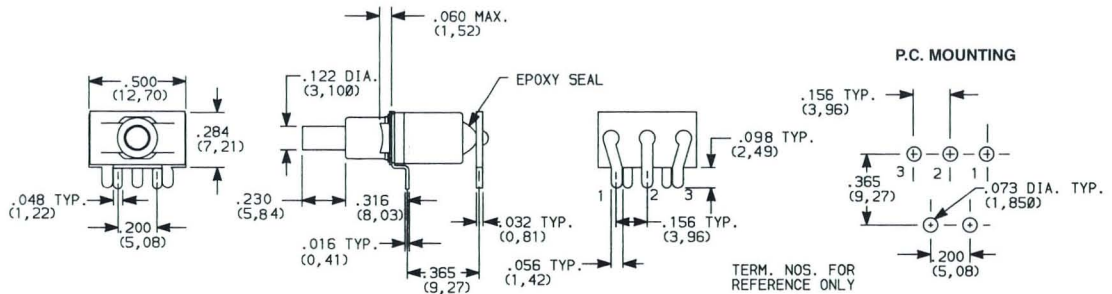
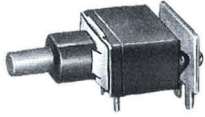


**SPDT**

Available with D1 bushing and B contact mat'l only.

Part No. Shown: E112SD1RBE

**R2**

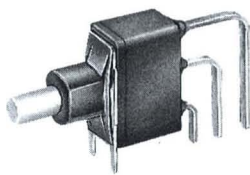


**SPDT**

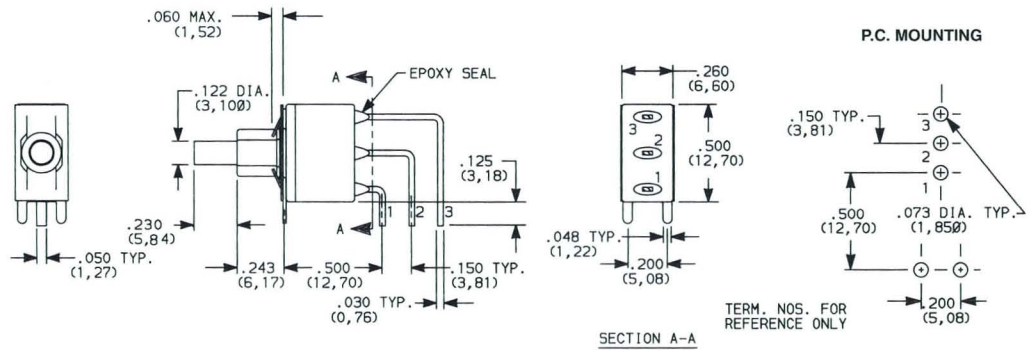
Available with D1 bushing and B contact mat'l only.

Part No. Shown: E112SD1R2BE

**AV2**

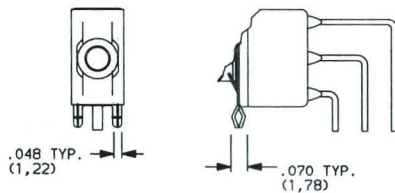


**AV2**



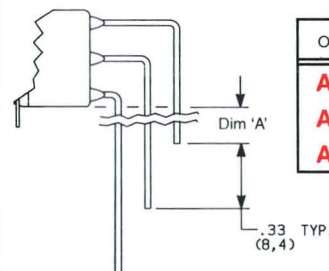
Part No. Shown: E112SD1AV2BE

**AV3 SNAP-IN**



SNAP-IN DESIGN RETAINS SWITCH.

**AV1-AV4-AV5 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AV1</b> | .15 (3,8)  |
| <b>AV4</b> | .25 (6,4)  |
| <b>AV5</b> | .49 (12,4) |

**SPDT**

Term. bend radii and lead-in mfg. option. B contact material std. Available with D1 bushing only.



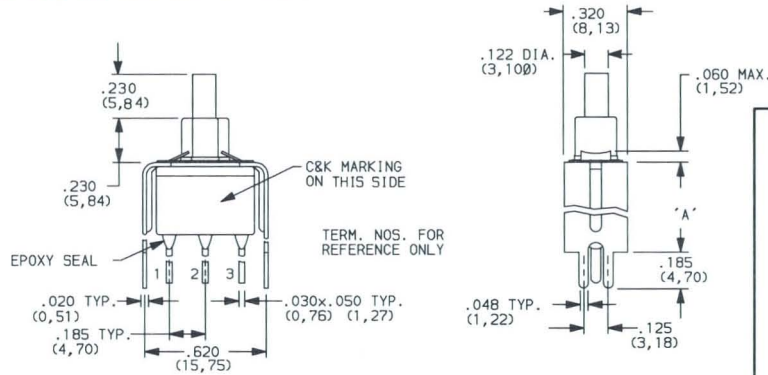
# E010 Series

# Sealed\* Momentary Pushbutton Switches

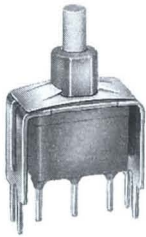
\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

### V3-V4-V9 REPLACES V30-V40-V90

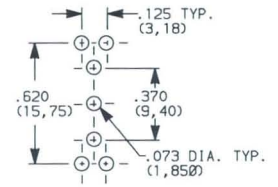


Part No. Shown: E112SD1V\_\_BE

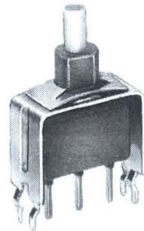


V3

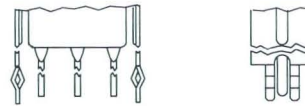
#### P.C. MOUNTING



### V31-V41-V91 SNAP-IN



V31



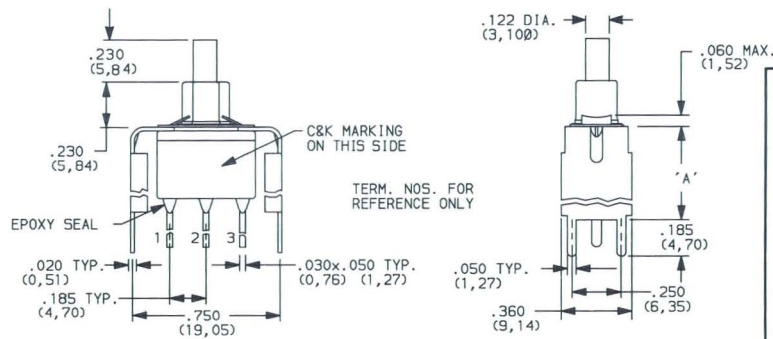
SNAP-IN DESIGN RETAINS SWITCH.

| Option  | Dim 'A'       |
|---------|---------------|
| V3, V31 | .460 (11,68)  |
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

SPDT

B contact material std.  
Available with D1 bushing only.

### V2-V6-V7-V8 REPLACES V20-V60-V70-V80

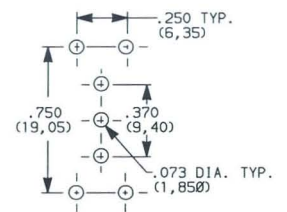


Part No. Shown: E112SD1V\_\_BE

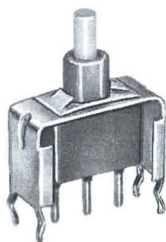


V6

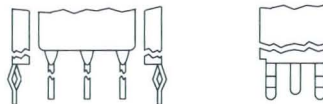
#### P.C. MOUNTING



### V21-V61-V71-V81 SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

SPDT

B contact material std.  
Available with D1 bushing only.



\*Process sealed—withstands soldering and cleaning processes.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.                                 |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | 4 AMPS @ 125 V AC OR 28 V DC.                                    |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR 4 AMPS @ 125 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

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

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

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

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

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

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

B contact material must be ordered with R, R2 terminations.

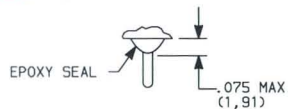
Q contact materials standard with Z, C, Z3 terminations.

K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material. See pages D-18 and VIII.

## SEAL

**E** (STD.)



## HOW TO ORDER

All available E010 SERIES SEALED MOMENTARY PUSHBUTTON SWITCH options are listed on page D-17, and are described on pages D-18 thru D-22. Switch with standard options is shown on page D-18. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page D-18. Actuator caps, hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

CONTACT RATING: 4 AMPS @ 125 V AC or 28 V DC (Q contact material).

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

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 75°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

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

## MATERIALS

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

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

SWITCH SUPPORT: Brass or steel, tin plated.

SWITCH SUPPORT RETAINER: Stainless steel.

END CONTACTS: Coin silver, silver plated (Q contact material).

CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact material).

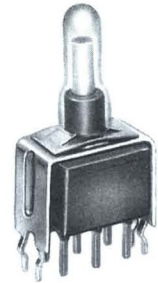
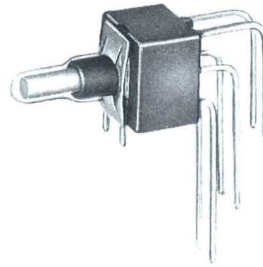
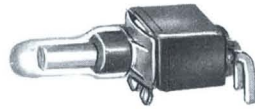
TERMINAL SEAL: Epoxy.

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



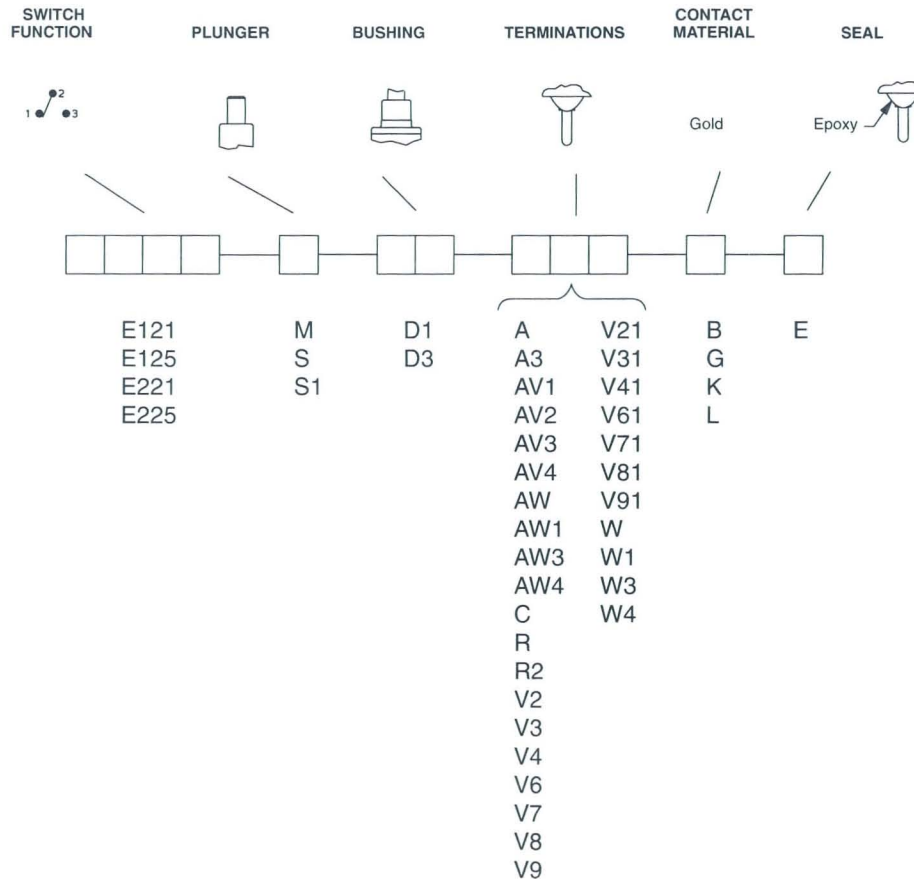
\*Process sealed—withstands soldering and cleaning processes.



models available, see page D-24.

### Easy Build-A-Switch:

Below is a complete listing of available options for E020 SERIES SEALED SNAP-ACTING MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-24; all available options are shown and described on pages D-24 thru D-30. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-30. Actuator caps available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



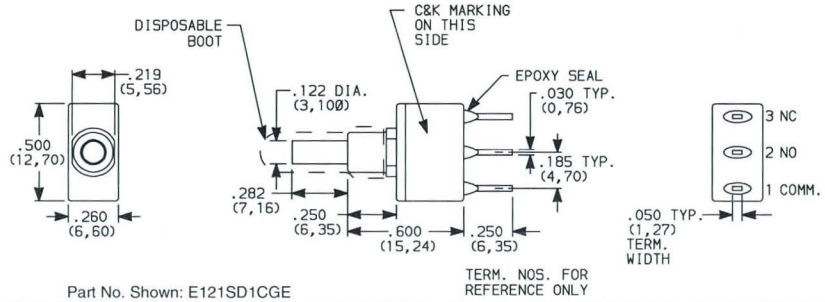


\*Process sealed—withstands soldering and cleaning processes.

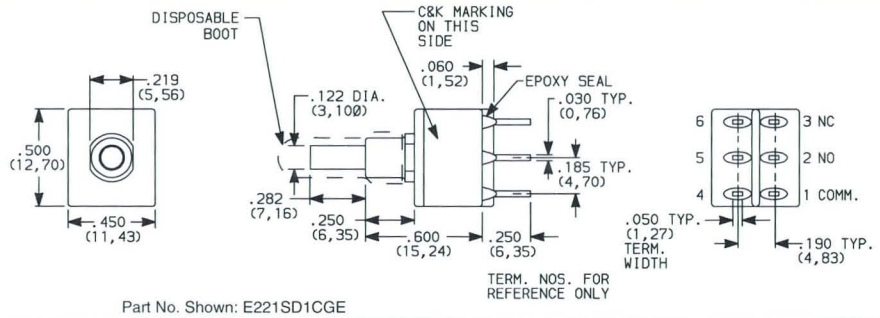
## SWITCHES WITH STANDARD OPTIONS



SPDT



DPDT



## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|-----------|-----------------|--------|---------------------|---------|-----------|
|           |           | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP        | E121      | ON              | MOM.   | 1-3                 | 1-2     |           |
|           | E125      | ON              | MOM.   |                     |         |           |
| DP        | E221      | ON              | MOM.   | 1-3,4-6             | 1-2,4-5 |           |
|           | E225      | ON              | MOM.   |                     |         |           |

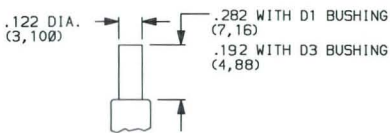
MOM. = MOMENTARY

† E121, E221 models with all options (except R, R2) when ordered with G or L contact material. See AGENCY APPROVALS, page VIII.

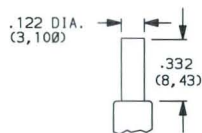
EX25 models must be ordered with B or K contact material. EX21 models must be ordered with G or L contact material.

## PLUNGER

S (STD.)

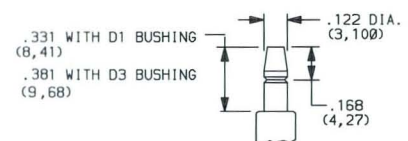


S1



Must be ordered with D3 bushing.

M SNAP-FITTING



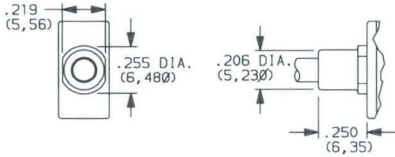
Caps available for all plunger options, see catalog section H.



\*Process sealed—withstands soldering and cleaning processes.

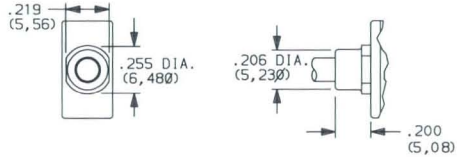
BUSHING

D1 (STD.)



Not available with S1 actuator.

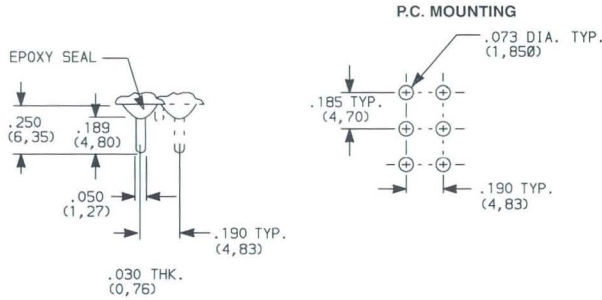
D3



Disposable splashproof vinyl boot over actuator and bushing supplied std., see page D-30.

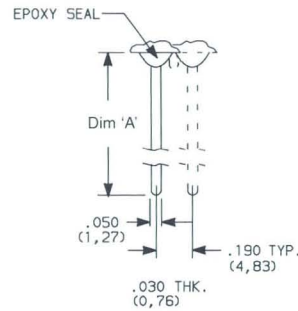
TERMINATIONS

C (STD.)



SPDT and DPDT

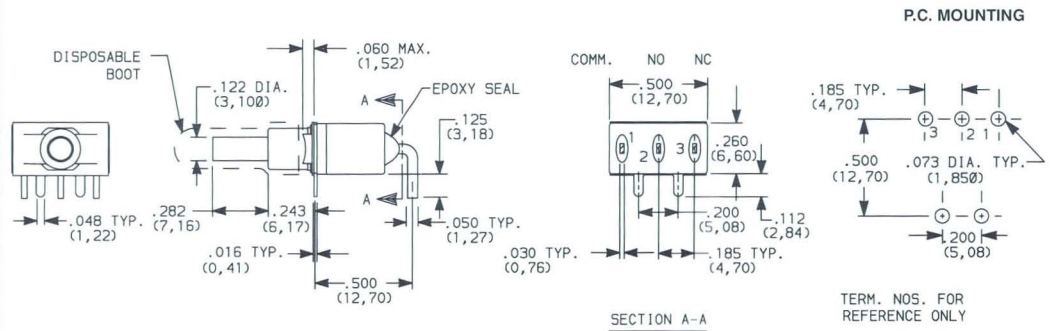
W-W1-W3-W4 WIRE WRAP



SPDT and DPDT

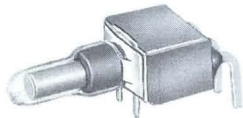
| Option | Dim 'A'       |
|--------|---------------|
| W      | .750 (19,05)  |
| W1     | .964 (24,49)  |
| W3     | .425 (10,80)  |
| W4     | 1.062 (26,97) |

A



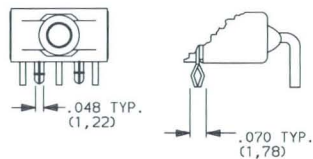
Part No. Shown: E121SD1AGE

TERM. NOS. FOR REFERENCE ONLY



A

A3 SNAP-IN

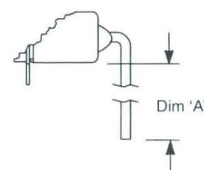


SNAP-IN DESIGN RETAINS SWITCH.

SPDT

Term. bend radii and lead-in mfg. option.

AW-AW1-AW3-AW4 EXTENDED



| Option | Dim 'A'    |
|--------|------------|
| AW     | .50 (12,7) |
| AW1    | .72 (18,3) |
| AW3    | .20 (5,1)  |
| AW4    | .83 (21,1) |



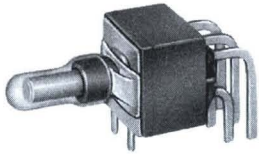
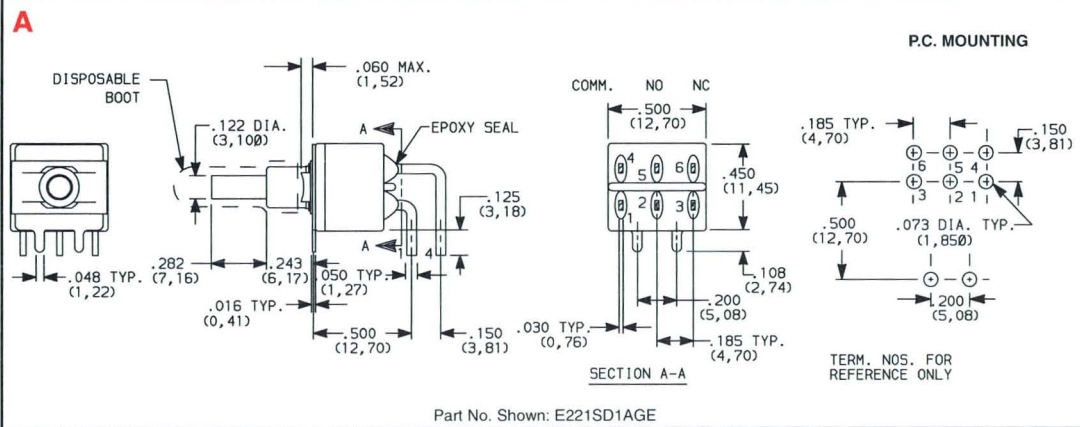


E020 Series

# Sealed\* Snap-Acting Momentary Pushbutton Switches

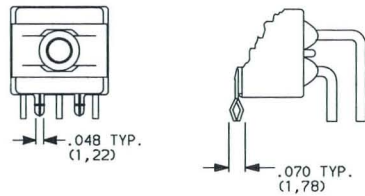
\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS



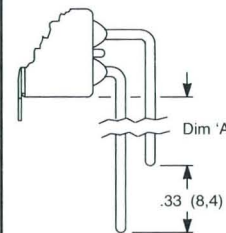
A

### A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AW-AW1-AW4 EXTENDED

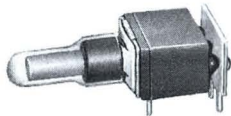


| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .21 (5,3)  |
| <b>AW1</b> | .42 (10,7) |
| <b>AW4</b> | .52 (13,2) |

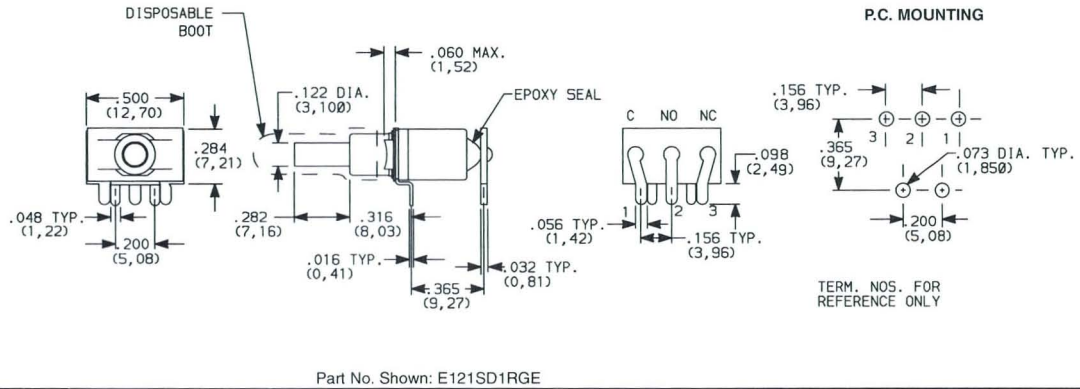
DPDT

Term. bend radii and lead-in mfg. option.

R

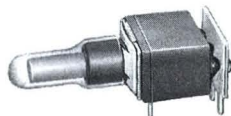


SPDT

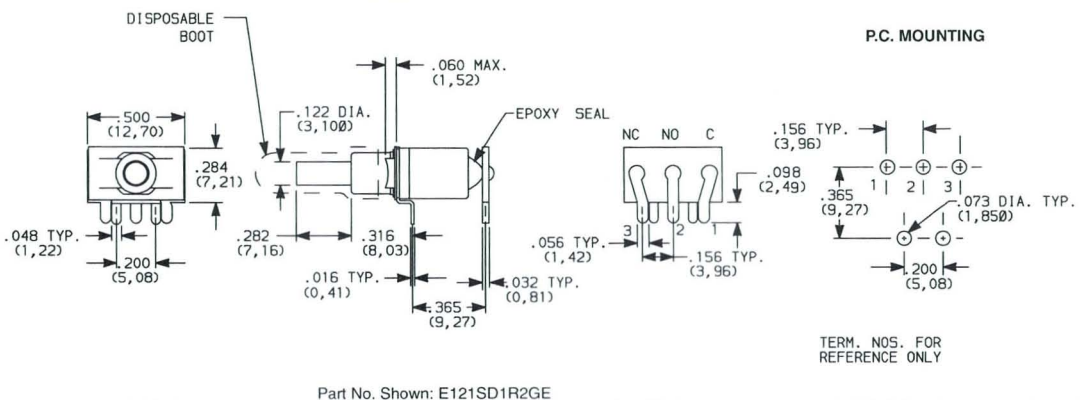


R terminations not UL, CSA approved.

R2



SPDT



R2 terminations not UL, CSA approved.





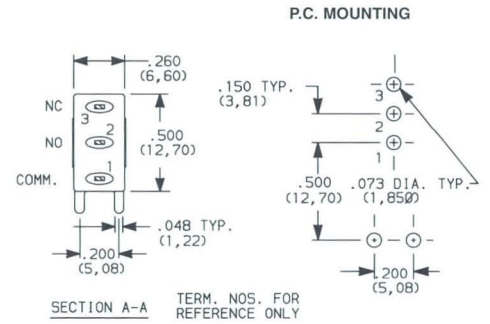
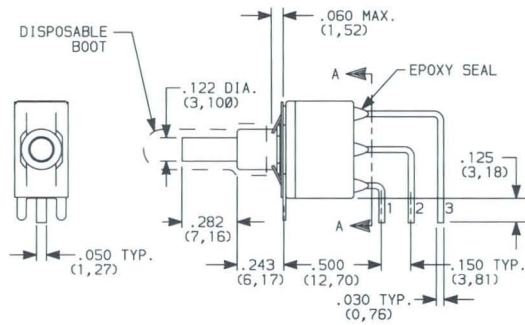
E020 Series

# Sealed\* Snap-Acting Momentary Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

## TERMINATIONS

### AV2



Part No. Shown: E121SD1AV2GE

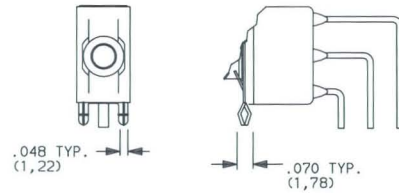


AV2

SPDT

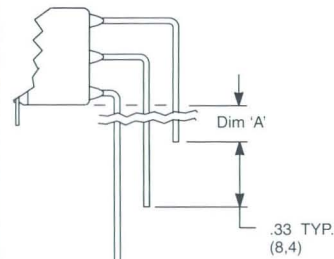
Term. bend radii and lead-in mfg. option.

### AV3 SNAP-IN



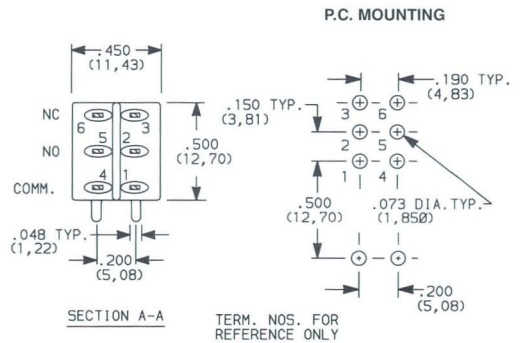
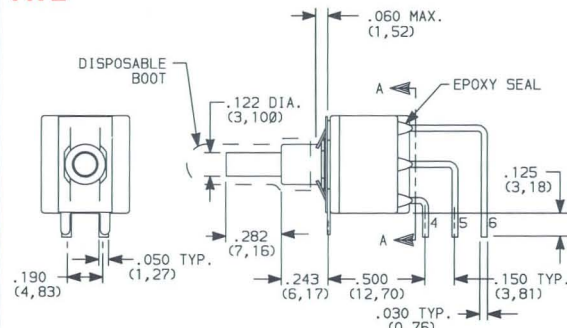
SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED

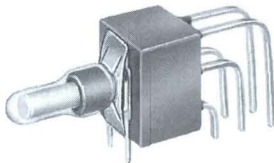


| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .25 (6,4) |

### AV2



Part No. Shown: E221SD1AV2GE

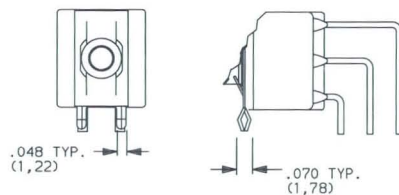


AV2

DPDT

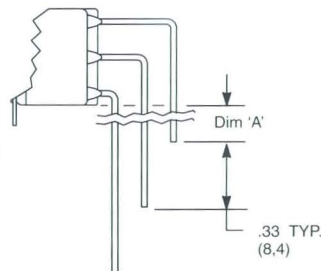
Term. bend radii and lead-in mfg. option.

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED



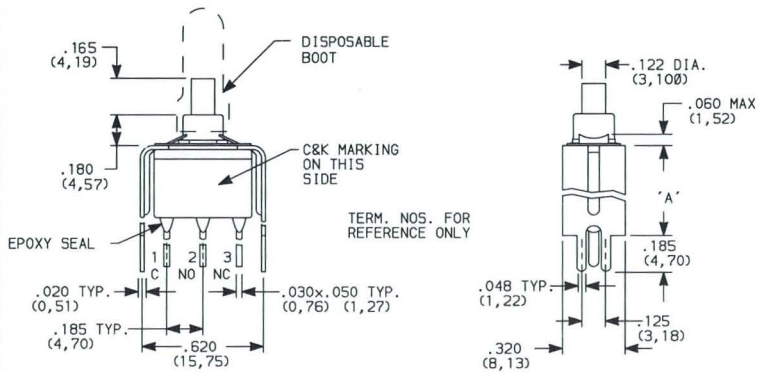
| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .25 (6,4) |



\*Process sealed—withstands soldering and cleaning processes.

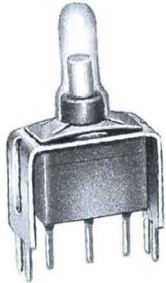
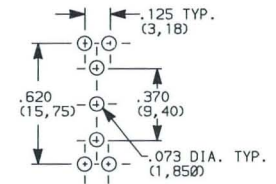
## TERMINATIONS

### V3-V4-V9



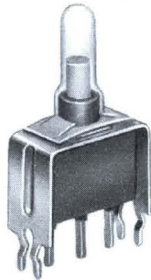
Part No. Shown: E121SD3V\_GE

### P.C. MOUNTING

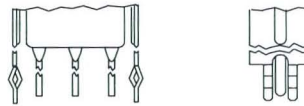


V3

### V31-V41-V91 SNAP-IN



V31

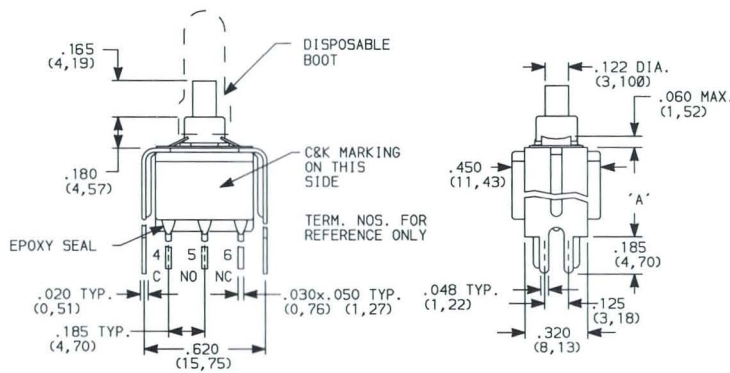


SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

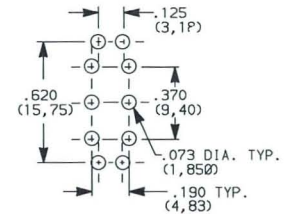
SPDT

### V3-V4-V9



Part No. Shown: E221SD3V\_GE

### P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

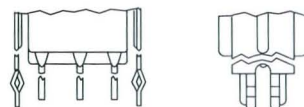


V3

### V31-V41-V91 SNAP-IN



V31



SNAP-IN DESIGN RETAINS SWITCH.

DPDT



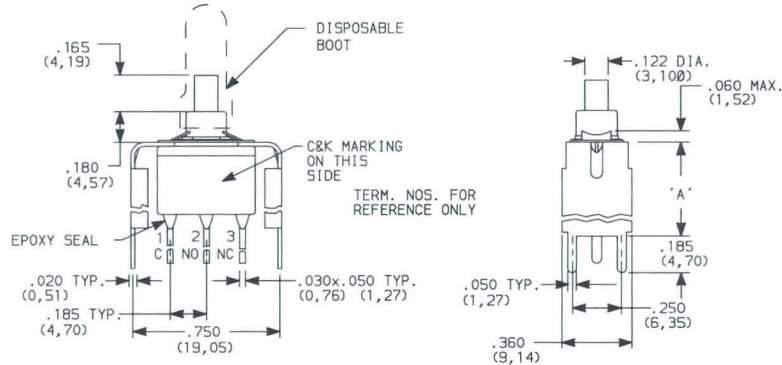
E020 Series

# Sealed\* Snap-Acting Momentary Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

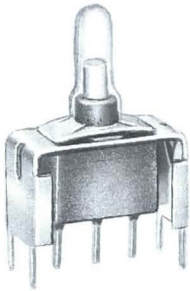
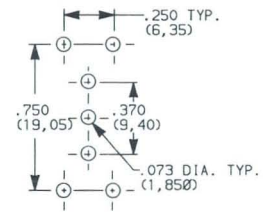
## TERMINATIONS

### V2-V6-V7-V8



Part No. Shown: E121SD3V\_GE

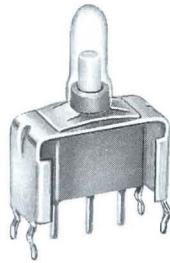
### P.C. MOUNTING



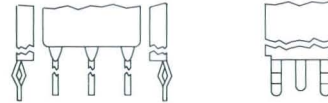
V6

SPDT

### V21-V61-V71-V81 SNAP-IN



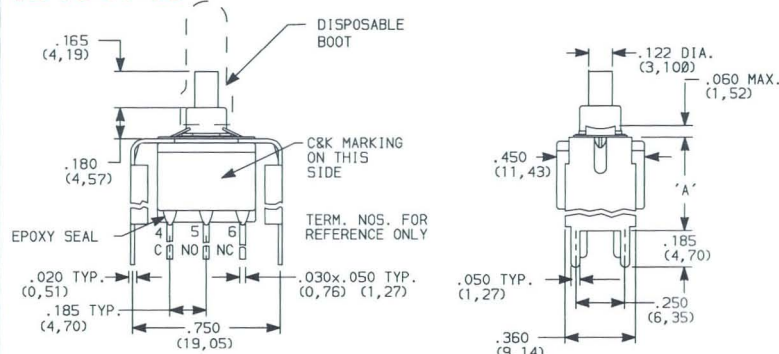
V61



SNAP-IN DESIGN RETAINS SWITCH.

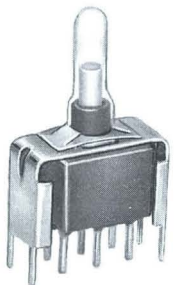
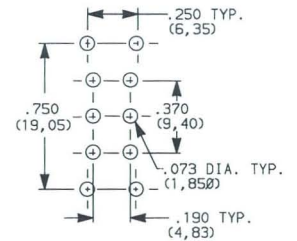
| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

### V2-V6-V7-V8



Part No. Shown: E221SD3V\_GE

### P.C. MOUNTING



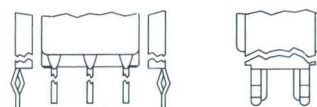
V6

DPDT

### V21-V61-V71-V81 SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |



\*Process sealed—withstands soldering and cleaning processes.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| B           | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | EX25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX.                                |
| K           |                                 | TIN-LEAD <sup>4</sup> |                                  |   |
| G           | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | EX21 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC. |
| L           |                                 | TIN-LEAD <sup>4</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

<sup>2</sup> N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.

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

<sup>4</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

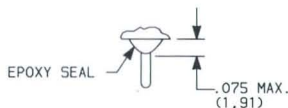
B or K contact material must be ordered with EX25 models.

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

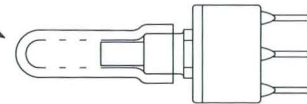
E121, E221 model numbers with all options when ordered with mandatory G or L contact material. See pages D-24 and VIII.

## SEAL

E (STD.)



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



## HOW TO ORDER

All available E020 SERIES SEALED SNAP-ACTING MOMENTARY PUSHBUTTON SWITCH options are listed on page D-23, and are described on pages D-24 thru D-30. Switches with standard options are shown on page D-24. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page D-24. Actuator caps, hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

### CONTACT RATING:

EX21 MODELS: 1 AMP @ 120 V AC or 28 V DC, or 0.4 VA max. @ 20 V AC or DC max. (G contact material).

EX25 MODELS: 0.4 VA max. @ 20 V AC or DC max. (B contact material). Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously.

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

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 75°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

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

## MATERIALS

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

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

SWITCH SUPPORT: Brass or steel, tin plated.

SWITCH SUPPORT RETAINER: Stainless steel.

### N.O. & N.C. CONTACTS:

EX21 MODELS: Coin silver, with gold plate over nickel plate (G contact material).

EX25 MODELS: Copper alloy, with gold plate over nickel plate (B contact material).

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

TERMINAL SEAL: Epoxy.

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

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



models available, see page D-33.

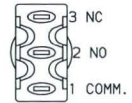
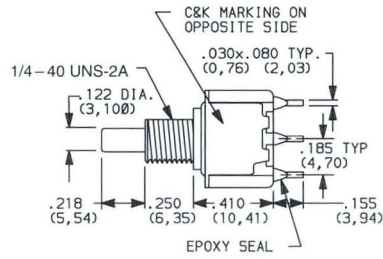
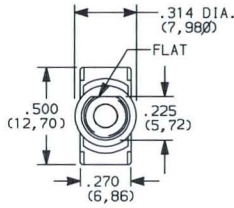
**Easy Build-A-Switch:**

Below is a complete listing of available options for 8020 SERIES SNAP-ACTING MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-32; all available options are shown and described on pages D-33 thru D-46. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-46. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

| SWITCH FUNCTION | ACTUATOR OR PLUNGER | BUSHING | TERMINATIONS | CONTACT MATERIAL | SEAL  | CAP COLOR | FRAME COLOR | LED COLOR |
|-----------------|---------------------|---------|--------------|------------------|-------|-----------|-------------|-----------|
|                 |                     |         |              | Gold             | Epoxy | Black     | Black       | Red       |
| [ ]             | [ ]                 | [ ]     | [ ]          | [ ]              | [ ]   | [ ]       | [ ]         | [ ]       |
| 8121            | J80                 | (NONE)  | A            | V21              | B     | (NONE)    | (NONE)      | (NONE)    |
| 8125            | J81                 | D       | A2           | V31              | G     | 1         | 1           | 3         |
| 8221            | J82                 | D2      | A3           | V41              | K     | 2         | 2           | 5         |
| 8225            | J83                 | D3      | A4           | V61              | L     | 3         | 3           | 6         |
| 8321            | J84                 | D8      | A6           | V71              |       | 4         | 4           |           |
| 8325            | J85                 | D9      | AV1          | V81              |       | 5         | 5           |           |
| 8421            | J95                 | H       | AV2          | V91              |       | 6         | 6           |           |
| 8425            | L                   | H9      | AV3          | W                |       | 7         | 7           |           |
| U811            | M                   | Y       | AV4          | W1               |       | 8         | 8           |           |
| U821            | S                   | Y3      | AW           | W3               |       | 9         | 9           |           |
| U831            |                     | Y4      | AW1          | W4               |       |           |             |           |
| U841            |                     | Y9      | AW3          | Z                |       |           |             |           |
|                 |                     |         | AW4          | Z3               |       |           |             |           |
|                 |                     |         | C            |                  |       |           |             |           |
|                 |                     |         | R            |                  |       |           |             |           |
|                 |                     |         | R2           |                  |       |           |             |           |
|                 |                     |         | V2           |                  |       |           |             |           |
|                 |                     |         | V3           |                  |       |           |             |           |
|                 |                     |         | V4           |                  |       |           |             |           |
|                 |                     |         | V6           |                  |       |           |             |           |
|                 |                     |         | V7           |                  |       |           |             |           |
|                 |                     |         | V8           |                  |       |           |             |           |
|                 |                     |         | V9           |                  |       |           |             |           |



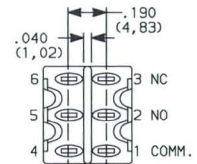
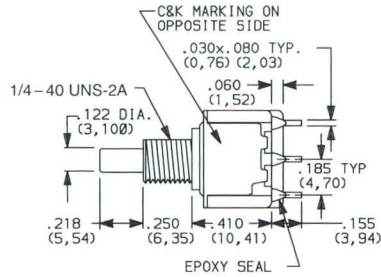
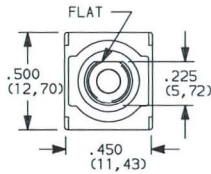
## SWITCHES WITH STANDARD OPTIONS



TERM. NOS. FOR REFERENCE ONLY

SPDT

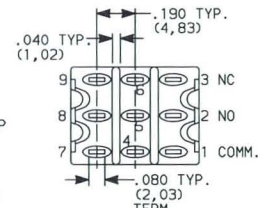
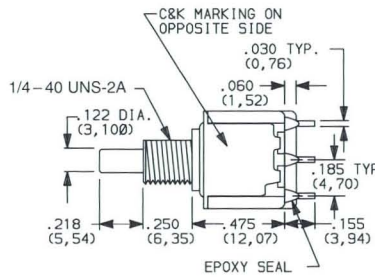
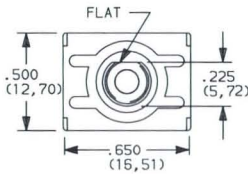
Part No. Shown: 8121SHZGE



TERM. NOS. FOR REFERENCE ONLY

DPDT

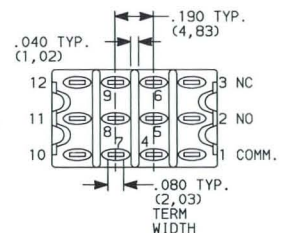
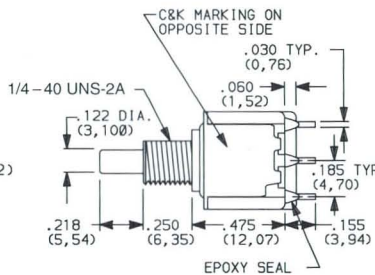
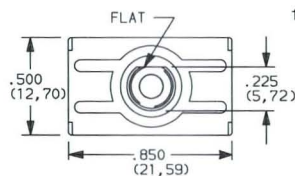
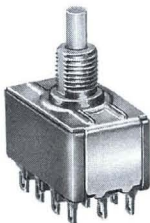
Part No. Shown: 8221SHZGE



TERM. NOS. FOR REFERENCE ONLY

3PDT

Part No. Shown: 8321SHZGE



TERM. NOS. FOR REFERENCE ONLY

4PDT

Part No. Shown: 8421SHZGE

**SWITCH FUNCTION**

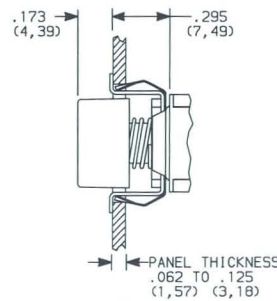
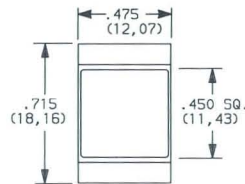
| NO. POLES | MODEL NO.   | UL/CSA MODEL NO.* | SWITCH FUNCTION |        | CONNECTED TERMINALS |                   | SCHEMATIC |
|-----------|-------------|-------------------|-----------------|--------|---------------------|-------------------|-----------|
|           |             |                   | POS. 1          | POS. 2 | POS. 1              | POS. 2            |           |
|           |             |                   |                 |        |                     |                   |           |
| SP        | <b>8121</b> | <b>U811</b>       | ON              | MOM.   | 1-3                 | 1-2               | SPDT      |
|           | <b>8125</b> |                   | ON              | MOM.   |                     |                   |           |
| DP        | <b>8221</b> | <b>U821</b>       | ON              | MOM.   | 1-3,4-6             | 1-2,4-5           | DPDT      |
|           | <b>8225</b> |                   | ON              | MOM.   |                     |                   |           |
| 3P        | <b>8321</b> | <b>U831</b>       | ON              | MOM.   | 1-3,4-6,7-9         | 1-2,4-5,7-8       | 3PDT      |
|           | <b>8325</b> |                   | ON              | MOM.   |                     |                   |           |
| 4P        | <b>8421</b> | <b>U841</b>       | ON              | MOM.   | 1-3,4-6,7-9,10-12   | 1-2,4-5,7-8,10-11 | 4PDT      |
|           | <b>8425</b> |                   | ON              | MOM.   |                     |                   |           |

MOM = MOMENTARY

\* U811 thru U841 model numbers with all options (except R, R2 terminations) when ordered with G or L contact material. See AGENCY APPROVALS, page VIII. 8X25 models must be ordered with B or K contact material. 8X21 and U8X1 models must be ordered with G or L contact material.

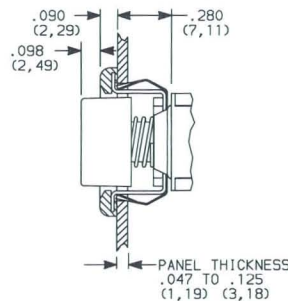
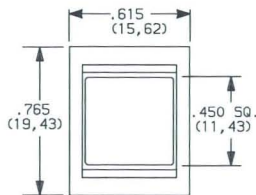
**ACTUATORS—SNAP-IN FRONT MOUNT**

**J80**



No frame color choice required.

**J81 WITH FRAME AND RAISED CAP**



**J83 WITH FRAME AND FLUSH CAP**



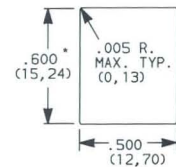
**CAP AND FRAME COLORS**

| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| <b>1</b>    | WHITE                |
| <b>2</b>    | BLACK (std.)         |
| <b>3</b>    | RED                  |
| <b>4</b>    | ORANGE               |
| <b>5</b>    | YELLOW               |
| <b>6</b>    | GREEN                |
| <b>7</b>    | BLUE                 |
| <b>8</b>    | BROWN                |
| <b>9</b>    | GRAY                 |

Select cap and frame colors (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Hardware is available separately, see catalog section H.

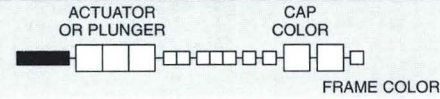
Available with Z, C, Z3, or W-W4 terminations and SPDT and DPDT models only.

**PANEL MOUNTING J80 – J81 – J83**

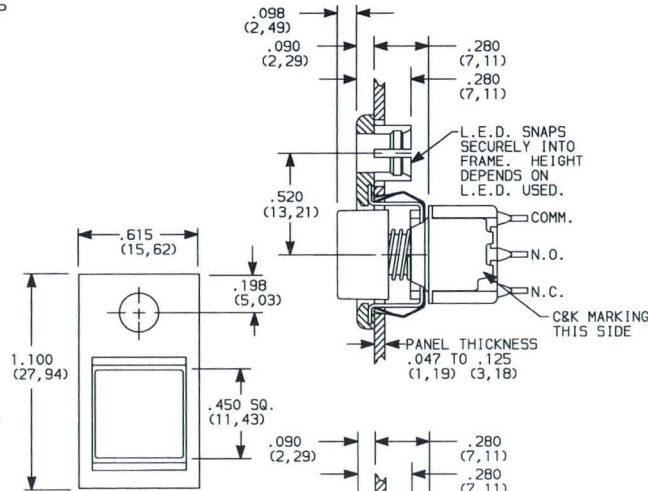
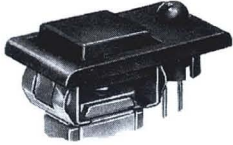


\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

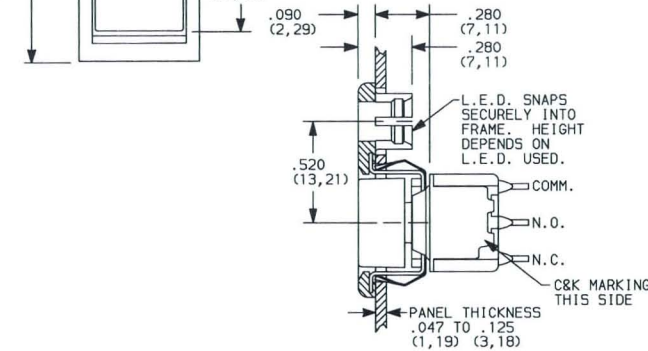
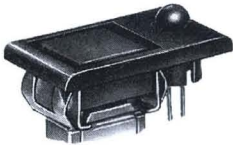
## ACTUATORS—SNAP-IN FRONT MOUNT



**J82** WITH FRAME FOR LED AND RAISED CAP



**J84** WITH FRAME FOR LED AND FLUSH CAP



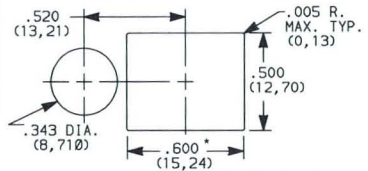
### CAP AND FRAME COLORS

| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| 1           | WHITE                |
| 2           | BLACK (std.)         |
| 3           | RED                  |
| 4           | ORANGE               |
| 5           | YELLOW               |
| 6           | GREEN                |
| 7           | BLUE                 |
| 8           | BROWN                |
| 9           | GRAY                 |

Select cap and frame colors from chart. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

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

### PANEL MOUNTING J82 - J84



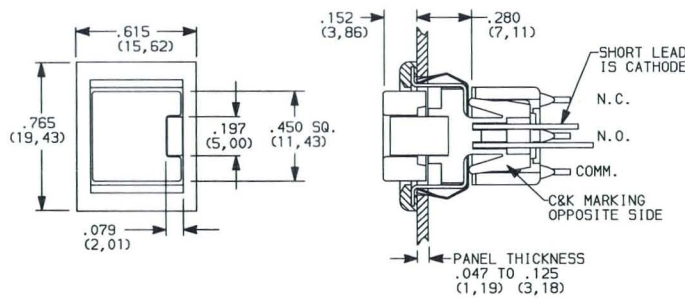
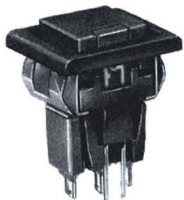
\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

U.S. Patent No. 4,004,120  
LED not included.  
See page IX for LED information.

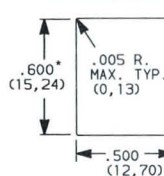
## ACTUATORS—SNAP-IN FRONT MOUNT



**J85** WITH FRAME, RAISED CAP, AND BUILT-IN LED



### PANEL MOUNTING



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

### CAP AND FRAME COLORS

| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| 1           | WHITE                |
| 2           | BLACK (std.)         |
| 3           | RED                  |
| 4           | ORANGE               |
| 5           | YELLOW               |
| 6           | GREEN                |
| 7           | BLUE                 |
| 8           | BROWN                |
| 9           | GRAY                 |

### LED COLOR

| OPTION CODE | LED COLOR  |
|-------------|------------|
| 3           | RED (std.) |
| 5           | YELLOW     |
| 6           | GREEN      |

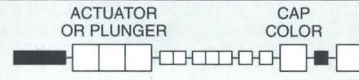
Select cap, frame, and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

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

See page IX for LED information.

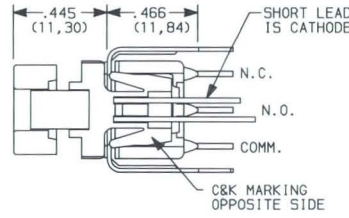
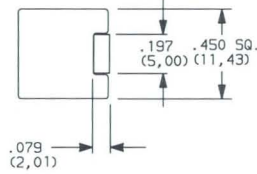


## ACTUATORS—P.C. MOUNT



LED COLOR

**J95** WITH BUILT-IN LED



### CAP COLOR

| OPTION CODE | CAP COLOR    |
|-------------|--------------|
| 1           | WHITE        |
| 2           | BLACK (std.) |
| 3           | RED          |
| 4           | ORANGE       |
| 5           | YELLOW       |
| 6           | GREEN        |
| 7           | BLUE         |
| 8           | BROWN        |
| 9           | GRAY         |

### LED COLOR

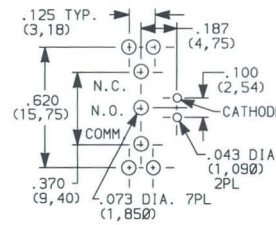
| OPTION CODE | LED COLOR  |
|-------------|------------|
| 3           | RED (std.) |
| 5           | YELLOW     |
| 6           | GREEN      |

Select cap and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

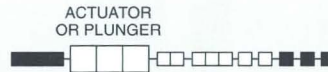
Available with V3 terminations and SPDT models only.

See page IX for LED information.

### P.C. MOUNTING



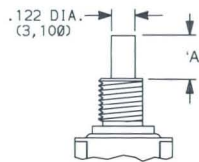
## PLUNGER



When selecting plunger option, bushing selection must also be made, see next page. No plunger option choice required when any JXX actuator option is selected.

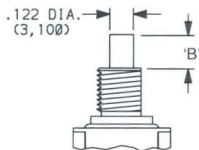
**(NONE)** NO PLUNGER CHOICE REQUIRED WHEN ANY JXX ACTUATOR OPTION IS SELECTED.

**S** (STD.)



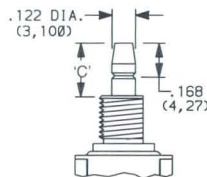
| AVAILABLE BUSHINGS see next page | DIM 'A' FOR Z,C,Z3,W-W4 TERMINATIONS | DIM 'A' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS | DIM 'A' FOR V2-V91 TERMINATIONS |
|----------------------------------|--------------------------------------|---|---------------------------------|
| D, D9                            | .244 (6,20)                          | .228 (5,79)   | .224 (5,69)                     |
| H, H9                            | .218 (5,54)                          | .202 (5,13)   | .198 (5,03)                     |
| Y, Y9                            | .203 (5,16)                          | .187 (4,75)   | .183 (4,65)                     |
| Y3                               | (5,54)                               | (5,13)  | (5,03)                          |
| Y4                               | .185 (4,70)                          | .169 (4,29)   | .165 (4,19)                     |
| D2, D8                           | N/A                                  | .232 (5,89)   | .228 (5,79)                     |
| D3                               | .178 (4,52)                          | .162 (4,11)   | .158 (4,01)                     |

**L**



| AVAILABLE BUSHINGS see next page | DIM 'B' FOR Z,C,Z3,W-W4 TERMINATIONS | DIM 'B' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS | DIM 'B' FOR V2-V91 TERMINATIONS |
|----------------------------------|--------------------------------------|---|---------------------------------|
| Y, Y9                            | .178 (4,52)                          | .162 (4,11)   | .158 (4,01)                     |
| Y4                               | .090 (2,29)                          | .074 (1,88)   | .070 (1,78)                     |

**M** SNAP-FITTING



| AVAILABLE BUSHINGS see next page | DIM 'C' FOR Z,C,Z3,W-W4 TERMINATIONS | DIM 'C' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS | DIM 'C' FOR V2-V91 TERMINATIONS |
|----------------------------------|--------------------------------------|---|---------------------------------|
| D, D9                            | .297 (7,54)                          | .281 (7,14)   | .277 (7,04)                     |
| H, H9                            | .267 (6,78)                          | .251 (6,38)   | .247 (6,27)                     |
| Y, Y9                            | .259 (6,58)                          | .243 (6,17)   | .239 (6,07)                     |
| Y3                               | (6,78)                               | (6,37)  | (6,27)                          |
| Y4                               | .259 (6,58)                          | .243 (6,17)   | .239 (6,07)                     |
| D2, D8                           | N/A                                  | .273 (6,93)   | .269 (6,83)                     |
| D3                               | .259 (6,58)                          | .243 (6,17)   | .239 (6,07)                     |

N/A = NOT AVAILABLE

Additional plunger lengths are available on SPDT and DPDT models, consult factory. Not all plunger lengths sufficient for use with caps. See cap dims., catalog section H.



# 8020 Series

# Snap-Acting Momentary Pushbutton Switches

## BUSHING

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

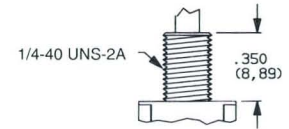
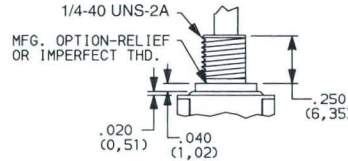
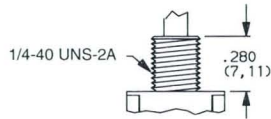
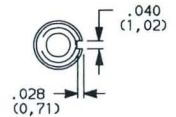
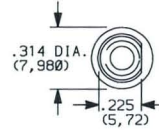
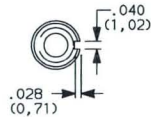
(NONE)

**D**  
**D9** UNTHREADED

**H**  
**H9** UNTHREADED

**Y**  
**Y9** UNTHREADED

No bushing choice required when any JXX actuator option is selected.



D9 bushing standard with A-A6, AW-AW4, R, R2 AV1-AV4 terminations.

H bushing standard with Z, C, Z3 or W-W4 terminations. H, H9 bushings not available on single pole models with A-A6, AW-AW4, R, R2 terminations.

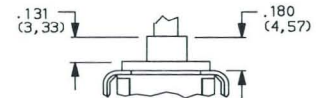
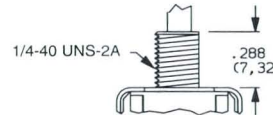
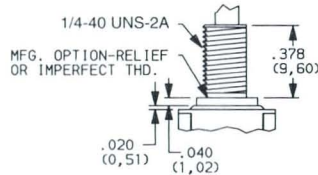
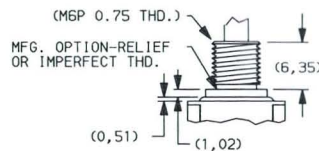
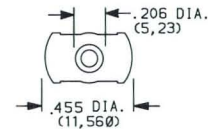
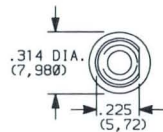
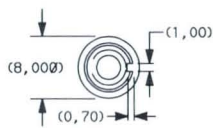
Will withstand 12 in.-lbs. of torque with no distortion.

**Y3** METRIC

**Y4**

**D2**  
**D8** UNTHREADED

**D3**



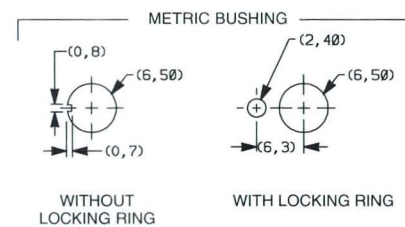
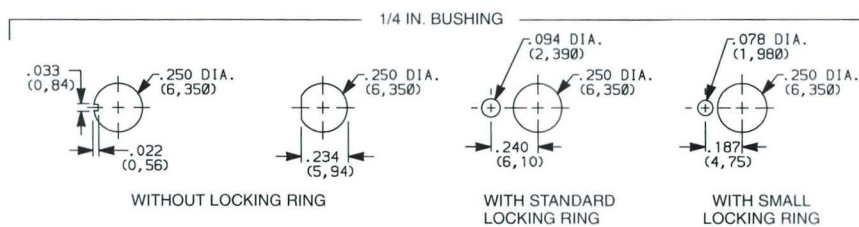
Y3, Y4 bushings not available on single pole models with A-A6, AW-AW4, R, R2 terminations.

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

D3 bushing standard with V2-V91 terminations.

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

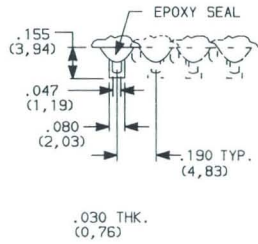
## PANEL MOUNTING



HARDWARE: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

## TERMINATIONS

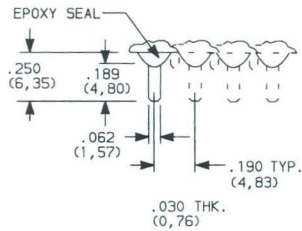
**Z (STD.)**



**SPDT thru 4PDT**

Not available with J95 actuator, K or L contact material.

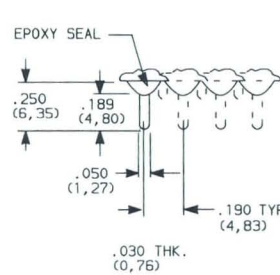
**Z3 QUICK CONNECT**



**SPDT thru 4PDT**

Not available with J95 actuator option. Mating quick connector available; order part no. 530100000.

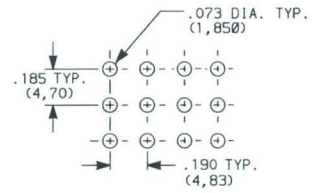
**C**



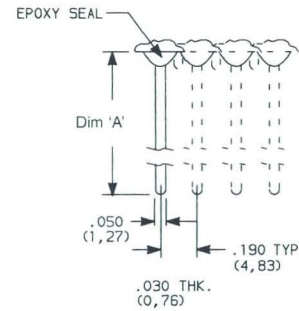
**SPDT thru 4PDT**

Not available with J95 actuator option.

**P.C. MOUNTING**



**W-W1-W3-W4 WIRE WRAP**

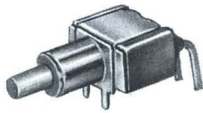


**SPDT thru 4PDT**

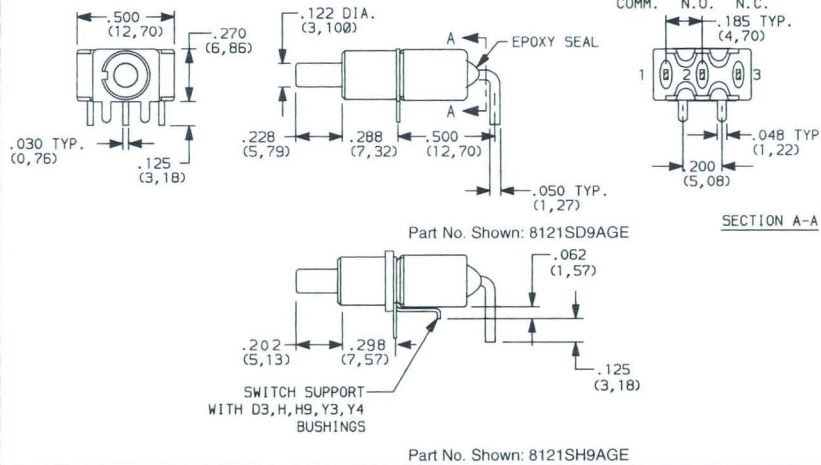
Not available with J95 actuator option.

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

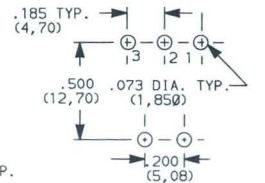
**A**



**A**

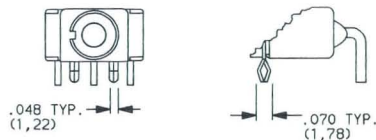


**P.C. MOUNTING**



TERM. NOS. FOR REFERENCE ONLY

**A3 SNAP-IN**

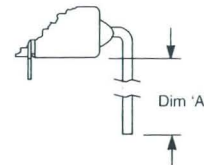


**SPDT**

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

SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW3-AW4 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .50 (12,7) |
| <b>AW1</b> | .72 (18,3) |
| <b>AW3</b> | .20 (5,1)  |
| <b>AW4</b> | .83 (21,1) |

## TERMINATIONS

**A**

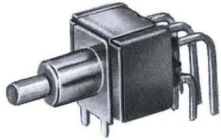
**P.C. MOUNTING**

Part No. Shown: 8221SD9AGE

COMM. N.O. N.C. .185 TYP. (4,70) .150 (3,81)

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY



**A3 SNAP-IN**

SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW4 EXTENDED**

| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .19 (4,8)  |
| <b>AW1</b> | .40 (10,2) |
| <b>AW4</b> | .50 (12,7) |

DPDT

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

**A**

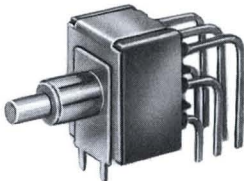
**P.C. MOUNTING**

Part No. Shown: 8321SD9AGE

COMM. N.O. N.C. .185 TYP. (4,70) .150 TYP. (3,81)

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY



**AW4 EXTENDED**

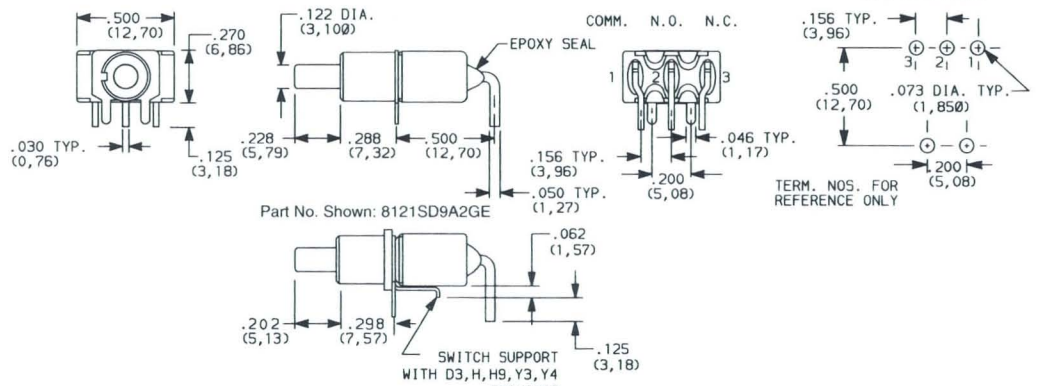
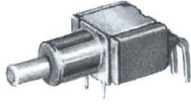
| Option     | Dim 'A'   |
|------------|-----------|
| <b>AW4</b> | .37 (9,4) |

3PDT

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

## TERMINATIONS

### A2

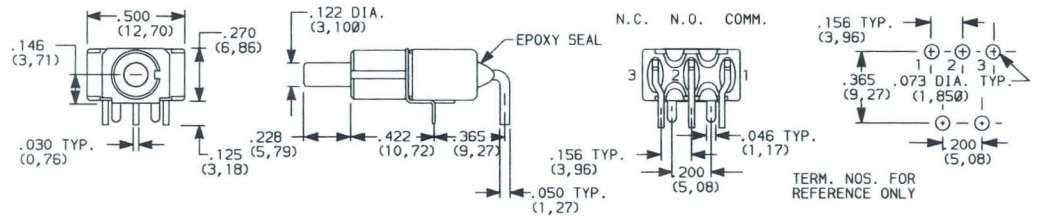
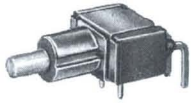


### SPDT

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

Part No. Shown: 8121SH9A2GE

### A4



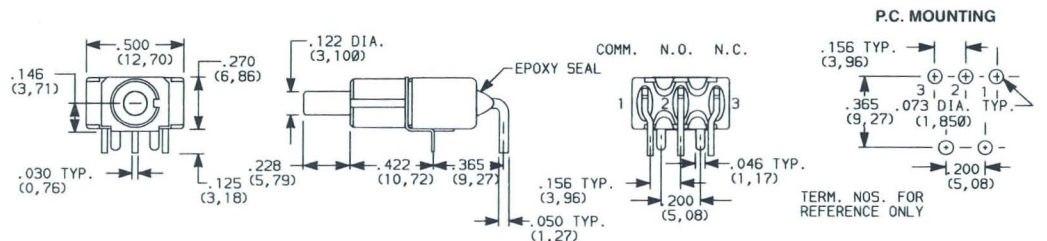
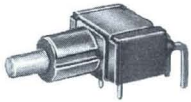
### SPDT

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

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

Part No. Shown: 8121SD9A4GE

### A6



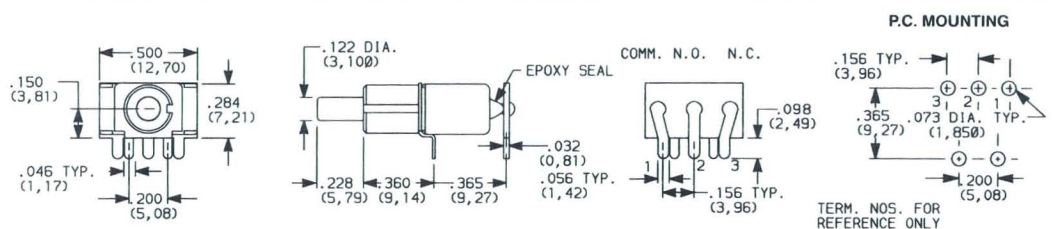
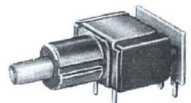
### SPDT

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

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

Part No. Shown: 8121SD9A6GE

### R

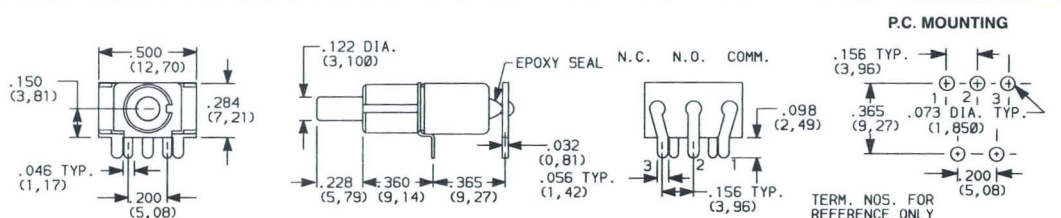
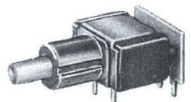


### SPDT

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

Part No. Shown: 8121SD9RGE

### R2



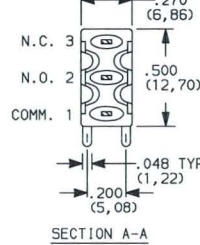
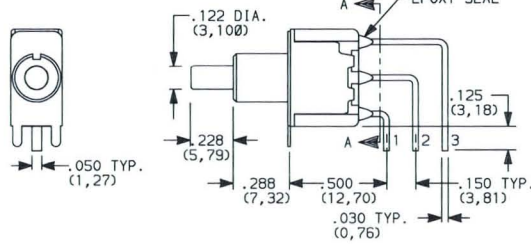
### SPDT

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

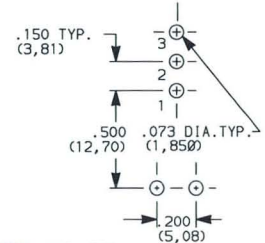
Part No. Shown: 8121SD9R2GE

## TERMINATIONS

### AV2



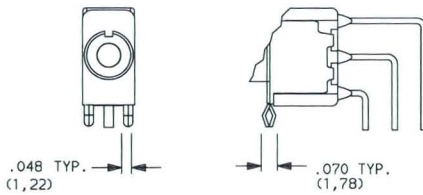
### P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

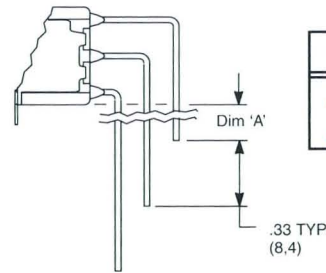
Part No. Shown: 8121SD9AV2GE

### AV3 SNAP-IN

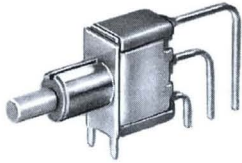


SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED



| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .24 (6,1) |

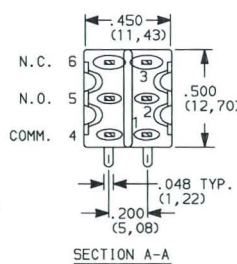
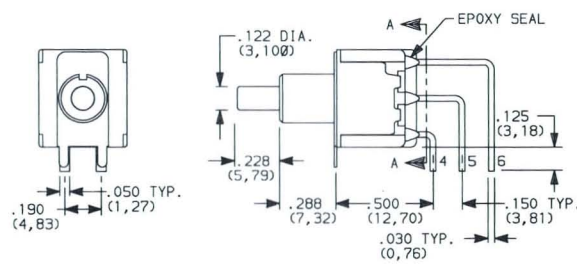


AV2

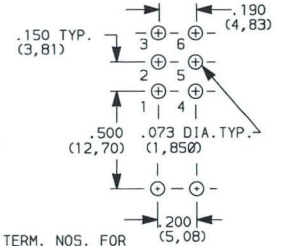
SPDT

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

### AV2



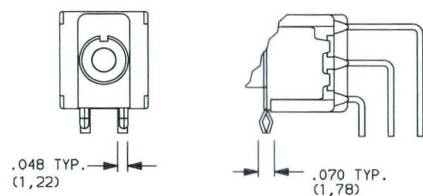
### P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

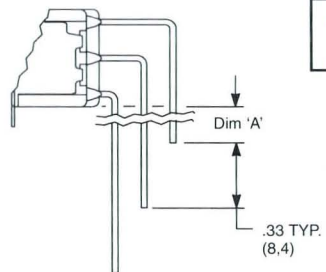
Part No. Shown: 8221SD9AV2GE

### AV3 SNAP-IN

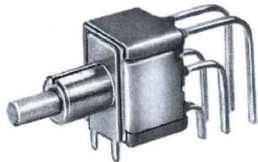


SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED



| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .24 (6,1) |



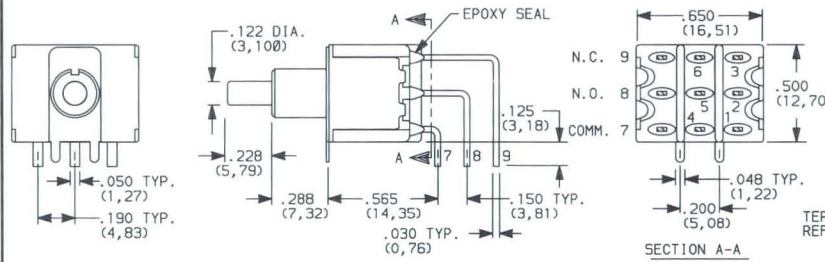
AV2

DPDT

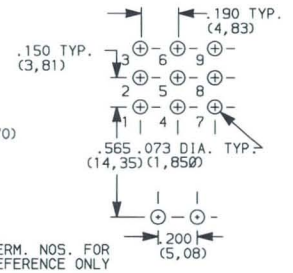
Term. bend radii and lead-in mfg. option. Not available with JXX actuators, I seal option.

## TERMINATIONS

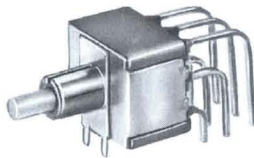
### AV2



### P.C. MOUNTING

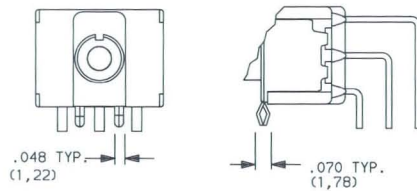


Part No. Shown: 8321SD9AV2GE



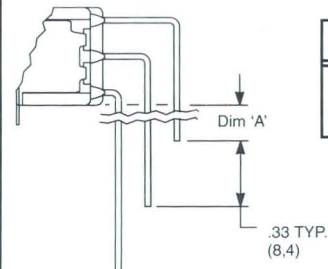
AV2

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED

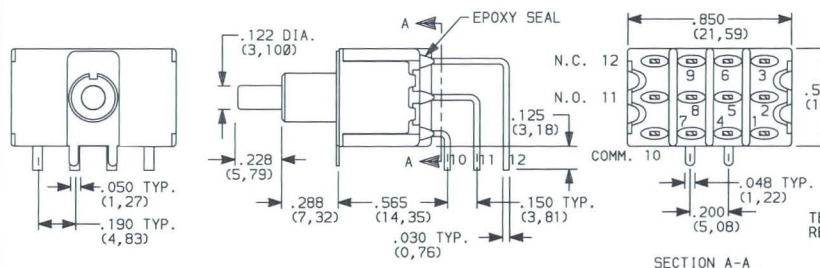


| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .24 (6,1) |

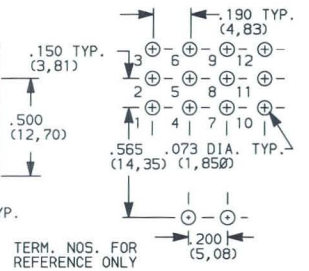
3PDT

Term. bend radii and lead-in mfg. option. Not available with JXX actuators I seal option.

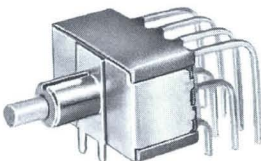
### AV2



### P.C. MOUNTING

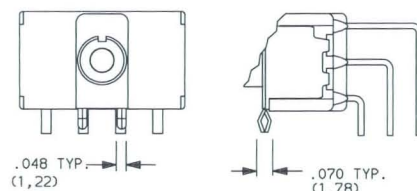


Part No. Shown: 8421SD9AV2GE



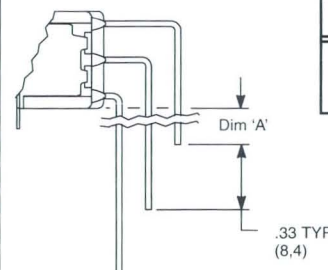
AV2

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

### AV1-AV4 EXTENDED



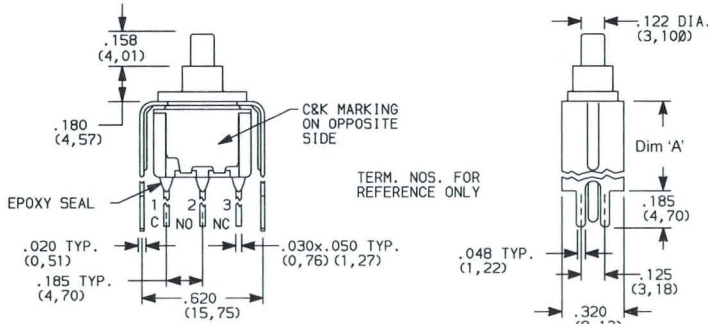
| Option | Dim 'A'   |
|--------|-----------|
| AV1    | .15 (3,8) |
| AV4    | .24 (6,1) |

4PDT

Term. bend radii and lead-in mfg. option. Not available with JXX actuators I seal option.

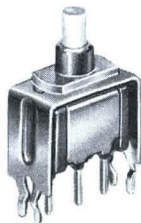
## TERMINATIONS

### V3-V4-V9 REPLACES V30-V40-V90

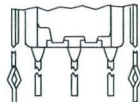


Part No. Shown: 8121SD3V\_\_GE

### V31-V41-V91 SNAP-IN

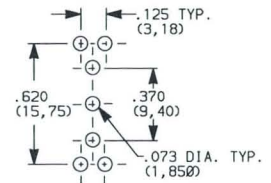


V31

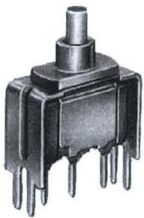


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

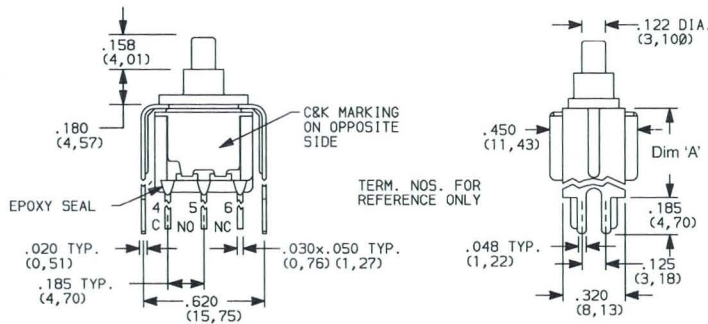


V3

SPDT

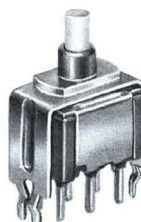
Not available with J8X actuators, I seal option.

### V3-V4-V9 REPLACES V30-V40-V90

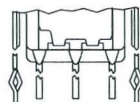


Part No. Shown: 8221SD3V\_\_GE

### V31-V41-V91 SNAP-IN

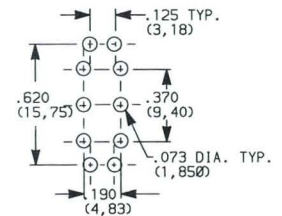


V31

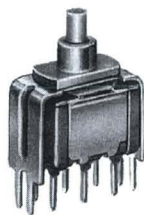


SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |



V3

DPDT

Not available with JXX actuators, I seal option.



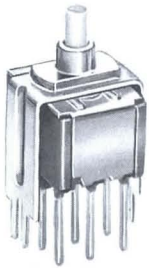
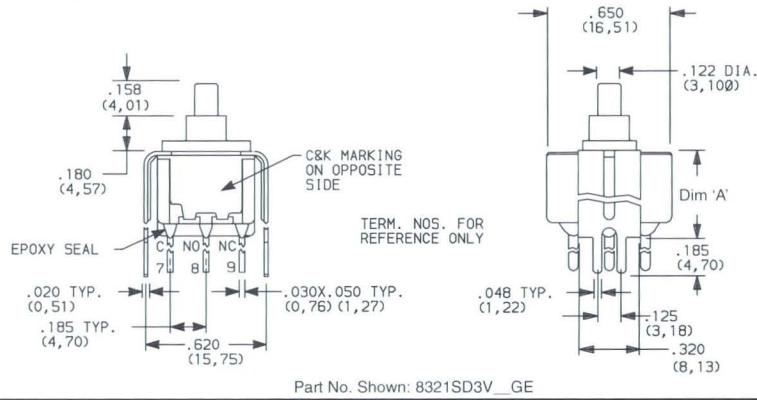


# 8020 Series

# Snap-Acting Momentary Pushbutton Switches

## TERMINATIONS

### V4-V9

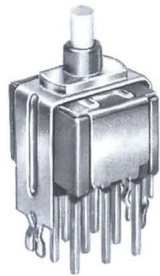


V4

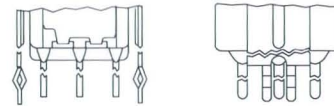
3PDT

Not available with JXX actuators, I seal option.

### V41-V91 SNAP-IN

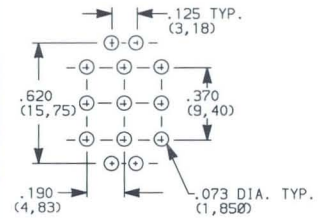


V41



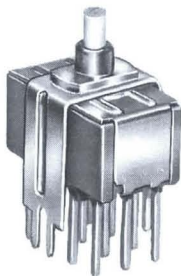
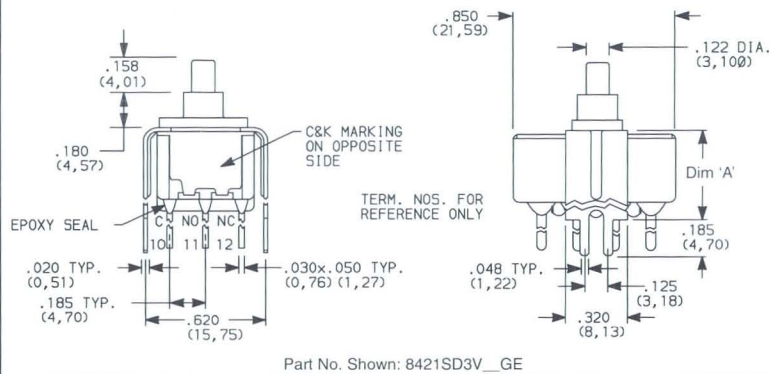
SNAP-IN DESIGN RETAINS SWITCH.

### P.C. MOUNTING



| Option  | Dim 'A'       |
|---------|---------------|
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

### V4-V9

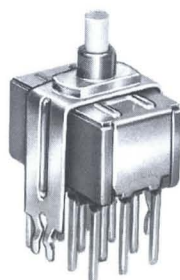


V4

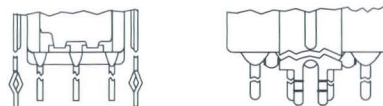
4PDT

Not available with JXX actuators, I seal option.

### V41-V91 SNAP-IN

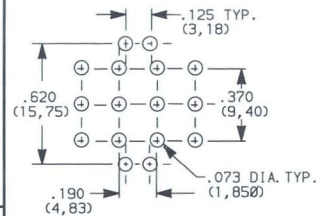


V41



SNAP-IN DESIGN RETAINS SWITCH.

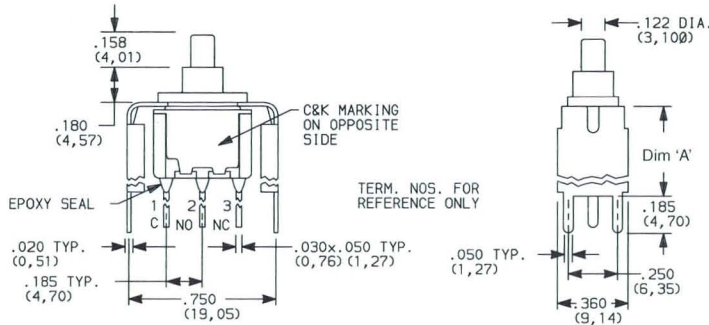
### P.C. MOUNTING



| Option  | Dim 'A'       |
|---------|---------------|
| V4, V41 | .630 (16,00)  |
| V9, V91 | 1.150 (29,21) |

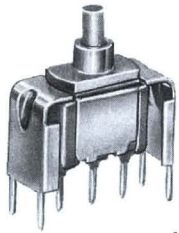
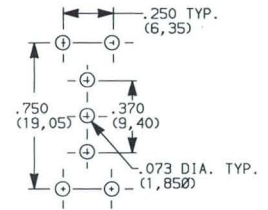
## TERMINATIONS

### V2-V6-V7-V8 REPLACES V20-V60-V70-V80



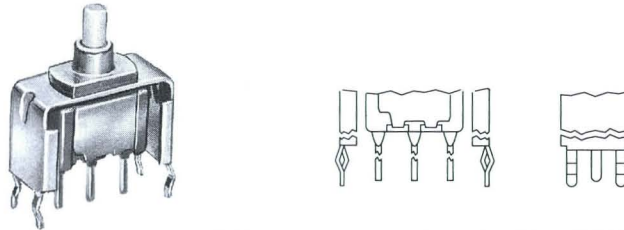
Part No. Shown: 8121SD3V\_\_GE

#### P.C. MOUNTING



V6

### V21-V61-V71-V81 SNAP-IN



V61

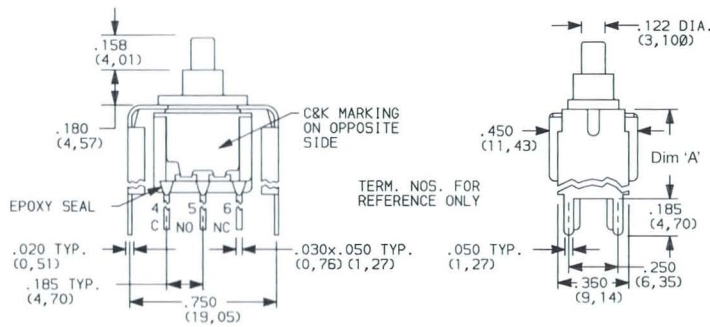
SNAP-IN DESIGN RETAINS SWITCH.

| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

SPDT

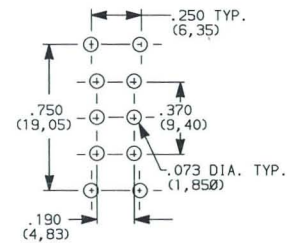
Not available with JXX actuators, I seal option.

### V2-V6-V7-V8 REPLACES V20-V60-V70-V80

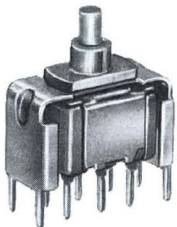


Part No. Shown: 8221SD3V\_\_GE

#### P.C. MOUNTING

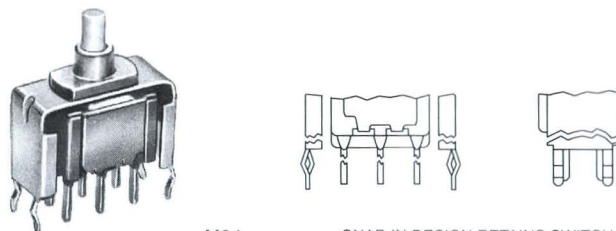


| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |



V6

### V21-V61-V71-V81 SNAP-IN



V61

SNAP-IN DESIGN RETAINS SWITCH.

DPDT

Not available with JXX actuators, I seal option.

## TERMINATIONS

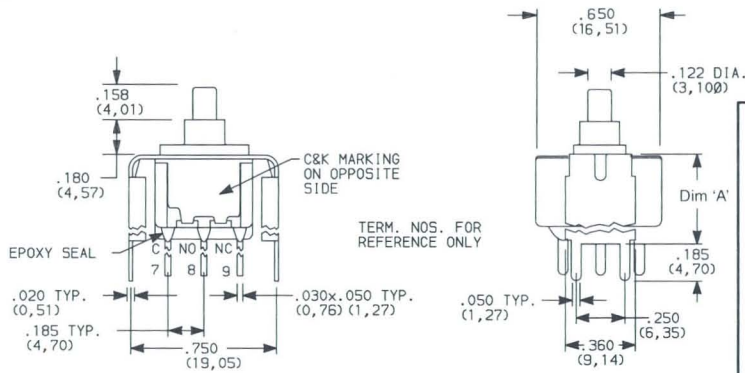
### V2-V7-V8



V7

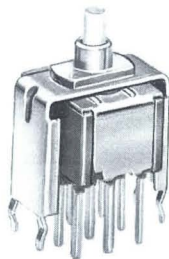
3PDT

Not available with JXX actuators, I seal option.

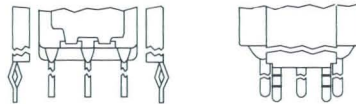


Part No. Shown: 8321SD3V\_\_GE

### V21-V71-V81 SNAP-IN

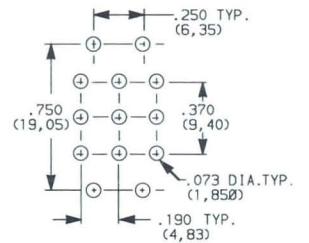


V71



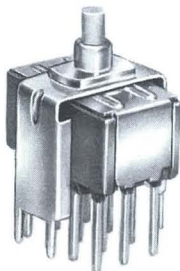
SNAP-IN DESIGN RETAINS SWITCH.

#### P.C. MOUNTING



| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |

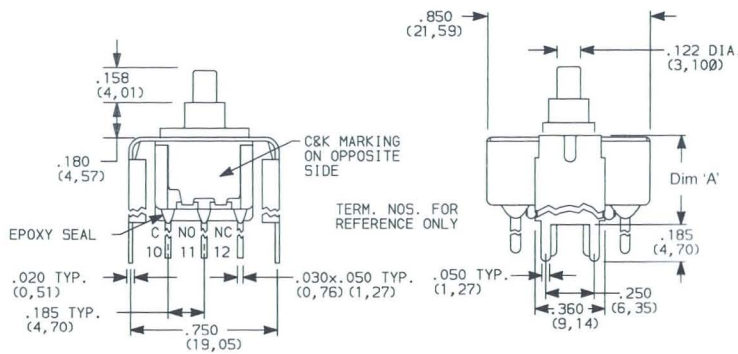
### V2-V7-V8



V7

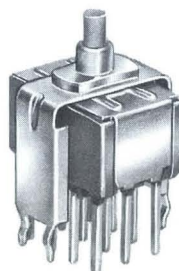
4PDT

Not available with JXX actuators, I seal option.

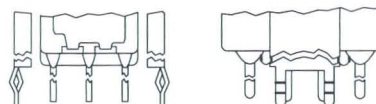


Part No. Shown: 8421SD3V\_\_GE

### V21-V71-V81 SNAP-IN

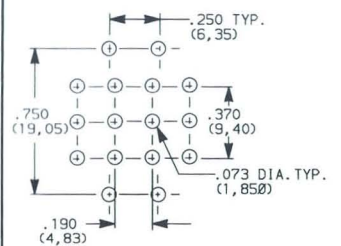


V71



SNAP-IN DESIGN RETAINS SWITCH.

#### P.C. MOUNTING



| Option  | Dim 'A'      |
|---------|--------------|
| V2, V21 | .555 (14,10) |
| V7, V71 | .630 (16,00) |
| V8, V81 | .953 (24,21) |



## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |   |
|-------------|---------------------------------|-----------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 8X25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX.                                      |
| <b>K</b>    |                                 | TIN-LEAD <sup>4</sup> |                                  |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 8X21, U8X1 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC; |
| <b>L</b>    |                                 | TIN-LEAD <sup>4</sup> |                                  |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

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

<sup>2</sup> N.O. & N.C. CONTACTS: Coin silver, with gold plate over nickel plate.

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

<sup>4</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

U811-U841 model numbers with all options (except R, R2 terminations) when ordered with mandatory G or L contact material. See pages D-33 and VIII.

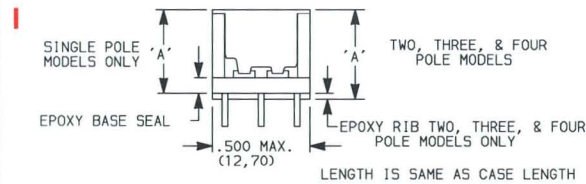
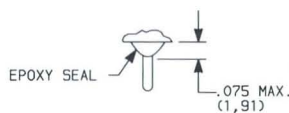
B or K contact material must be ordered with 8X25 models.

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

K and L contact materials not available with Z terminations.

## SEAL

**E** (STD.)



| Poles | Dim 'A'      |
|-------|--------------|
| SP    | .410 (10,41) |
| DP    | .440 (11,18) |
| 3P    | .505 (12,83) |
| 4P    | .505 (12,83) |

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

## HOW TO ORDER

All available 8020 SERIES SNAP-ACTING MOMENTARY PUSHBUTTON SWITCH options are listed on page D-31, and are described on pages D-33 thru D-46. Switches with standard options are shown on page D-32. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom wash PC board cleaning methods. models available, see page D-33. Actuator caps, hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

### CONTACT RATING:

8X21, U8X1 MODELS: 1 AMP @ 120 V AC or 28 V DC or 0.4 VA max. @ 20 V AC or DC max. (G contact material).

8X25 MODELS: 0.4 VA max. @ 20 V AC or DC maximum (B contact material).

NOTE: Break-before-make contacts. Multi-pole contact do not make and break simultaneously.

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

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.

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

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

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

## MATERIALS

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

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

CAP & FRAME: Nylon, black, standard.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

### N.O. & N.C. CONTACTS

8X21, U8X1 MODELS: Coin silver, with gold plate over nickel plate (G contact material).

8X25 MODELS: Copper alloy, with gold plate over nickel plate (B contact material.).

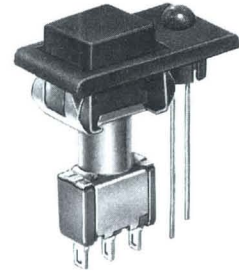
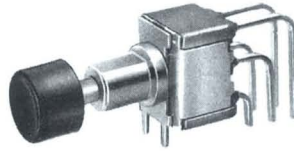
COMMON CONTACT & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

TERMINAL SEAL: Epoxy.

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

NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

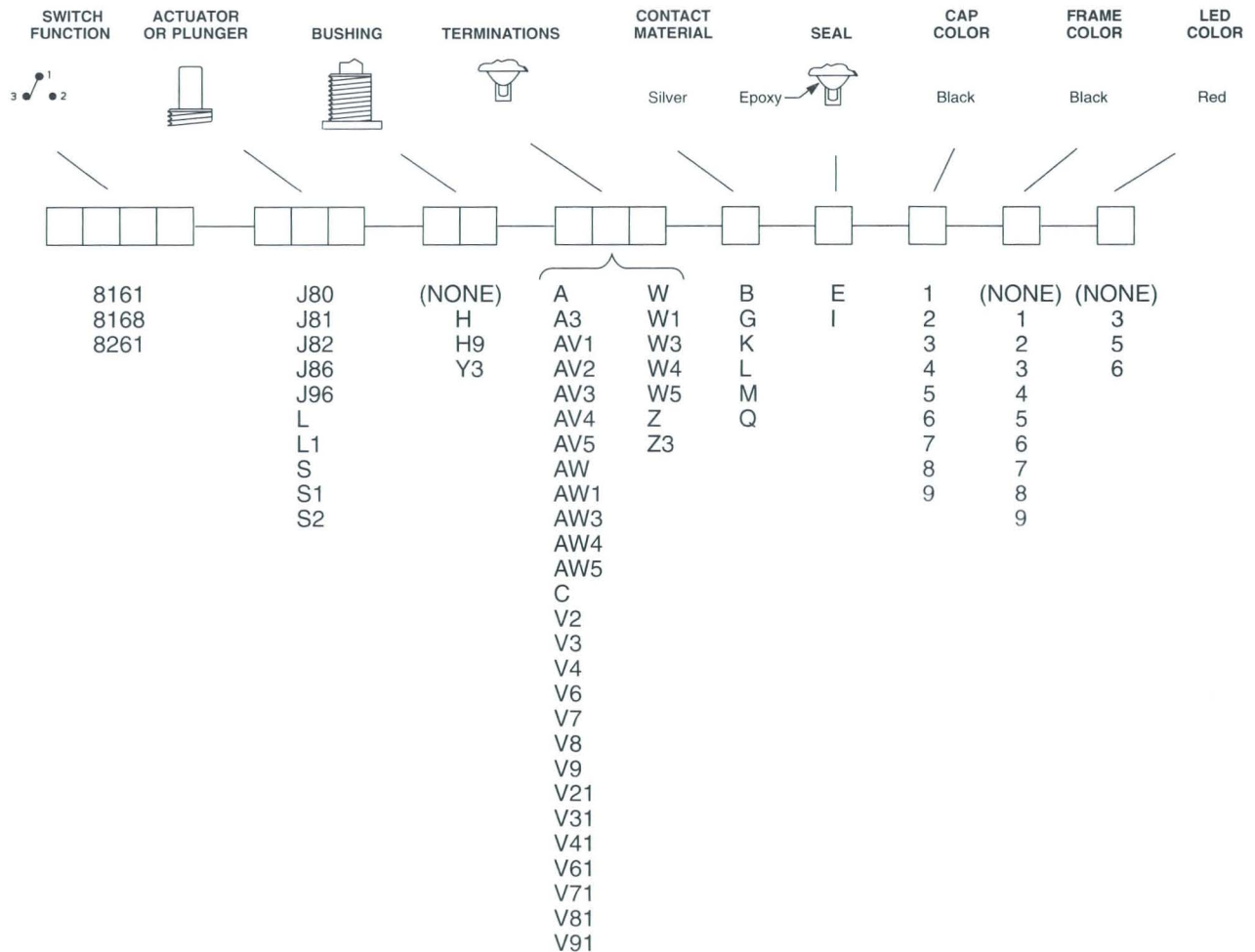




**RUL** **SF**® models available, see page D-48.

### Easy Build-A-Switch:

Below is a complete listing of available options for 8060 SERIES ALTERNATE ACTION AND MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-48; all available options are shown and described on pages D-48 thru D-56. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-56. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



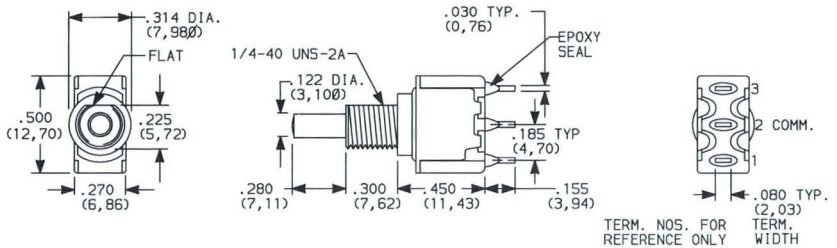


8060 Series

# Alternate Action and Momentary Pushbutton Switches

## SWITCHES WITH STANDARD OPTIONS

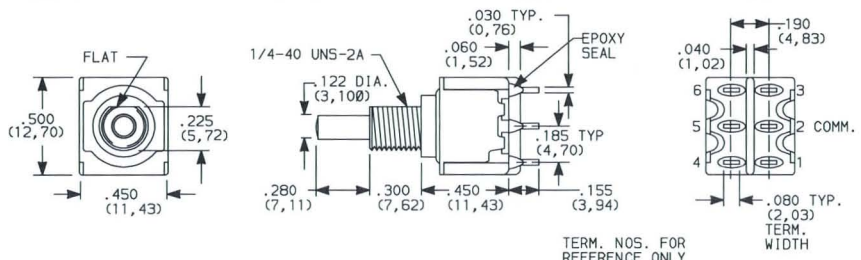
SPDT



U.S. PATENT NO. 4,095,070

Part No. Shown: 8161SHZQE2

DPDT



U.S. PATENT NO. 4,095,070

Part No. Shown: 8261SHZQE2

## SWITCH FUNCTION

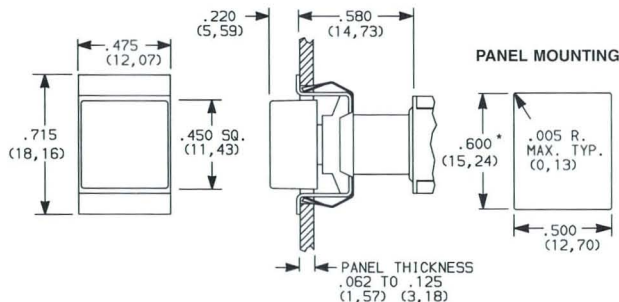
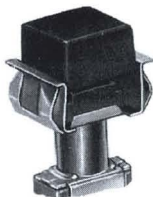
| NO. POLES | MODEL <sup>†</sup> NO. | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|------------------------|-----------------|--------|---------------------|---------|-----------|
|           |                        | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP        | 8161                   | ON              | ON     | 2-3                 | 2-1     |           |
|           | 8168                   | ON              | MOM.   |                     |         |           |
| DP        | 8261                   | ON              | ON     | 2-3-5-6             | 2-1-5-4 |           |

MOM. = MOMENTARY

<sup>†</sup> All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

## ACTUATORS—SNAP-IN FRONT MOUNT

J80



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

### CAP COLOR

| OPTION CODE | CAP COLORS   | OPTION CODE | CAP COLORS |
|-------------|--------------|-------------|------------|
| 1           | WHITE        | 6           | GREEN      |
| 2           | BLACK (std.) | 7           | BLUE       |
| 3           | RED          | 8           | BROWN      |
| 4           | ORANGE       | 9           | GRAY       |
| 5           | YELLOW       |             |            |

Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: matte. Custom actuator markings and legends available, consult factory.

Available with Z, C, Z3, or W-W5 terminations.

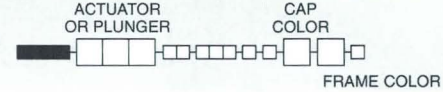
No frame color choice required.



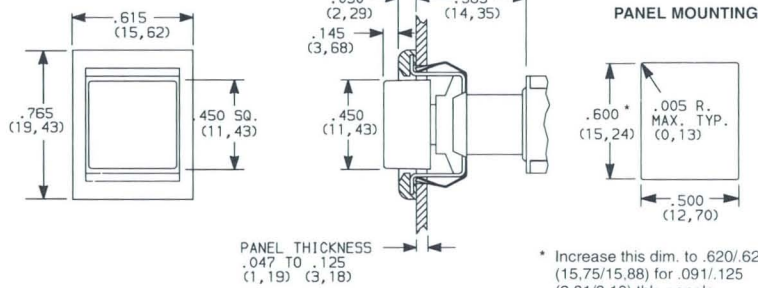
# 8060 Series

# Alternate Action and Momentary Pushbutton Switches

## ACTUATORS—SNAP-IN FRONT MOUNT



**J81** WITH FRAME



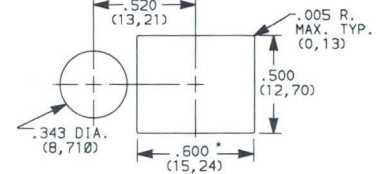
### CAP AND FRAME COLORS

| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| 1           | WHITE                |
| 2           | BLACK (std.)         |
| 3           | RED                  |
| 4           | ORANGE               |
| 5           | YELLOW               |
| 6           | GREEN                |
| 7           | BLUE                 |
| 8           | BROWN                |
| 9           | GRAY                 |

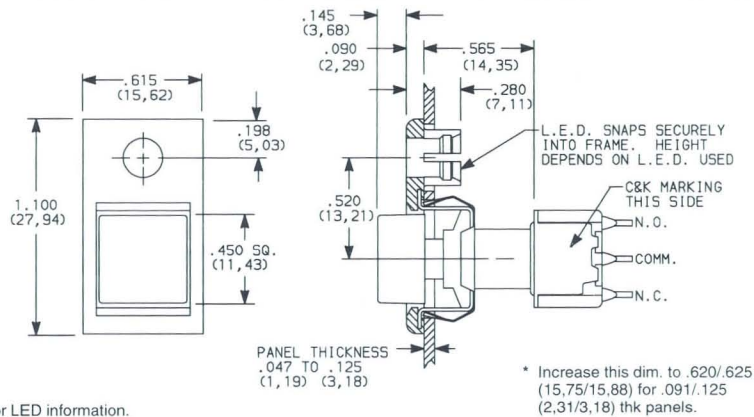
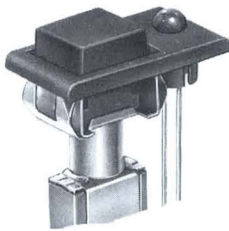
Select cap and frame colors from chart. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

Available with Z, C, Z3, or W-W5 terminations.

### PANEL MOUNTING



**J82** WITH FRAME FOR LED

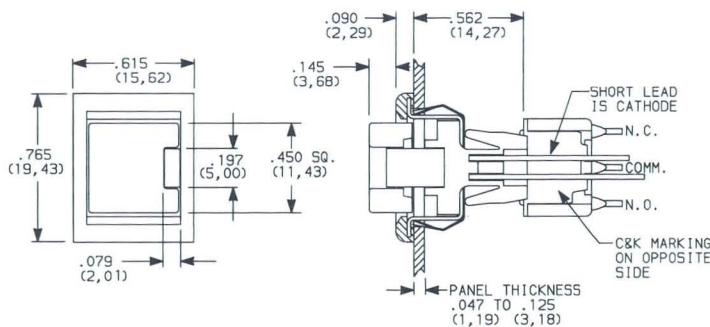
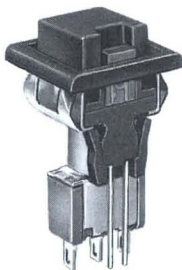


U.S. Patent No. 4,004,120  
LED not included. See page IX for LED information.

## ACTUATORS—SNAP-IN FRONT MOUNT



**J86** WITH BUILT-IN LED



### CAP AND FRAME COLORS

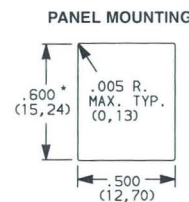
| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| 1           | WHITE                |
| 2           | BLACK (std.)         |
| 3           | RED                  |
| 4           | ORANGE               |
| 5           | YELLOW               |
| 6           | GREEN                |
| 7           | BLUE                 |
| 8           | BROWN                |
| 9           | GRAY                 |

### LED COLOR

| OPTION CODE | LED COLOR  |
|-------------|------------|
| 3           | RED (std.) |
| 5           | YELLOW     |
| 6           | GREEN      |

Select cap, frame and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator legends and markings available, consult factory. Cap and frame available separately, see catalog section H.

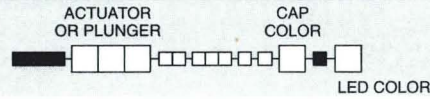
Available with Z, C, Z3 or W-W5 terminations and SPDT models only.



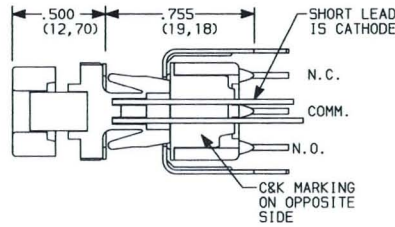
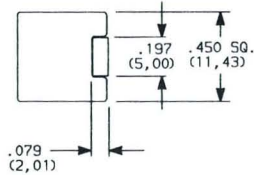
\* Increase this dim. to .620/.625 (15.75/15.88) for .091/.125 (2,31/3,18) thk. panels.

See page IX for LED information.

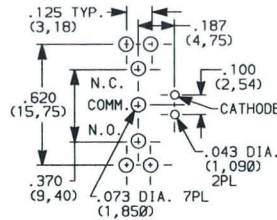
## ACTUATORS—P.C. MOUNT



**J96** WITH BUILT-IN LED



### P.C. MOUNTING



### CAP COLOR

| OPTION CODE | CAP COLOR    |
|-------------|--------------|
| 1           | WHITE        |
| 2           | BLACK (std.) |
| 3           | RED          |
| 4           | ORANGE       |
| 5           | YELLOW       |
| 6           | GREEN        |
| 7           | BLUE         |
| 8           | BROWN        |
| 9           | GRAY         |

### LED COLOR

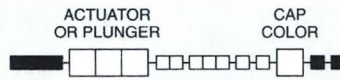
| OPTION CODE | LED COLOR  |
|-------------|------------|
| 3           | RED (std.) |
| 5           | YELLOW     |
| 6           | GREEN      |

Select cap and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap finish: matte. Custom actuator legends and markings available, consult factory. Cap available separately, see catalog section H.

Avail. with V3 termination and SPDT model only.

See page IX for LED information.

## PLUNGER



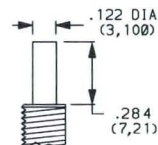
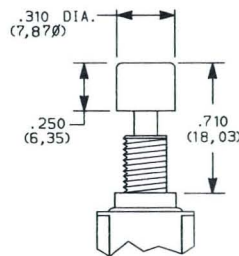
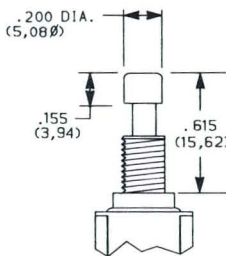
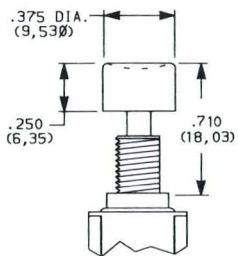
When selecting plunger & cap option, bushing selection must also be made, see next page.

**S** (STD.)

**S1**

**S2**

S, S1, S2 PLUNGER DIMS.



S, S1, S2 plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

### CAP COLOR

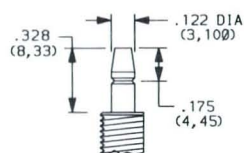
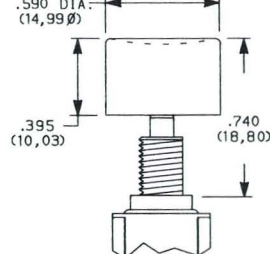
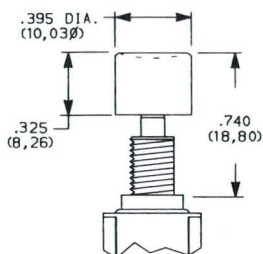
| OPTION CODE | CAP COLOR    |
|-------------|--------------|
| 1           | WHITE        |
| 2           | BLACK (std.) |
| 3           | RED          |
| 4           | ORANGE       |
| 5           | YELLOW       |
| 6           | GREEN        |
| 7           | BLUE         |
| 8           | BROWN        |
| 9           | GRAY         |

Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: gloss. Caps supplied not installed. Custom actuator legends and markings available, consult factory. Cap available separately, see catalog section H.

**L** SNAP-FITTING

**L1** SNAP-FITTING

L, L1 PLUNGER DIMS.



L, L1 plunger material: Brass, chrome plated.



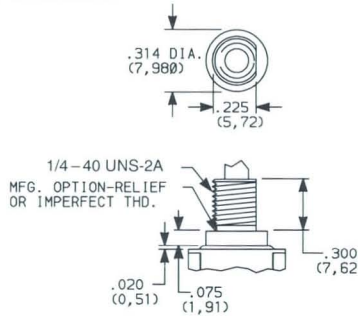
## BUSHING

When selecting bushing option, plunger selection must also be made, see previous page. No bushing option choice required when any JXX actuator option is selected.

**(NONE)**

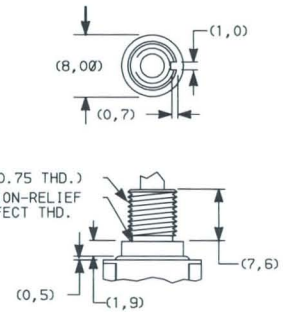
No bushing option choice required when any JXX actuator option is selected.

**H**  
**H9** UNTHREADED



H bushing standard with Z, C, Z3, or W-W5 terminations.  
H9 bushing standard with A, A3, AW-AW5, AV1-AV5, V2-V91 terminations.

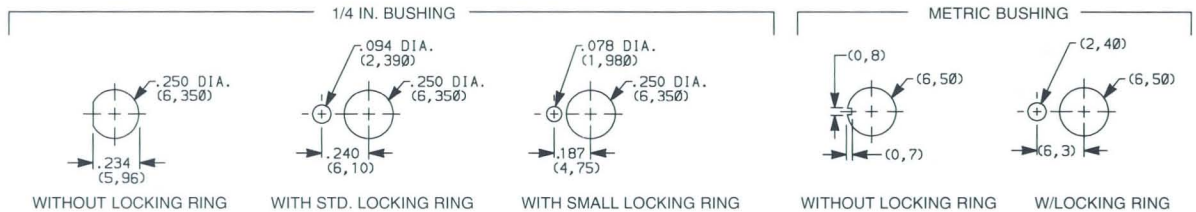
**Y3** METRIC



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

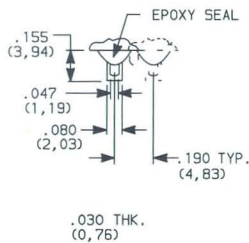
## PANEL MOUNTING

Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see Hardware, catalog section H.



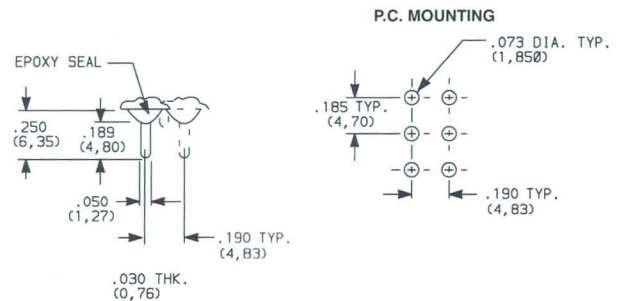
## TERMINATIONS

**Z** (STD.)



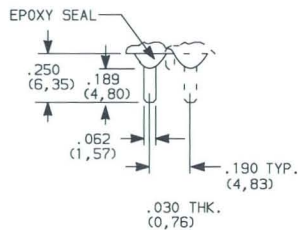
SPDT and DPDT Q contact material std. Not available with K, L, or M contact material.

**C**



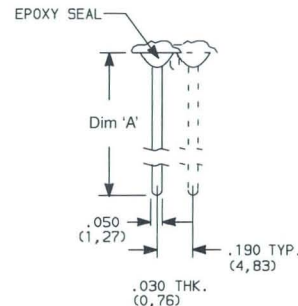
SPDT and DPDT Q contact material std.

**Z3** QUICK CONNECT



SPDT and DPDT Q contact material std. Not available with K, L, or M contact material. Mating quick connector available; order part no. 530100000.

**W-W1-W3-W4-W5** WIRE WRAP

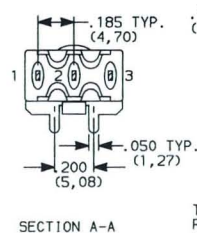
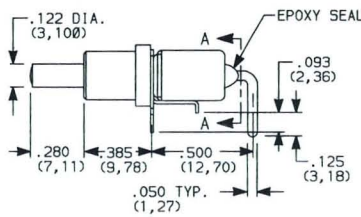
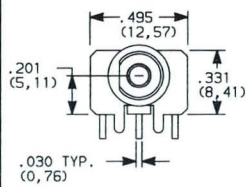


SPDT and DPDT B contact material std.

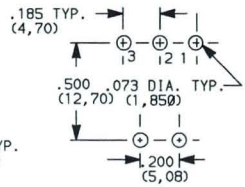
| Option    | Dim 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |

## TERMINATIONS

**A**



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

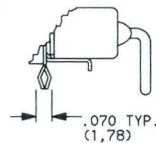
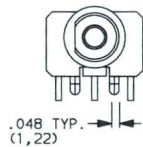
SECTION A-A

Part No. Shown: 8161SH9ABE2



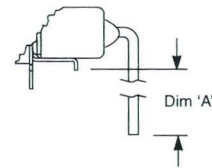
**A**

**A3 SNAP-IN**



SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW3-AW4-AW5 EXTENDED**

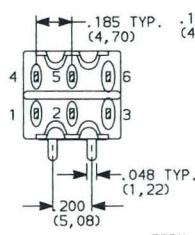
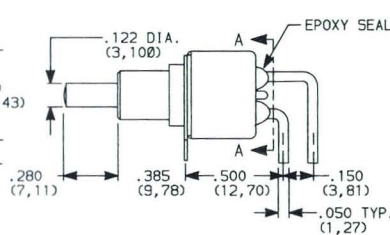
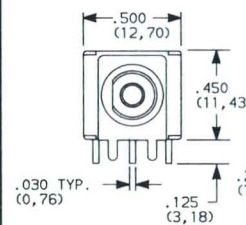


| Option     | Dim 'A'     |
|------------|-------------|
| <b>AW</b>  | .44 (11,2)  |
| <b>AW1</b> | .66 (16,8)  |
| <b>AW3</b> | .14 (3,6)   |
| <b>AW4</b> | .77 (19,6)  |
| <b>AW5</b> | 1.02 (25,9) |

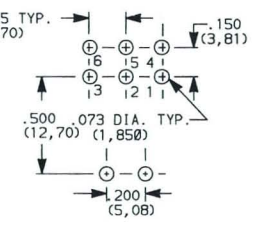
**SPDT**

Term. bend radii and lead-in mfg. option.  
B contact material std.  
Not available with I seal option.  
Note: P.C. pattern must clear switch support leg.

**A**



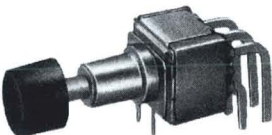
P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

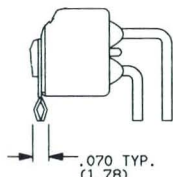
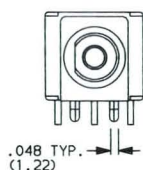
SECTION A-A

Part No. Shown: 8261SH9ABE2



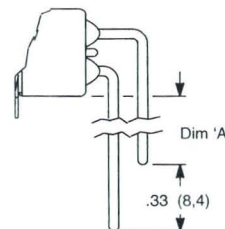
**A**

**A3 SNAP-IN**



SNAP-IN DESIGN RETAINS SWITCH.

**AW-AW1-AW4-AW5 EXTENDED**



| Option     | Dim 'A'    |
|------------|------------|
| <b>AW</b>  | .19 (4,8)  |
| <b>AW1</b> | .40 (10,2) |
| <b>AW4</b> | .50 (12,7) |
| <b>AW5</b> | .74 (18,8) |

**DPDT**

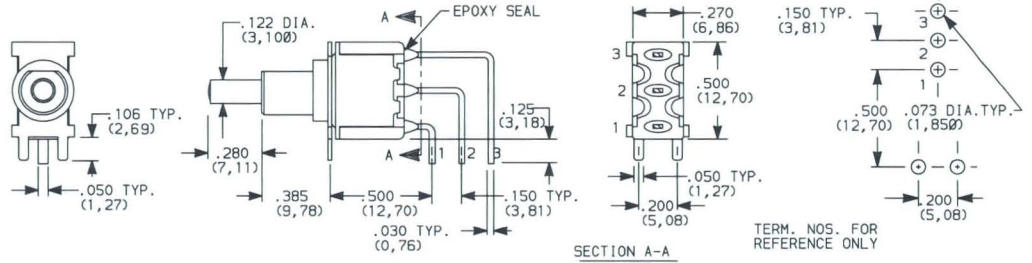
Term. bend radii and lead-in mfg. option.  
B contact material std.  
Not available with I seal option.



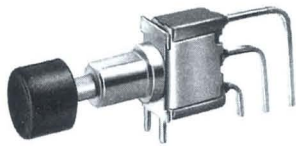
## TERMINATIONS

### AV2

#### P.C. MOUNTING



Part No. Shown: 8161SH9AV2BE2

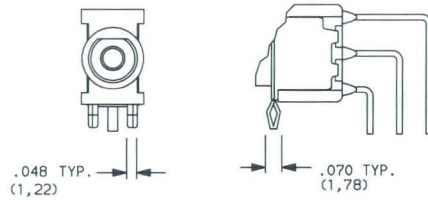


AV2

SPDT

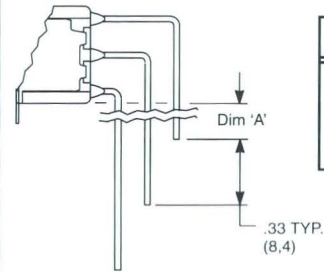
Term. bend radii and lead-in mfg. option. B contact material std. Not available with I seal option.

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

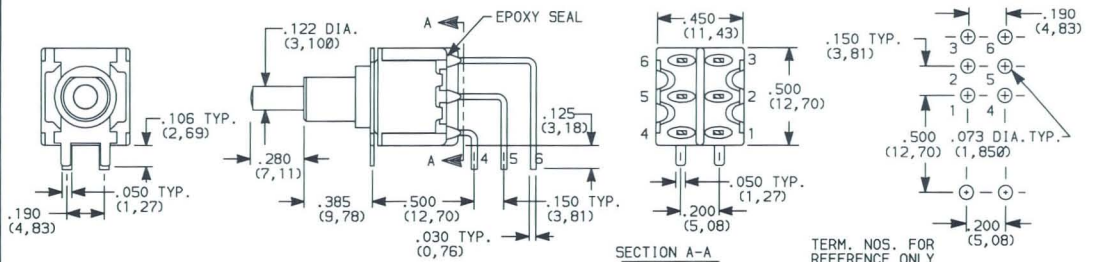
### AV1-AV4-AV5 EXTENDED



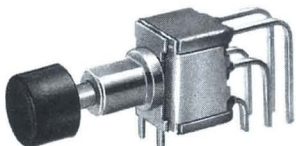
| Option | Dim 'A'    |
|--------|------------|
| AV1    | .15 (3,8)  |
| AV4    | .24 (6,1)  |
| AV5    | .48 (12,2) |

### AV2

#### P.C. MOUNTING



Part No. Shown: 8261SH9AV2BE2

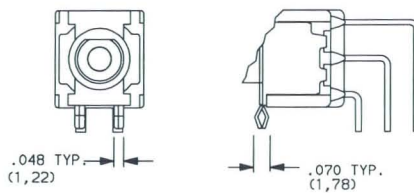


AV2

DPDT

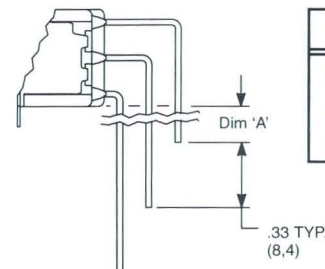
Term. bend radii and lead-in mfg. option. B contact material std. Not available with I seal option.

### AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

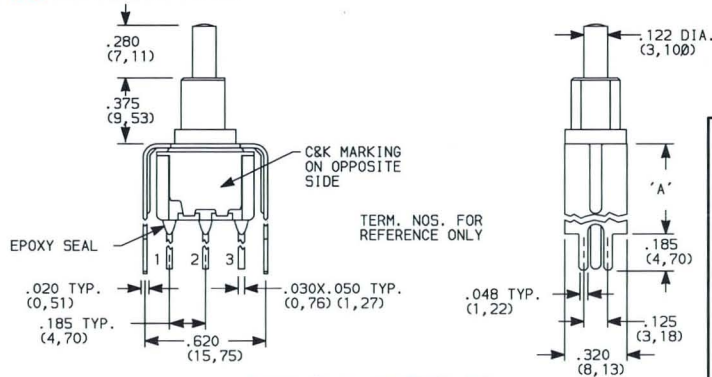
### AV1-AV4-AV5 EXTENDED



| Option | Dim 'A'    |
|--------|------------|
| AV1    | .15 (3,8)  |
| AV4    | .24 (6,1)  |
| AV5    | .48 (12,2) |

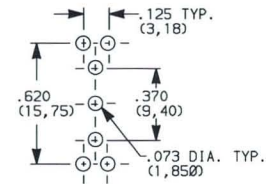
## TERMINATIONS

**V3-V4-V9** REPLACES V30-V40-V90



Part No. Shown: 8161SH9V\_BE2

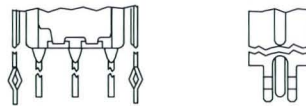
### P.C. MOUNTING



**V31-V41-V91** SNAP-IN



V31



SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |

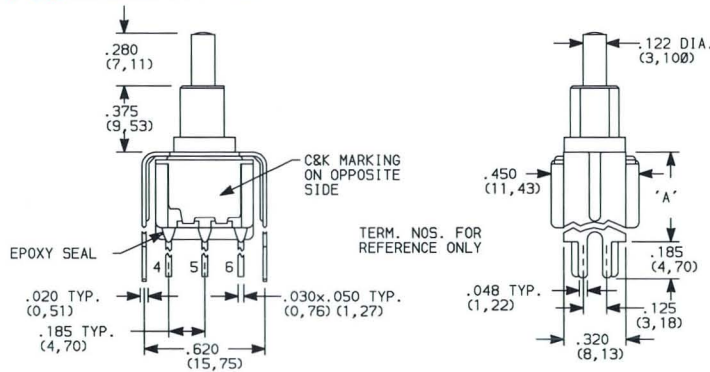


V3

SPDT

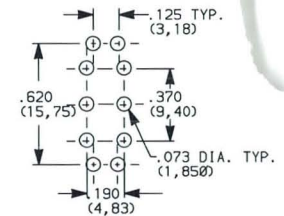
B contact material std.  
Not available with I seal option.

**V3-V4-V9** REPLACES V30-V40-V90

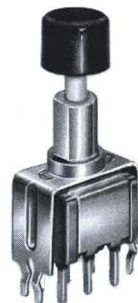


Part No. Shown: 8261SH9V\_BE2

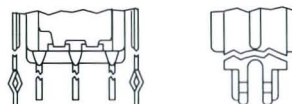
### P.C. MOUNTING



**V31-V41-V91** SNAP-IN



V31



SNAP-IN DESIGN RETAINS SWITCH.

| Option         | Dim 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4, V41</b> | .630 (16,00)  |
| <b>V9, V91</b> | 1.150 (29,21) |



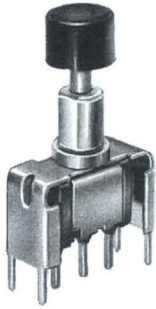
V3

DPDT

B contact material std.  
Not available with I seal option.



TERMINATIONS

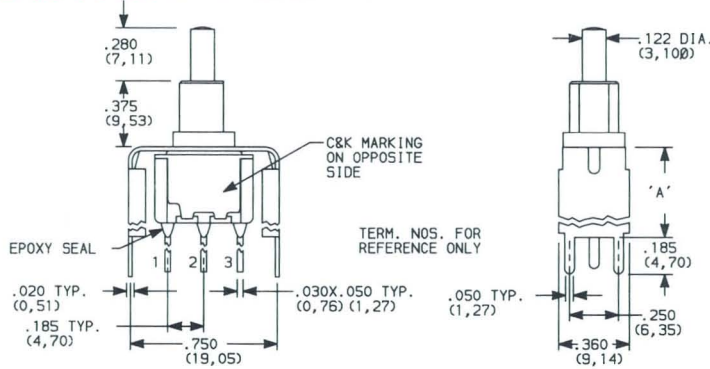


V6

SPDT

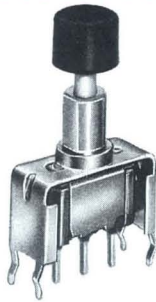
B contact material std.  
Not available with I seal option.

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80

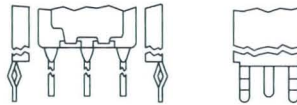


Part No. Shown: 8161SH9V\_BE2

**V21-V61-V71-V81** SNAP-IN

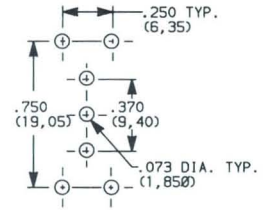


V61

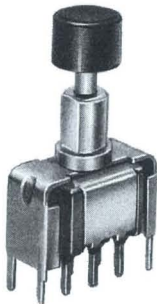


SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

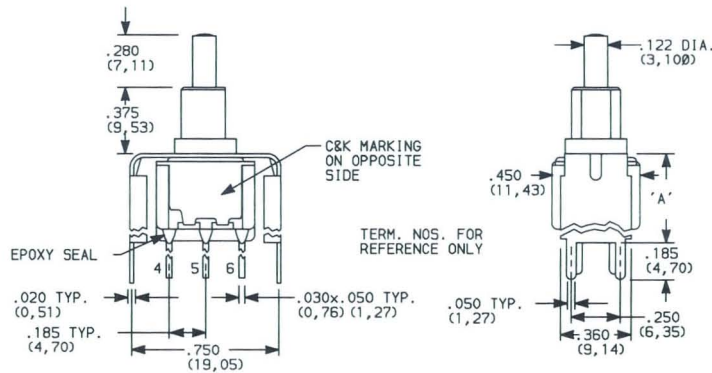


V6

DPDT

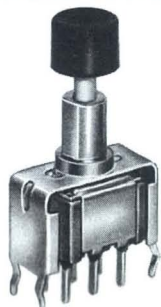
B contact material std.  
Not available with I seal option.

**V2-V6-V7-V8** REPLACES V20-V60-V70-V80

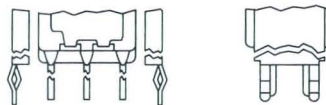


Part No. Shown: 8261SH9V\_BE2

**V21-V61-V71-V81** SNAP-IN

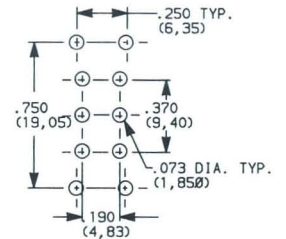


V61



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



| Option         | Dim 'A'      |
|----------------|--------------|
| <b>V2, V21</b> | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7, V71</b> | .630 (16,00) |
| <b>V8, V81</b> | .953 (24,21) |

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.                                     |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

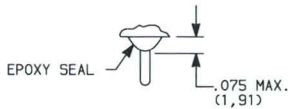
- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material standard with all terminations except Z, C, Z3.  
 Q contact material standard with Z, C, Z3 terminations.  
 K, L, M contact materials not available with Z terminations.

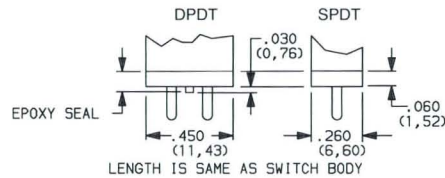
All models with all options when ordered with G, L, M or Q contact material. See pages D-48 and VIII.

## SEAL

**E** (STD.)



**I**



Available with Z, C, Z3, W-W5 terminations only.

### HOW TO ORDER

All available 8060 SERIES ALTERNATE ACTION AND MOMENTARY PUSHBUTTON SWITCH options are listed on page D-47, and are described on pages D-48 thru D-56. Switches with standard options are shown on page D-48. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page D-48. Actuator caps, hardware and accessories are available separately, see catalog section H.

### SPECIFICATIONS

- CONTACT RATING:  
6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC (Q contact material).
- ELECTRICAL LIFE: 50,000 make-and-break cycles at full load.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 65°C
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).
- CAP INSTALLATION FORCE: 10 lbs. maximum permissible.

### MATERIALS

- CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
- PLUNGER: S, S1, S2 Options: Glass filled nylon or glass filled polyester (UL 94V-0).  
L, L1 Options: Brass, nickel plated.
- CAP & FRAME: Nylon, black standard.
- BUSHING: Brass or zinc, nickel plated.
- HOUSING: Stainless steel.
- SWITCH SUPPORT: Brass or steel, tin plated.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy
- HARDWARE: Nut & Locking ring— Brass, nickel plated;  
Lockwasher— Steel, nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



# 8600 Series

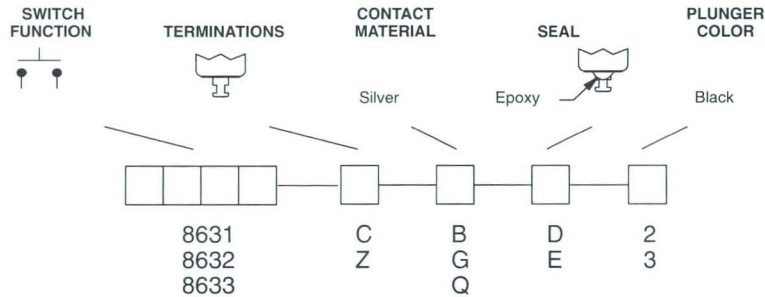
# Microminiature Pushbutton Switches



models available, see page D-58.

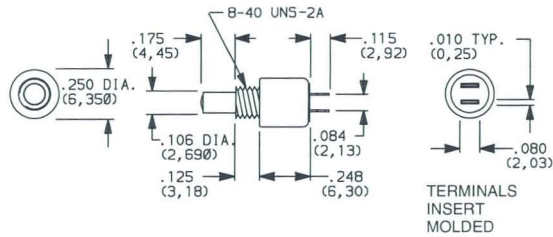
## Easy Build-A-Switch:

Below is a complete listing of available options for 8600 SERIES MICROMINIATURE PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown on pages D-57 and D-58. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-58. Actuator caps, hardware and accessories are available separately, see catalog section H.



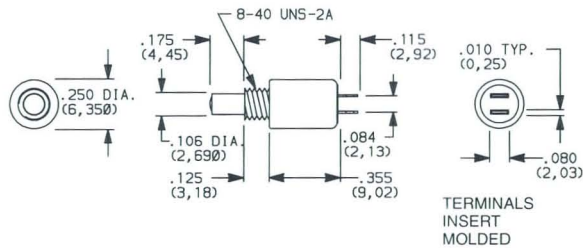
## SWITCH FUNCTION

|  |              |        |
|--|--------------|--------|
| OPTION CODE  | SWITCH FUNC. |        |
|  | POS. 1       | POS. 2 |
| <b>8631</b>  |              |        |
| Schematic:   |              |        |
| N.O.<br>Total Travel: .040 (1.02) typ.<br>Actuation Force: 5 OZ. (140g) typ. |              |        |
| MOM. = MOMENTARY   |              |        |



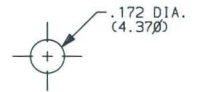
Part No. Shown: 8631ZQD2

|  |              |        |
|--|--------------|--------|
| OPTION CODE  | SWITCH FUNC. |        |
|  | POS. 1       | POS. 2 |
| <b>8632</b>  |              |        |
| Schematic:   |              |        |
| N.O. w/Overtravel<br>Total Travel: .106 (2.69) typ.<br>Overtravel: .024 (0.61) typ.<br>Actuation Force: 6.25 OZ. (177g) typ. |              |        |
| MOM. = MOMENTARY   |              |        |



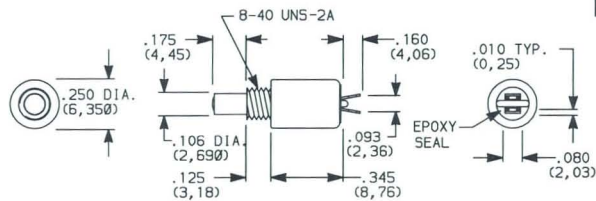
Part No. Shown: 8632ZQD2

### PANEL MOUNTING



HARDWARE:  
One mounting nut  
supplied std.

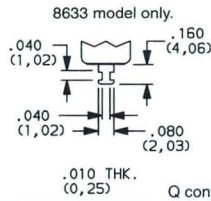
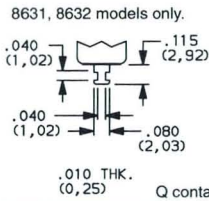
|  |              |        |
|--|--------------|--------|
| OPTION CODE  | SWITCH FUNC. |        |
|  | POS. 1       | POS. 2 |
| <b>8633</b>  |              |        |
| Schematic:   |              |        |
| N.C.<br>Total Travel: .048 (1.22) typ.<br>Actuation Force: 5 OZ. (140g) typ. |              |        |
| MOM. = MOMENTARY   |              |        |



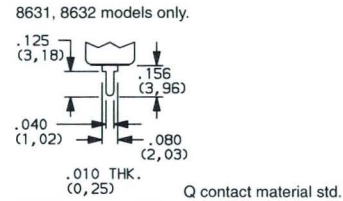
Part No. Shown: 8633ZQE2

## TERMINATIONS

**Z** (STD.)



**C**



## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL              | TERMINAL PLATING    | RATINGS                          |  |
|-------------|-------------------------------|---------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>             | GOLD <sup>1</sup>   | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>Q</b>    | SILVER <sup>4</sup>           | SILVER <sup>5</sup> | POWER                            | 8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC.<br>8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC.                                       |
| <b>G</b>    | GOLD OVER SILVER <sup>2</sup> | GOLD <sup>3</sup>   | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC.<br>8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC. |

CONTACT MATERIAL /APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

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

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

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

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

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

Q contact material standard with Z, C terminations.

8631, 8632 models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

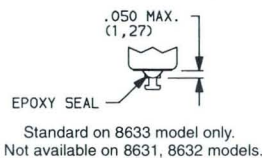
## SEAL

**D**

NO SEAL

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

**E**



## PLUNGER COLOR

**2** BLACK (STD.)

**3** RED

## HOW TO ORDER

All available 8600 SERIES MICROMINIATURE PUSHBUTTON SWITCH options are listed on page D-57, and are described on pages D-57 thru D-58. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have either epoxy terminal seal or insert molded terminals, and are compatible with 'bottom-wash' PC board cleaning methods. models available, see above. Actuator caps, hardware and accessories are available separately, see catalog section H.

## SPECIFICATIONS

### CONTACT RATING:

8631 and 8632 MODELS: 500 mA @ 120 V AC or 28 V DC; 250 mA @ 250 V AC. 8633 MODEL: 250 mA @ 120 V AC or 28 V DC; 125 mA @ 250 V AC (Q contact material).

### ELECTRICAL LIFE:

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

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

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

## MATERIALS

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

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

BUSHING: Brass, nickel plated.

CONTACTS: Coin silver, silver plated (Q contact material).

TERMINALS: 8631, 8632 MODELS: Copper alloy, silver plated.  
8633 MODELS: Coin silver (Q contact material).


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

HARDWARE: Nut—Brass, nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

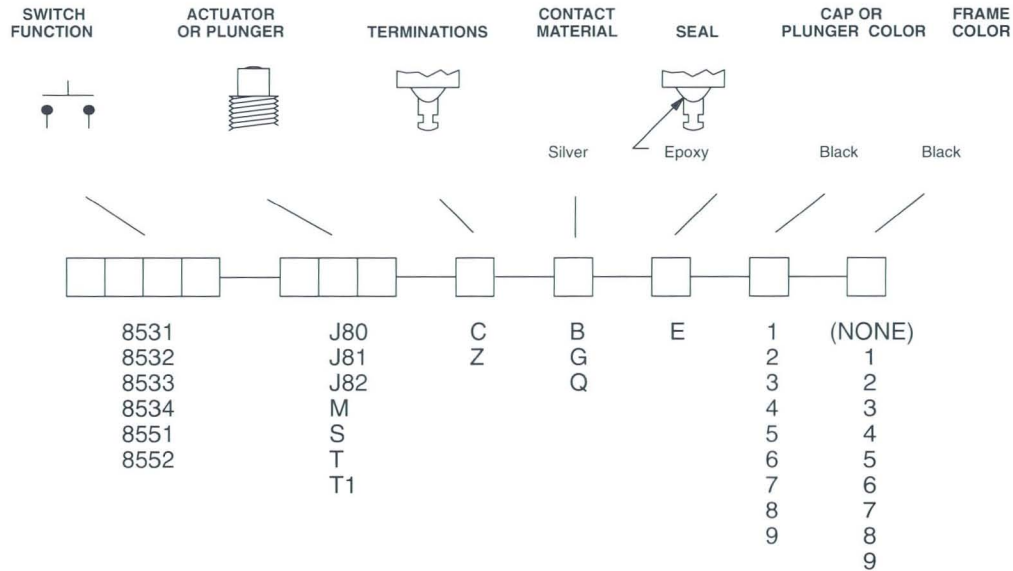




 models available, see page D-60.

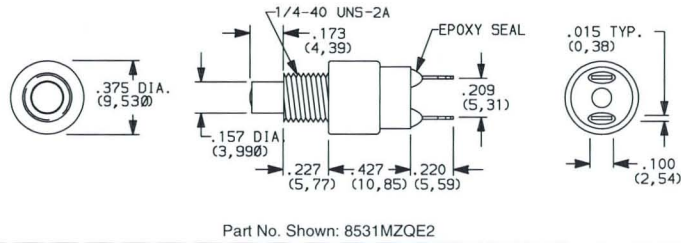
**Easy Build-A-Switch:**

Below is a complete listing of available options for 8500 SERIES SUBMINIATURE PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown and described on pages D-60 thru D-62. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-62. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

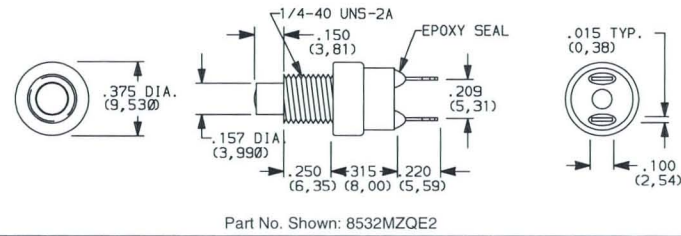


## SWITCH FUNCTION

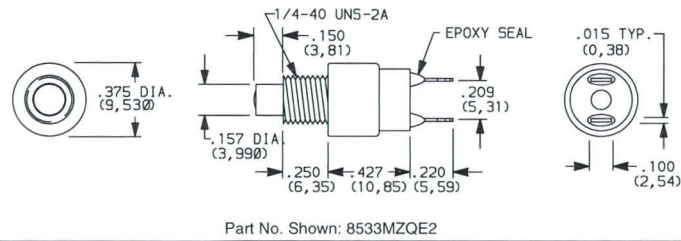
**8531—1 Amp**  
**8551—3 Amps**



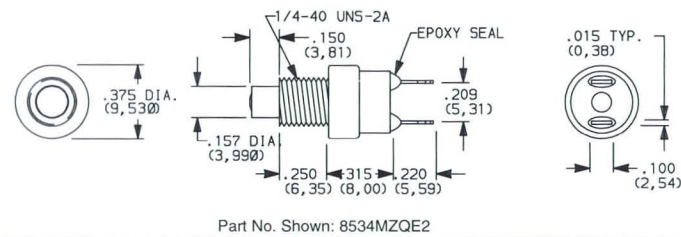
**8532—1 Amp**  
**8552—3 Amps**



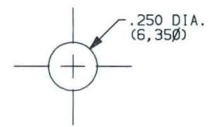
**8533—1 Amp**



**8534—1 Amp**



### PANEL MOUNTING

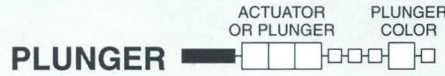


Hardware: Mounting hardware included, see HOW TO ORDER, page D-62.

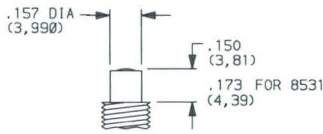
| NO. POLES   | MODEL NO.   | SWITCH FUNCTION |                   | TOTAL TRAVEL                       | ACTUATION FORCE                    | SCHEMATIC            |                  |
|-------------|-------------|-----------------|-------------------|------------------------------------|------------------------------------|----------------------|------------------|
|             |             | POS. 1          | POS. 2            |                                    |                                    |                      |                  |
| SP          | <b>8531</b> | OFF             | MOM.              | .095 (2, 41) TYP.                  | w/ Overtravel<br>.042 (1, 07) TYP. | 7.7 oz (220g) TYP.   |                  |
|             | <b>8551</b> |                 |                   |                                    |                                    |                      |                  |
|             | <b>8532</b> | OFF             | MOM.              | .050 (1, 27) TYP.                  | 6 oz (170g) TYP.                   | N.O.                 |                  |
|             | <b>8552</b> |                 |                   |                                    |                                    |                      |                  |
|             | <b>8533</b> | ON              | MOM.              | .080 (2, 03) TYP.                  | w/ Pretravel<br>.057 (1, 45) TYP.  | 11.5 oz (326 g) TYP. | N.C. W/PRETRAVEL |
| <b>8534</b> | ON          | MOM.            | .032 (0, 81) TYP. | w/ Overtravel<br>.028 (0, 71) TYP. | 10.3 oz (292g) TYP.                | N.C. W/OVERTRAVEL    |                  |

MOM. = MOMENTARY

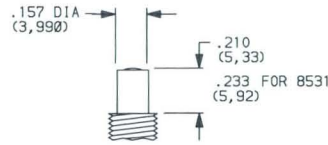
All models with all options when ordered with G or Q contact material. See AGENCY APPROVALS, page VIII.



**M** (STD.)

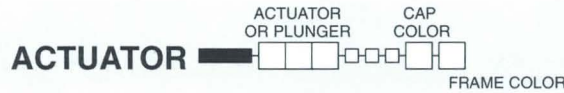


**S**

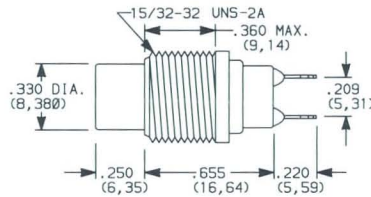


**PLUNGER COLOR**

- 2** BLACK (STD.)
- 3** RED

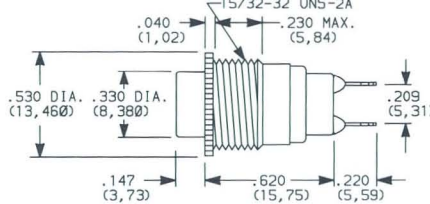


**T**



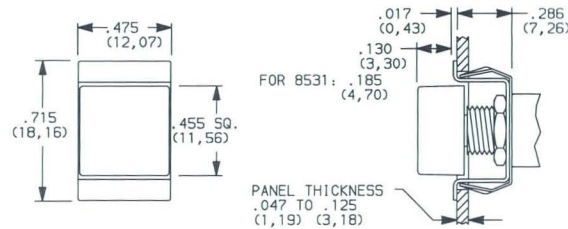
No frame color choice required.

**T1**



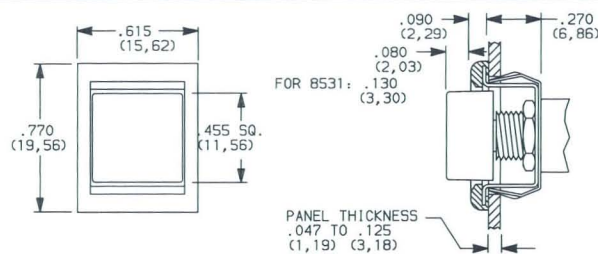
Available with 8532 and 8534 models only.  
No frame color choice required.

**J80**

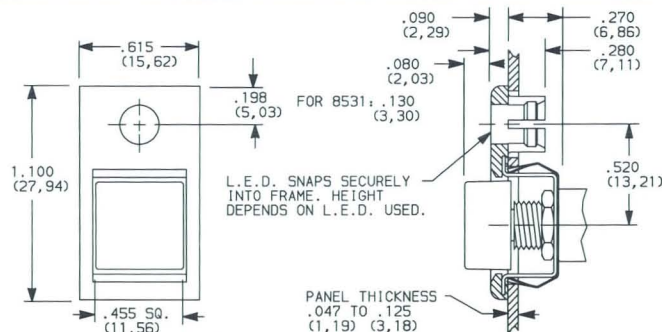


No frame color choice required.

**J81**



**J82**



U.S. PATENT NO. 4,004,120  
LED not included.  
See page IX for LED information.

## CAP AND FRAME COLORS

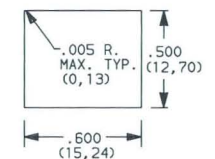
| OPTION CODE | CAP AND FRAME COLORS |
|-------------|----------------------|
| <b>1</b>    | WHITE                |
| <b>2</b>    | BLACK (std.)         |
| <b>3</b>    | RED                  |
| <b>4</b>    | ORANGE               |
| <b>5</b>    | YELLOW               |
| <b>6</b>    | GREEN                |
| <b>7</b>    | BLUE                 |
| <b>8</b>    | BROWN                |
| <b>9</b>    | GRAY                 |

Select cap and frame colors (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. J80, J81, J82 cap and frame finish: matte. T, T1 cap finish: gloss. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page D-62. Actuators and hardware are available separately, see catalog section H.

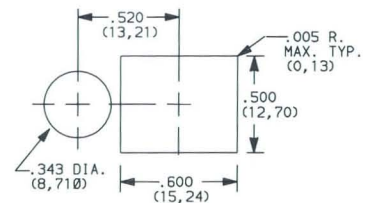
### PANEL MOUNTING T - T1



### PANEL MOUNTING J80 - J81

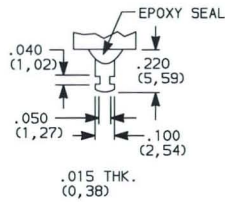


### PANEL MOUNTING J82



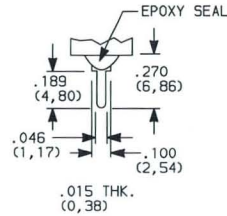
## TERMINATIONS

**Z** (STD.)



Q contact material std.

**C**



Q contact material std.

## CONTACT MATERIAL

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

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

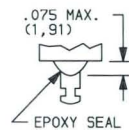
- 1 CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- 2 CONTACTS: Coin silver, with gold plate over nickel plate.
- 3 TERMINALS: Copper alloy, with gold plate over nickel plate.
- 4 CONTACTS: Coin silver, silver plated.
- 5 TERMINALS: Copper alloy, silver plated.

Q contact material standard with Z, C terminations.

All models with all options when ordered with G or Q contact material. See AGENCY APPROVALS, page VIII.

## SEAL

**E**



### HOW TO ORDER

All available 8500 SERIES SUBMINIATURE PUSHBUTTON SWITCH options are listed on page D-59, and are described on pages D-60 thru D-62. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods. models available, see above. Hardware: One mounting nut and lockwasher supplied standard, where applicable (except T actuator option: two mounting nuts supplied standard). Hardware and accessories are available separately, see catalog section H.

### SPECIFICATIONS

- CONTACT RATING:  
853X MODELS: 1 AMP @ 120 V AC or 28 V DC;  
855X MODELS: 3 AMPS @ 120 V AC or 28 V DC  
(Q contact material).
- ELECTRICAL LIFE:  
853X MODELS: 250,000 actuations at full load.  
855X MODELS: 10,000 actuations at full load.
- CONTACT RESISTANCE: Below 30 milliohms typ. initial  
@ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 65°C.

### MATERIALS

- CASE: Glass filled phenolic or diallyl phthalate (DAP). (UL 94V-0).
- PLUNGER: Phenolic or glass filled polyester, black standard (UL 94V-0).
- CAP & FRAME: Nylon, black standard.
- BUSHING: Brass, nickel plated.
- CONTACTS: Coin silver, silver plated (Q contact material).
- TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.
- HARDWARE: Nut—Brass, nickel plated; Lockwasher—Steel, bright nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

\*Process sealed—withstands soldering and cleaning processes.



- **ULTRA-MINIATURE LOW PROFILE DESIGN—** APPROX. .250 IN. (6 mm) SQ
- **PROCESS COMPATIBLE—WITHSTANDS** SOLDERING AND CLEANING PROCESSES— HIGH TEMPERATURE MATERIALS (UL 94V-0)
- **SEALED CONSTRUCTION—INTERNAL SILICONE** RUBBER ACTUATOR SEAL AND INSERT MOLDED TERMINALS STANDARD
- **TIN-LEAD ALLOY COATS ALL SIDES OF** TERMINALS FOR JOINT INTEGRITY

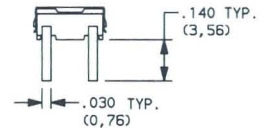
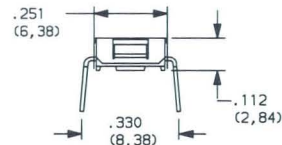
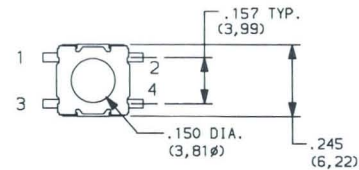
### WITH C TERMINALS

| PART NO.        | ACTUATOR HEIGHT | SWITCH FUNCTION |         |
|-----------------|-----------------|-----------------|---------|
|                 |                 | POS. 1          | POS. 2  |
| <b>KT11B0CM</b> | FLUSH           | OFF             | MOM.    |
| <b>KT11B1CM</b> | .025 (0,64)     | OFF             | MOM.    |
| <b>KT11B2CM</b> | .088 (2,24)     | OFF             | MOM.    |
| <b>KT11P2CM</b> | .093 (2,36)     | OFF             | MOM.    |
| <b>KT11P3CM</b> | .044 (1,12)     | OFF             | MOM.    |
| <b>KT11P4CM</b> | .156 (3,96)     | OFF             | MOM.    |
| Conn. Terms     |                 | OPEN            | 1,2-3,4 |
| Schematic       |                 |                 |         |
| SPST            |                 |                 |         |

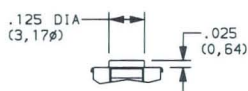
MOM. = MOMENTARY



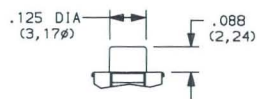
WITH B0 ACTUATOR



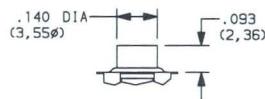
Part No. Shown: KT11B0CM



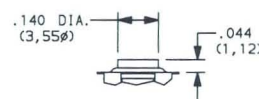
WITH B1 SILICONE RUBBER ACTUATOR



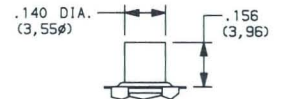
WITH B2 SILICONE RUBBER ACTUATOR



WITH P2 HARD PLASTIC ACTUATOR

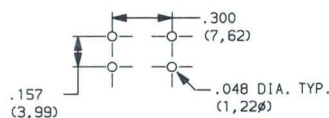


**NEW!** WITH P3 HARD PLASTIC ACTUATOR



**NEW!** WITH P4 HARD PLASTIC ACTUATOR

### P.C. MOUNTING





## HOW TO ORDER

Complete part numbers for KT SERIES SEALED MINIATURE KEY SWITCHES are shown on page D-63. KT Series surface mount models also available—see catalog section A, pages A-18 thru A-20.

## SPECIFICATIONS

CONTACT RATING: 1.0 VA max. @ 50 V AC or DC max.  
MECHANICAL & ELECTRICAL LIFE: 100,000 make-and-break cycles at full load.  
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.  
INSULATION RESISTANCE:  $10^9$  ohms min.  
DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.  
OPERATING TEMPERATURE: -40°C to 90°C.  
SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
PACKAGING: Switches supplied in rigid dispensing tubes.

## MATERIALS

BASE: LCP (UL 94V-0).  
ACTUATOR BUTTON AND SEAL: Silicone rubber.  
HOUSING: Stainless steel.  
MOVABLE CONTACT: Stainless steel, silver plated.  
STATIONARY CONTACTS: Copper alloy, silver plated.  
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

D



KA Series

NEW

# Sealed\* Half-Inch Dome Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

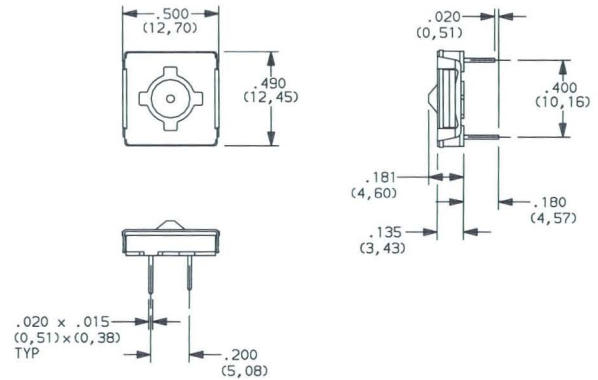


- MINIATURE LOW PROFILE DESIGN—APPROX. .500 IN. SQ
- PROCESS COMPATIBLE—WITHSTANDS SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- AVAILABLE WITH AND WITHOUT ACTUATOR CAPS
- SEALED CONSTRUCTION—INTERNAL SILICONE RUBBER ACTUATOR SEAL AND EPOXY SEALED TERMINALS STANDARD
- ELECTRICAL AND MECHANICAL LIFE: 1 MILLION CYCLES AT FULL LOAD

## WITH SILICONE RUBBER ACTUATOR BUTTON

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>KA11B1CBE</b> | OFF             | MOM.   |
| Conn. Terms.     | OPEN            | 1-2    |
| Schematic        |                 |        |
| SPST             |                 |        |

MOM.=MOMENTARY

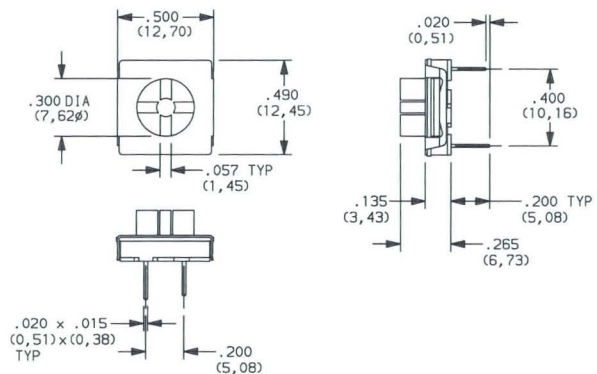
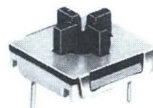


## WITH ACTUATOR FOR CAPS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>KA11K1CBE</b> | OFF             | MOM.   |
| Conn. Terms.     | OPEN            | 1-2    |
| Schematic        |                 |        |
| SPST             |                 |        |

MOM.=MOMENTARY

Caps available separately— See catalog section H.





KA Series

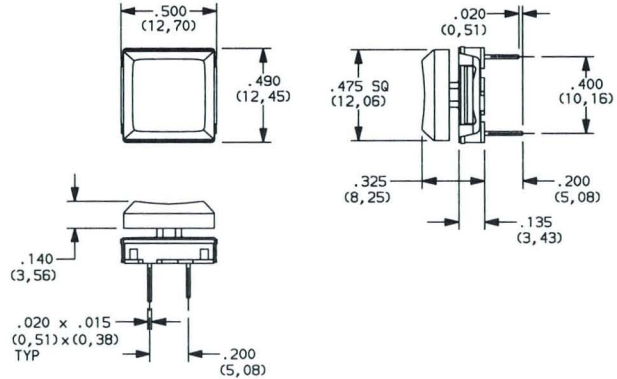
NEW

# Sealed\* Half-Inch Dome Pushbutton Switches

\*Process sealed—withstands soldering and cleaning processes.

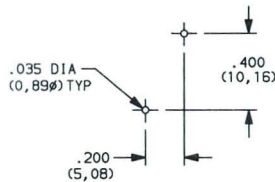
## WITH ACTUATOR CAP

| PART NO.     | CAP COLOR    | SWITCH FUNCTION |        |
|--------------|--------------|-----------------|--------|
|              |              | POS. 1          | POS. 2 |
| KA11R1CBE1   | WHITE        | OFF             | MOM.   |
| KA11R1CBE2   | BLACK (std.) | OFF             | MOM.   |
| KA11R1CBE3   | RED          | OFF             | MOM.   |
| KA11R1CBE4   | ORANGE       | OFF             | MOM.   |
| KA11R1CBE5   | YELLOW       | OFF             | MOM.   |
| KA11R1CBE6   | GREEN        | OFF             | MOM.   |
| KA11R1CBE7   | BLUE         | OFF             | MOM.   |
| KA11R1CBE8   | BROWN        | OFF             | MOM.   |
| KA11R1CBE9   | GRAY         | OFF             | MOM.   |
| Conn. Terms. |              | OPEN            | 1-2    |
| Schematic    |              |                 |        |
| SPST         |              |                 |        |



MOM.=MOMENTARY

## P.C. MOUNTING



## HOW TO ORDER

Complete part numbers for KA SERIES SEALED HALF-INCH DOME PUSHBUTTON SWITCHES are shown on pages D-65 and D-66. Actuator caps are available separately, see catalog section H.

## SPECIFICATIONS

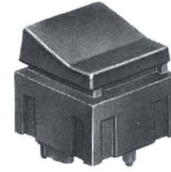
CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
 MECHANICAL & ELECTRICAL LIFE: 1,000,000 make-and-break cycles at full load.  
 CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.  
 INSULATION RESISTANCE: 10<sup>9</sup> ohms min.  
 DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.  
 OPERATING TEMPERATURE: -40°C to 90°C.  
 SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 ( 1 hour steam aging).

## MATERIALS

BASE: Glass filled nylon 4/6 (UL 94V-0).  
 ACTUATOR BUTTON AND SEAL: Silicone rubber.  
 ACTUATOR CAPS: 6/6 nylon, black standard.  
 HOUSING: Stainless steel.  
 MOVABLE CONTACT: Stainless steel, gold plated.  
 STATIONARY CONTACTS AND TERMINALS: Copper alloy, gold plated.  
 TERMINAL SEAL: Epoxy.

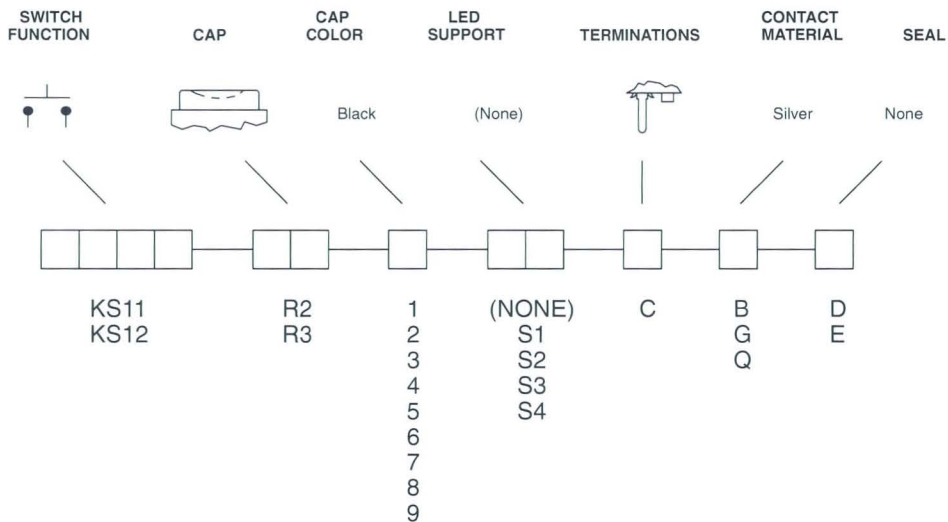
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.





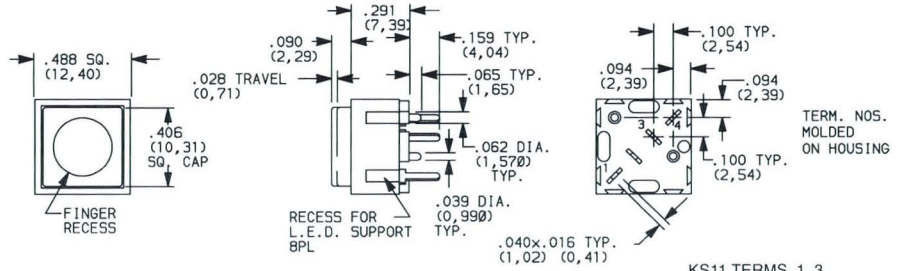
**Easy Build-A-Switch:**

Below is a complete listing of available options for KS SERIES PUSHBUTTON KEY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown on page D-68 and D-69. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-69. Hardware and accessories are available separately, see catalog section H.





SWITCH FUNCTION

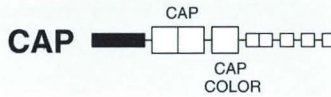


Part No. Shown: KS12R22CQD

KS11 TERMS. 1, 3  
KS12 TERMS. 1, 3, 4

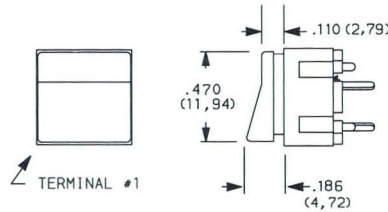
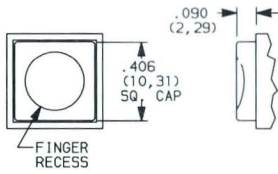
| NO. POLES | MODEL NO.   | SWITCH FUNCTION |        | CONNECTED TERMINALS |        | SCHEMATIC |
|-----------|-------------|-----------------|--------|---------------------|--------|-----------|
|           |             | POS. 1          | POS. 2 | POS. 1              | POS. 2 |           |
| SP        | <b>KS11</b> | OFF             | MOM.   | OPEN                | 1-3    | SPST      |
|           | <b>KS12</b> | ON              | MOM.   | 1-4                 | 1-3    | SPDT      |

MOM. = MOMENTARY



**R2** (STD.)

**R3**



CAP COLORS

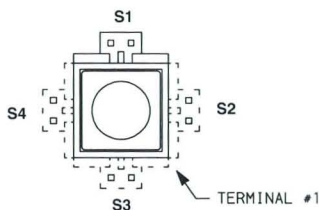
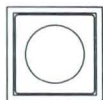
| OPTION CODE | ACTUATOR COLOR |
|-------------|----------------|
| 1           | WHITE          |
| 2           | BLACK (std.)   |
| 3           | RED            |
| 4           | ORANGE         |
| 5           | YELLOW         |
| 6           | GREEN          |
| 7           | BLUE           |
| 8           | BROWN          |
| 9           | GRAY           |

Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: matte. Custom actuator markings and legends available, consult factory.

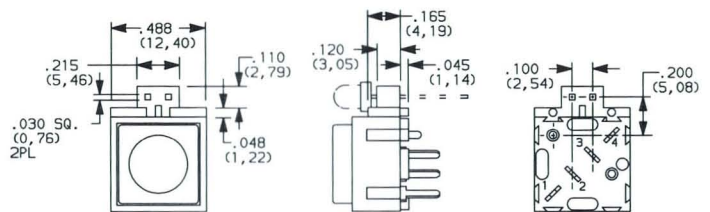
LED SUPPORT

**(NONE)** (STD.)

**S1-S2-S3-S4**



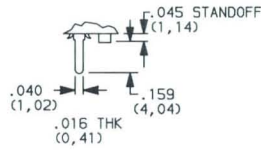
TYPICAL INSTALLATION



LED support shown in position S1. LED not supplied. LED support also available separately, see catalog section H.

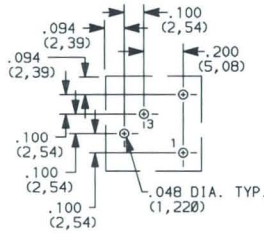
## TERMINATIONS

**C** (STD.)

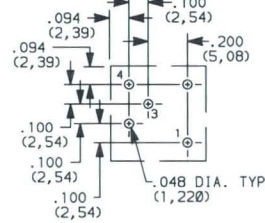


Q contact material std.

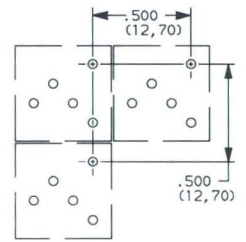
P.C. MOUNTING



KS11



KS12



MULTIPLE SWITCH SPACING

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL              | TERMINAL PLATING    | RATINGS                          |   |
|-------------|-------------------------------|---------------------|----------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>             | GOLD <sup>1</sup>   | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.                                    |
| <b>Q</b>    | SILVER <sup>2</sup>           | SILVER <sup>2</sup> | POWER                            | 25 mA MAX. @ 50 V AC OR DC MAX.                                     |
| <b>G</b>    | GOLD OVER SILVER <sup>3</sup> | GOLD <sup>3</sup>   | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 25 mA MAX. @ 50 V AC OR DC MAX. |

CONTACT MATERIAL /APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

- <sup>1</sup> MOVABLE CONTACT: Beryllium copper, with gold plate over nickel plate.  
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> MOVABLE CONTACT: Beryllium copper, silver plated  
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- <sup>3</sup> MOVABLE CONTACT: Beryllium copper, with gold plate over nickel plate over silver plate.  
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate over silver plate.

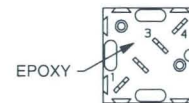
Q contact material standard.

## SEAL

**D** (STD.)

NO SEAL

**E**



## HOW TO ORDER

All available KS SERIES PUSHBUTTON KEY SWITCH options are listed on page D-67, and are described on pages D-68 and D-69. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

LED support is available separately, see catalog section H.

## SPECIFICATIONS

- CONTACT RATING: 25 mA max. @ 50 V AC or DC max. (Q contact material).
- MECHANICAL LIFE: 100,000 actuations.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 65°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

## MATERIALS

- CASE: Glass filled nylon (UL 94 V-0).
- ACTUATOR: ABS or polycarbonate—ABS blend, matte finish, black standard.
- MOVABLE CONTACT: Beryllium copper, silver plated (Q contact material).
- STATIONARY CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

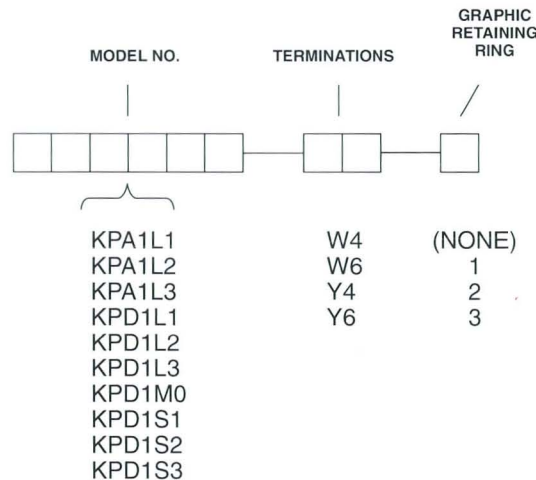


Patent Pending

- ALL-ELECTRONIC SWITCHING CIRCUIT—NO CONTACT ARCING OR BOUNCE—NO MOVABLE PARTS OR MECHANICAL WEAR
- ONE PIECE HOUSING—HERMETICALLY SEALED—IMMERSIBLE
- SPST NORMALLY-OPEN MOMENTARY—INTERFACES WITH ALL DIGITAL LOGIC CIRCUITRY—AC AND DC MODELS AVAILABLE
- 3 HOUSING STYLES—4 COLORS —PLASTIC AND ALUMINUM
- WIRE LEAD TERMINATIONS—WITH AND WITHOUT CONNECTORS
- SHOCKPROOF SWITCH—WITHSTANDS HARSH ENVIRONMENTS AND TEMPERATURE EXTREMES—INSENSITIVE TO SHOCK, MAGNETIC FIELDS, VIBRATION

**Easy Build-A-Switch:**

Below is a complete listing of available options for KP SERIES PIEZO PULSE MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown and described on pages D-71 and D-72. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-72.





KP Series

NEW

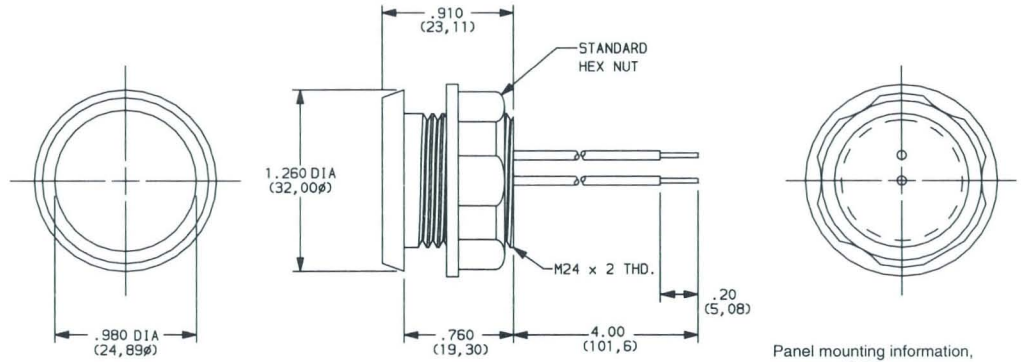
# Piezo Pulse Momentary Pushbutton Switches

MODELS

## L LARGE—PLASTIC

| MODEL NO.     | CIRCUIT TYPE | HOUSING COLOR |
|---------------|--------------|---------------|
| <b>KPA1L1</b> | AC           | WHITE         |
| <b>KPA1L2</b> | AC           | BLACK         |
| <b>KPA1L3</b> | AC           | RED           |
| <b>KPD1L1</b> | DC           | WHITE         |
| <b>KPD1L2</b> | DC           | BLACK         |
| <b>KPD1L3</b> | DC           | RED           |

SPST N.O. MOMENTARY  
(See schematic page D-73.)



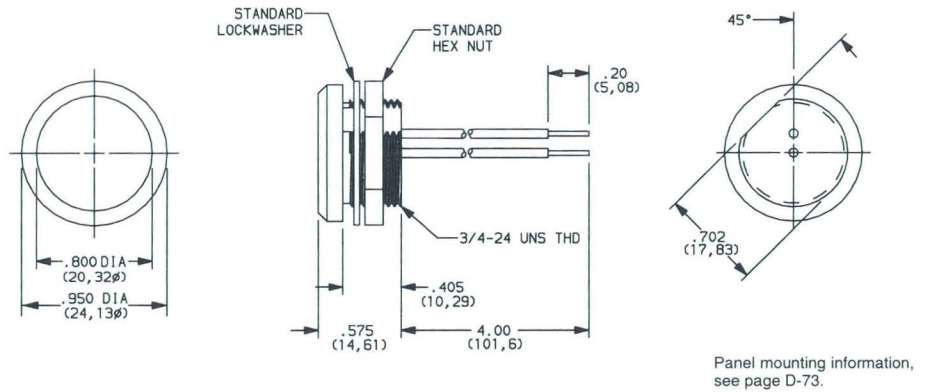
NOTE: Graphic Ring option not available with L Large Plastic Models, see page D-72.

Part No. Shown: KPA1L2W4

## M SMALL—ALUMINUM

| MODEL NO.     | CIRCUIT TYPE | HOUSING COLOR |
|---------------|--------------|---------------|
| <b>KPD1M0</b> | DC           | NATURAL       |

SPST N.O. MOMENTARY  
(See schematic page D-73.)



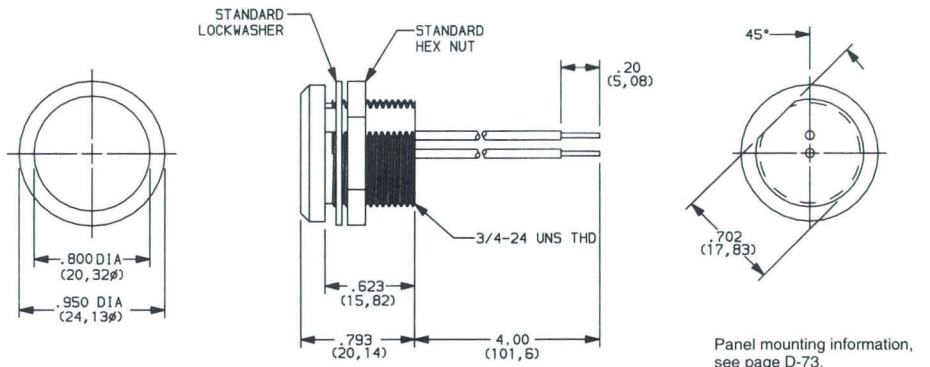
NOTE: Metal housing of M Small Aluminum Model should be grounded.

Part No. Shown: KPD1M0W4

## S SMALL—PLASTIC

| MODEL NO.     | CIRCUIT TYPE | HOUSING COLOR |
|---------------|--------------|---------------|
| <b>KPD1S1</b> | DC           | WHITE         |
| <b>KPD1S2</b> | DC           | BLACK         |
| <b>KPD1S3</b> | DC           | RED           |

SPST N.O. MOMENTARY  
(See schematic page D-73.)

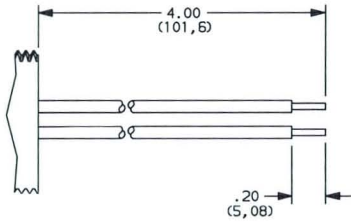


Part No. Shown: KPD1S2W4

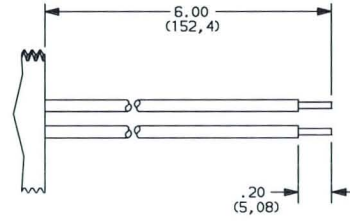


## TERMINATIONS

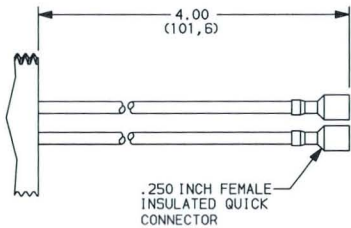
**W4** 4 INCH WIRE LEAD, .20 STRIP



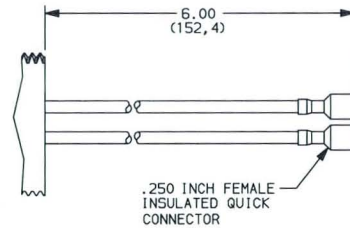
**W6** 6 INCH WIRE LEAD, .20 STRIP



**Y4** 4 INCH WIRE LEAD WITH .250 FEMALE INSULATED QUICK CONNECTOR



**Y6** 6 INCH WIRE LEAD WITH .250 FEMALE INSULATED QUICK CONNECTOR



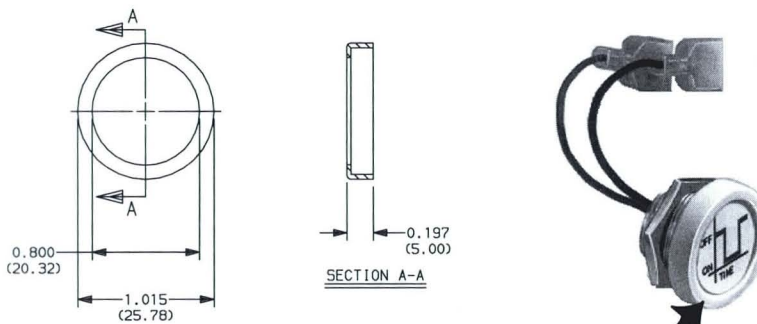
**NOTE:** Standard wire leads are 22 AWG. Standard wire colors: AC models — all leads red, DC models — red positive lead, violet negative lead. Other colors, lengths, gages available, consult factory.

## GRAPHIC RETAINING RING

**(NONE)** No Graphics Ring (STD.)

- 1** White
- 2** Black
- 3** Red

Graphic retaining ring fits M Small Aluminum Models and S Small Plastic Models only. Not available with L Large Plastic Models. Ring simply snaps on and holds graphic in position, or can be used alone as decorative trim ring. Graphic may be installed by customer or C&K, consult factory.



RING SIMPLY SNAPS ON — HOLDS GRAPHIC IN POSITION, OR CAN BE USED ALONE AS DECORATIVE TRIM RING (FITS SMALL M AND S MODELS ONLY).

**MATERIAL:** 6/6 Nylon (UL 94V-2), finish: matte.

**NOTE:** Other colors available, consult factory.

## HOW TO ORDER

All available KP SERIES PIEZO PULSE MOMENTARY PUSHBUTTON SWITCH options are listed on page D-70 and are described on pages D-71 and D-72. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

**SPECIFICATIONS**

RATING: 250 mA continuous, 50 V max. 500 mA continuous available, consult factory.  
 ELECTRICAL LIFE: 10,000,000 actuations typ.  
 CONTACT RESISTANCE: ON: 7.5Ω; OFF: 5 meg Ω.  
 INSULATION RESISTANCE: 10<sup>9</sup> ohms min.  
 ACTUATION: 8oz typical up to 3lbs max.  
 OPERATING TEMPERATURE: -40° C to 85° C.  
 CIRCUIT CLOSURE DURATION: 50 mS min.

**MATERIALS**

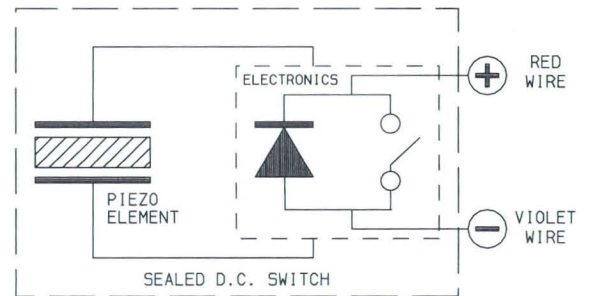
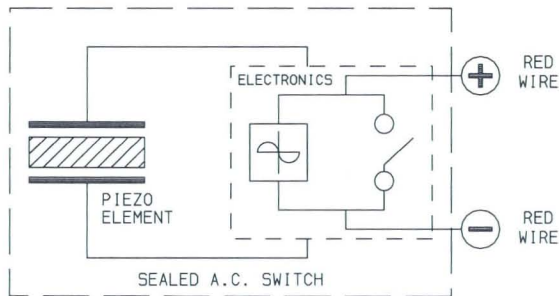
HOUSING: L and S Models — Polyetherimide (UL 94V-0), black standard ; M Models — Aluminum, natural iridite finish.  
 WIRE LEADS: 22 AWG; AC Models—all leads red; DC Models—red positive lead, violet negative lead.  
 GRAPHIC RETAINING RING: 6/6 nylon (UL 94V-2)  
 MOUNTING NUT: L Models—nylon; M and S Models—steel, zinc plated.  
 LOCKWASHER: M and S Models only—steel, zinc plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

**SCHEMATICS:**

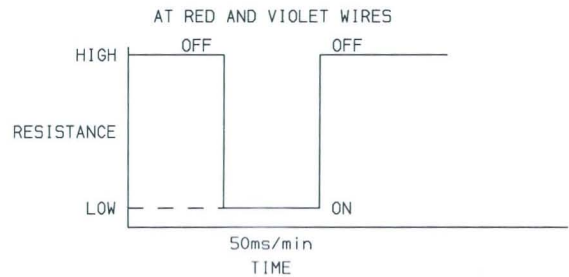
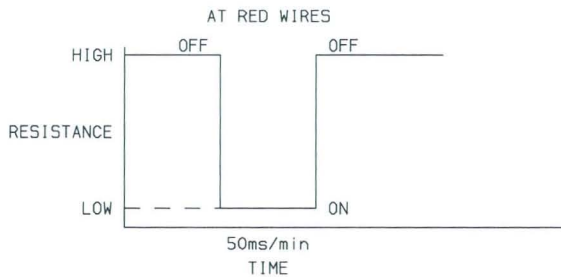
**AC—KPA1 MODEL**

**DC—KPD1 MODEL**

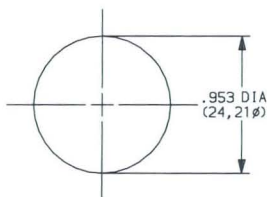


SPST NORMALLY OPEN MOMENTARY

SPST NORMALLY OPEN MOMENTARY

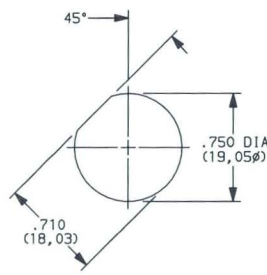


**PANEL MOUNTING**



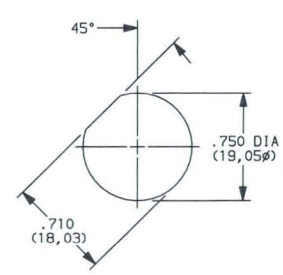
L MODELS

Panel thickness: .250 (6,35) max.



M MODELS

Panel thickness: .200 (5,80) max.



S MODELS

Panel thickness: .350 (8,89) max.

D

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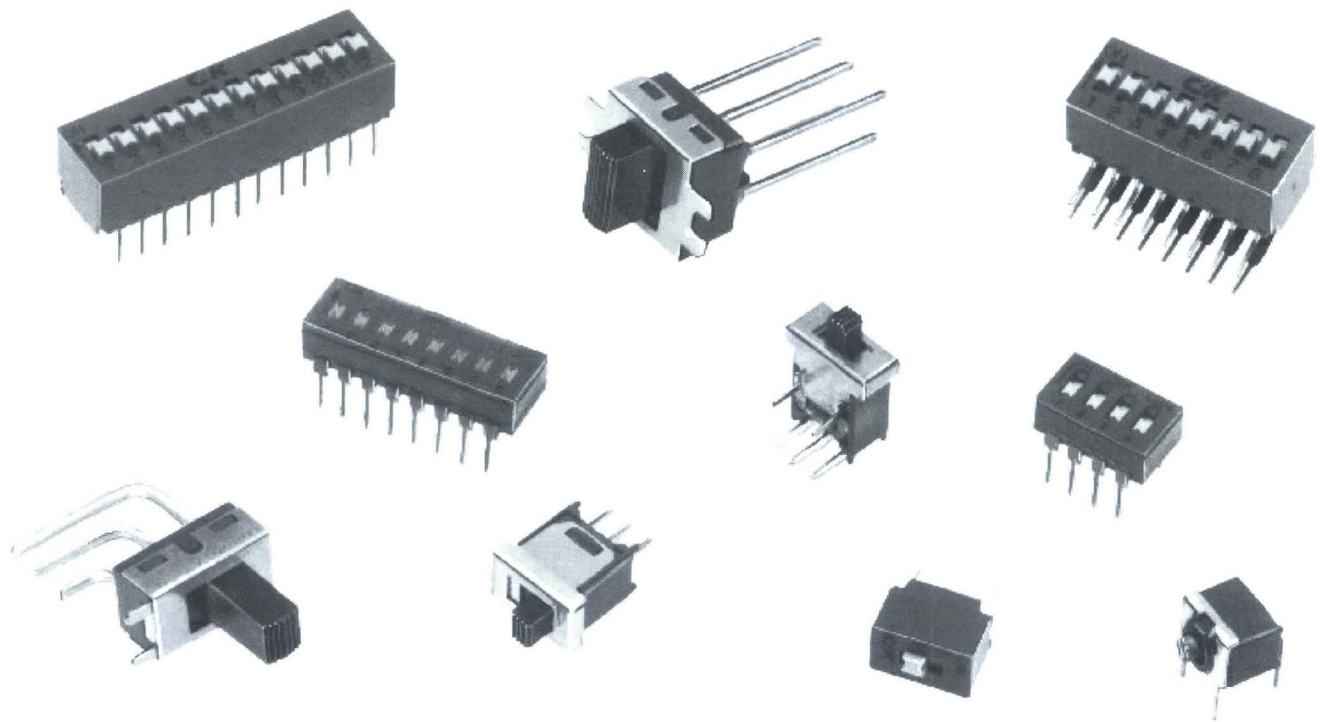


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## SECTION E

### DIP AND SLIDE SWITCHES

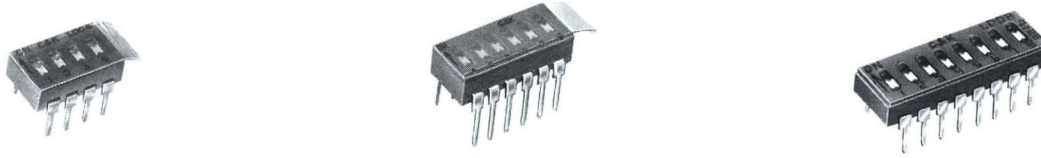
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|             |                                 |                |
|-------------|---------------------------------|----------------|
| LD Series   | Sealed Low Profile DIP Switches | E-2 thru E-3   |
| BD Series   | Washable DIP Switches           | E-4 thru E-6   |
| BP Series   | Side Actuated DIP Switches      | E-7 thru E-8   |
| GS Series   | Ultra-Miniature Slide Switches  | E-9 thru E-10  |
| TS Series   | Tiny Slide Switches             | E-11 thru E-13 |
| 1000 Series | Miniature Slide Switches        | E-14 thru E-20 |

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\*Process sealed—withstands soldering and cleaning processes.



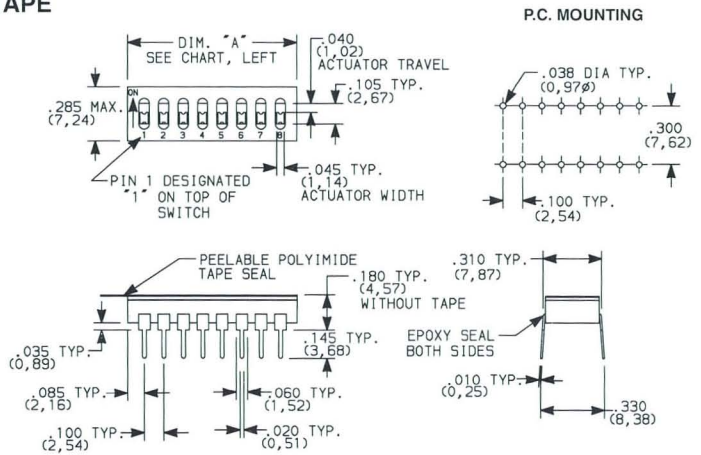
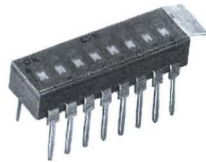
- MACHINE INSERTABLE—LOW PROFILE DESIGN—SPST—4, 5, 6, 7, 8, 10 POSITIONS
- PROCESS SEALED CONSTRUCTION—WITHSTANDS SOLDERING AND CLEANING PROCESSES—REMOVABLE POLYIMIDE TOP TAPE SEAL STANDARD
- DESIGNED WITH HIGH TEMPERATURE MATERIALS (UL 94V-0)
- RECESSED SLIDE ACTUATORS AND POSITIVE DETENT—PREVENT ACCIDENTAL ACTUATION
- BIFURCATED GOLD PLATED CONTACTS—NO LUBRICANTS REQUIRED
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY

### SEALED—WITH TOP TAPE

| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| LD04H0K  | 4        | .470 (11,94)  |
| LD05H0K  | 5        | .570 (14,48)  |
| LD06H0K  | 6        | .670 (17,02)  |
| LD07H0K  | 7        | .770 (19,56)  |
| LD08H0K  | 8        | .870 (22,10)  |
| LD10H0K  | 10       | 1.070 (27,18) |

Schematic

SPST



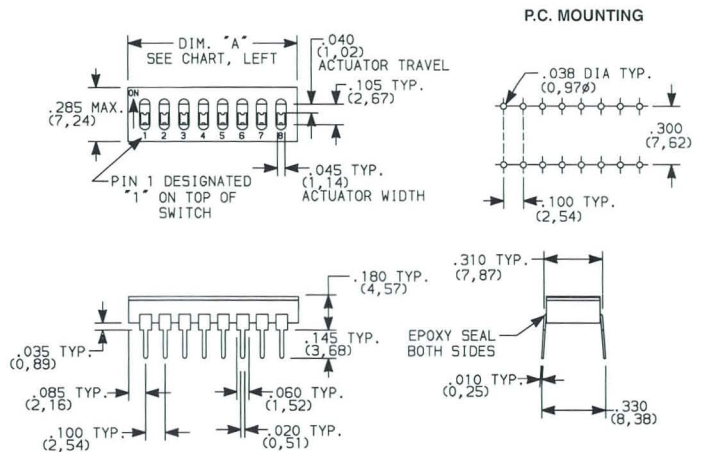
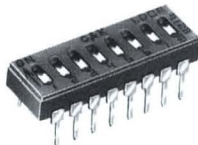
Part No. Shown: LD08H0K

### UNSEALED—NO TAPE

| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| LD04H0KD | 4        | .470 (11,94)  |
| LD05H0KD | 5        | .570 (14,48)  |
| LD06H0KD | 6        | .670 (17,02)  |
| LD07H0KD | 7        | .770 (19,56)  |
| LD08H0KD | 8        | .870 (22,10)  |
| LD10H0KD | 10       | 1.070 (27,18) |

Schematic

SPST

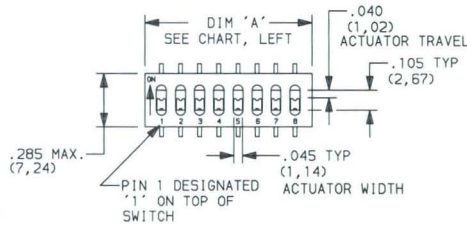
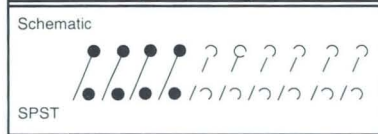


Part No. Shown: LD08H0KD

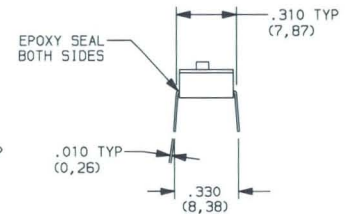
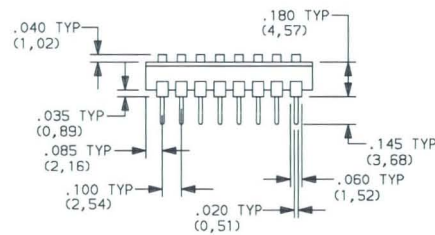
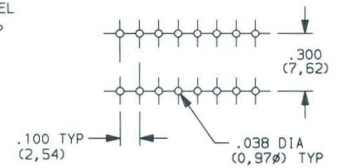
\*Process sealed—withstands soldering and cleaning processes.

**UNSEALED—NO TAPE—EXTENDED ACTUATORS**

| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| LD04H1KD | 4        | .470 (11,94)  |
| LD05H1KD | 5        | .570 (14,48)  |
| LD06H1KD | 6        | .670 (17,02)  |
| LD07H1KD | 7        | .770 (19,56)  |
| LD08H1KD | 8        | .870 (22,10)  |
| LD10H1KD | 10       | 1.070 (27,18) |



**P.C. MOUNTING**



Part No. Shown: LD08H1KD

**HOW TO ORDER**

Complete part numbers for LD SERIES SEALED LOW PROFILE DIP SWITCHES are shown on pages E-2 and E-3. All switches supplied in 'OFF' position in rigid dispensing tubes. Tape and reel packaging per EIA 481A also available, consult factory. LD Series surface mount models also available—see catalog section A, pages A-3 and A-4. Rigid plastic splash-resistant cover available for 8 position models with flush actuators, see catalog section H.

**SPECIFICATIONS**

SWITCH FUNCTION: SPST—4, 5, 6, 7, 8, & 10 positions.

CONTACT RATING:

Carry: 100 mA max. @ 50 V DC.

Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles at full load, each circuit.

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

CAPACITANCE: 5 pF max. between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

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

PACKAGING: Switches supplied in rigid dispensing tubes. Switch position 1 denotes pin no. 1. All switch actuators in 'OFF' position standard. Tape and reel packaging per EIA 481A also available, consult factory.

**MATERIALS**

CASE & COVER: Glass filled polyester (PET), flame retardant (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

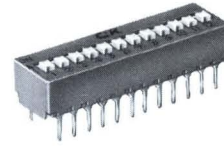
CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

TAPE SEAL: Polyimide. Also available unsealed, without top tape.

NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



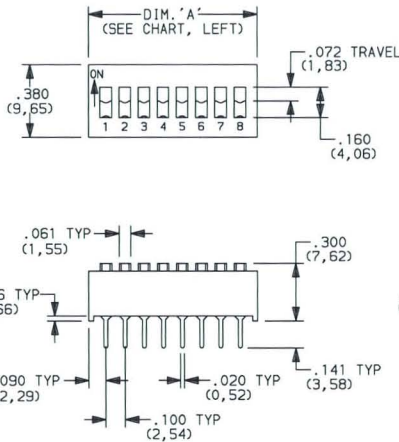
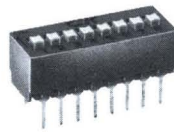
- PROVEN WASHABLE DESIGN—NO BOOTS, CAPS OR TAPE REQUIRED—OPEN BASE DESIGN ALLOWS CLEANERS TO FLUSH THROUGH—NEW CLOSED BASE MODELS ALSO AVAILABLE
- HIGH TEMPERATURE MATERIALS (UL 94V-0) WITHSTANDS SOLDERING AND CLEANING TEMPERATURES AND PROCESSES
- SLIDE ACTUATORS WITH POSITIVE DETENT—PREVENT ACCIDENTAL ACTUATION
- RELIABLE WIPING CONTACT MECHANISM
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY

### WITH OPEN BASE

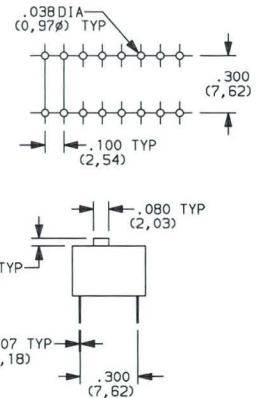
| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| BD01     | 1        | .180 (4,57)   |
| BD02     | 2        | .280 (7,11)   |
| BD03     | 3        | .380 (9,65)   |
| BD04     | 4        | .480 (12,19)  |
| BD05     | 5        | .580 (14,73)  |
| BD06     | 6        | .680 (17,27)  |
| BD07     | 7        | .780 (19,81)  |
| BD08     | 8        | .880 (22,35)  |
| BD09     | 9        | .980 (24,89)  |
| BD10     | 10       | 1.080 (27,43) |
| BD12     | 12       | 1.280 (32,51) |

Schematic

SPST



### P.C. MOUNTING



Part No. Shown: BD08

### WITH CLOSED BASE & EPOXY TERMINAL SEAL

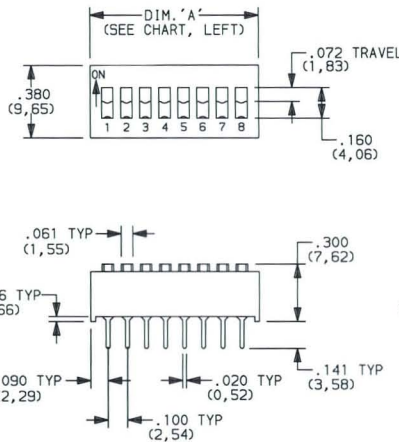
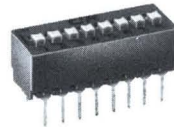
(SUITABLE FOR BOTTOM WASH CLEANING METHODS ONLY)

| PART NO. | NO. POS. | DIM. 'A'     |
|----------|----------|--------------|
| BD02E    | 2        | .280 (7,11)  |
| BD04E    | 4        | .480 (12,19) |
| BD06E    | 6        | .680 (17,27) |
| BD08E    | 8        | .880 (22,35) |

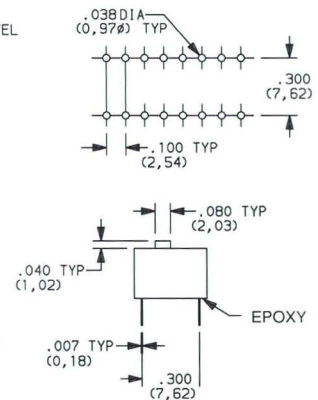
Schematic

SPST

**NEW**



### P.C. MOUNTING

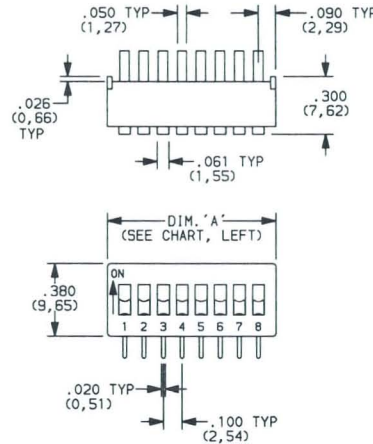
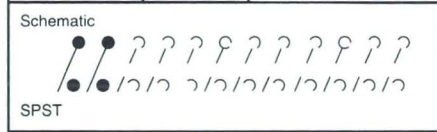


Part No. Shown: BD08E

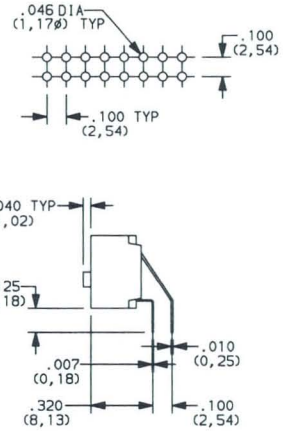


### WITH AV RIGHT ANGLE TERMINAL STYLE & OPEN BASE

| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| BD02AV   | 2        | .280 (7,11)   |
| BD03AV   | 3        | .380 (9,65)   |
| BD04AV   | 4        | .480 (12,19)  |
| BD05AV   | 5        | .580 (14,73)  |
| BD06AV   | 6        | .680 (17,27)  |
| BD07AV   | 7        | .780 (19,81)  |
| BD08AV   | 8        | .880 (22,35)  |
| BD09AV   | 9        | .980 (24,89)  |
| BD10AV   | 10       | 1.080 (27,43) |
| BD12AV   | 12       | 1.280 (32,51) |



### P.C. MOUNTING

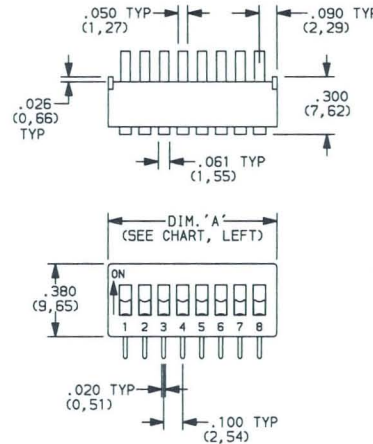
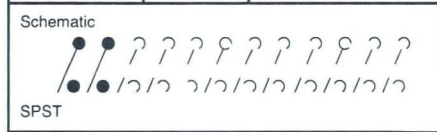


Part No. Shown: BD08AV

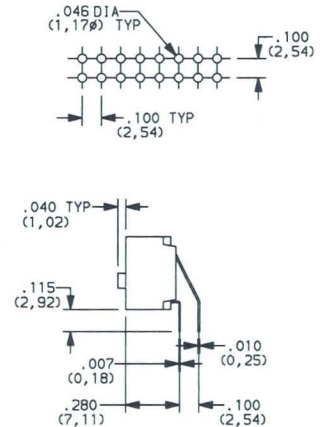
Term. bend radii mfg. option.

### WITH AV2 RIGHT ANGLE TERMINAL STYLE & OPEN BASE

| PART NO. | NO. POS. | DIM. 'A'      |
|----------|----------|---------------|
| BD02AV2  | 2        | .280 (7,11)   |
| BD03AV2  | 3        | .380 (9,65)   |
| BD04AV2  | 4        | .480 (12,19)  |
| BD05AV2  | 5        | .580 (14,73)  |
| BD06AV2  | 6        | .680 (17,27)  |
| BD07AV2  | 7        | .780 (19,81)  |
| BD08AV2  | 8        | .880 (22,35)  |
| BD09AV2  | 9        | .980 (24,89)  |
| BD10AV2  | 10       | 1.080 (27,43) |
| BD12AV2  | 12       | 1.280 (32,51) |



### P.C. MOUNTING



Part No. Shown: BD08AV2

Term. bend radii mfg. option.

### HOW TO ORDER

Complete part numbers for BD SERIES WASHABLE DIP SWITCHES are shown on pages E-4 and E-5. All switches supplied in 'OFF' position and in rigid dispensing tubes. Closed base models suitable for bottom wash cleaning methods only.



## SPECIFICATIONS

SWITCH FUNCTION: SPST— 1 thru 12 position available (except position 11).

CONTACT RATING:  
Carry: 100 mA max. @ 50 V DC.  
Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 10,000 make-and-break cycles at full load, each circuit.

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

INSULATION RESISTANCE:  $10^9$  ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

CAPACITANCE: 5 pF max. between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

SHOCK: Withstands 20g 11 ms sawtooth waveform with no contact opening greater than 10 microseconds.

VIBRATION: No contact opening greater than 10 microseconds and no contact closure when exposed to vibration .06 in DA or 5g, whichever is less, from 10 to 55 Hz, and 10g from 55 to 500 Hz.

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

PACKAGING: Switches supplied in rigid dispensing tubes. Switch position 1 denotes pin no. 1. All switch actuators in 'OFF' position standard.

## MATERIALS

CASE & COVER: Glass filled polyester (PBT), flame retardant (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

CONTACTS: WE#1 over palladium silver over nickel over phosphor bronze.

TERMINALS: Phosphor bronze, with tin-lead alloy over nickel plate.

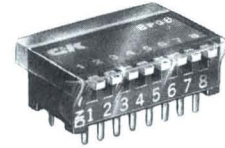
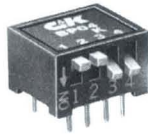
TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

## INSTALLATION, SOLDERING & CLEANING

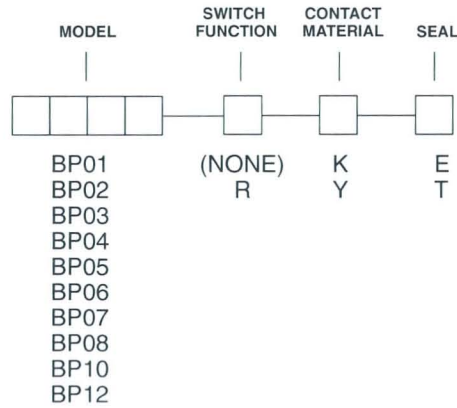
All BD Series DIP Switches can be hand soldered or machine soldered without the use of boots, caps, tapes or special attention. Open base washable models have unique design, allowing solvent cleaners and water/detergent solutions to flush and clean the electrical contacts of contaminants and fluxes. Closed base models with epoxy terminal sealing recommended for no-wash or bottom-wash assembly methods only. For best results, follow these recommendations:

- 1) Wave soldering recommended at 500° F solder temperature.
- 2) Hand solder using 30 watt small tip iron controlled at 500° F, 10 sec. max./terminal.
- 3) Open base washable models—clean flux using forced rinse, high agitation or triple bath cleaning method. DO NOT mask or cover switch in any way during cleaning. Switch is designed for easy solvent flush out.
- 4) Closed base models with epoxy terminal seal—recommended for no-wash or bottom-wash assembly methods only.
- 5) All switch actuators must be in 'OFF' position during soldering and cleaning processes.



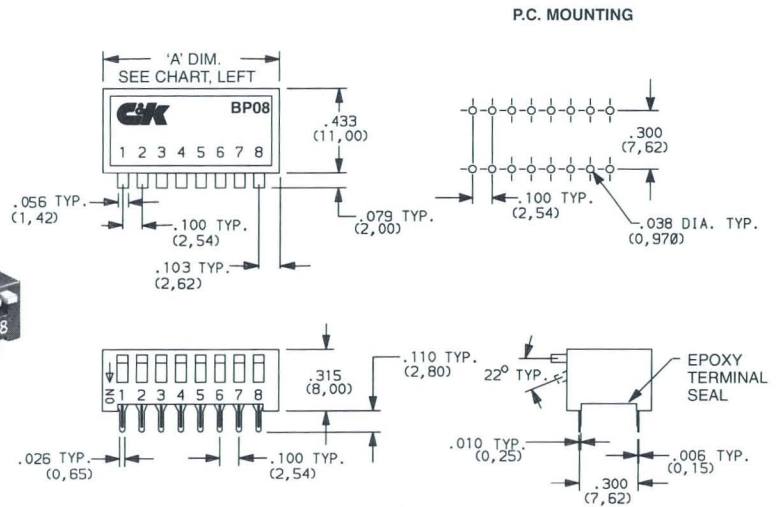
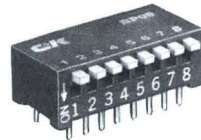
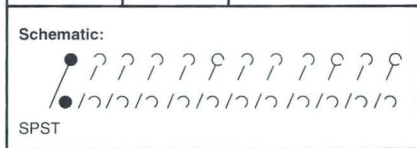
Easy Build-A-Switch:

Below is a complete listing of available options for BP SERIES SIDE ACTUATED DIP SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown on pages E-7 and E-8. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page E-8.



MODEL

| MODEL NO. | NO. POS. | DIM. 'A'      |
|-----------|----------|---------------|
| BP01      | 1        | .217 (5,50)   |
| BP02      | 2        | .315 (8,00)   |
| BP03      | 3        | .413 (10,50)  |
| BP04      | 4        | .512 (13,00)  |
| BP05      | 5        | .610 (15,50)  |
| BP06      | 6        | .709 (18,00)  |
| BP07      | 7        | .807 (20,50)  |
| BP08      | 8        | .906 (23,00)  |
| BP10      | 10       | 1.102 (28,00) |
| BP12      | 12       | 1.299 (33,00) |



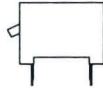
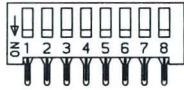
Part No. Shown: BP08KE



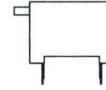
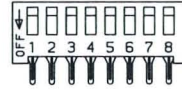
## SWITCH FUNCTION

**(NONE)** (STD.) THROW

**R** REVERSE THROW



Actuator is DOWN in ON position, as shown.



Actuator is UP in ON position, as shown.

**NOTE:** All switches shipped in 'OFF' position standard.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL  | TERMINAL PLATING | RATINGS                 |  |
|-------------|-------------------|------------------|-------------------------|--|
| <b>K</b>    | GOLD <sup>1</sup> | TIN <sup>2</sup> | LOW LEVEL / DRY CIRCUIT | CARRY: 100 mA max. @ 50 V DC;<br>SWITCH: 100 mA max. @ 5 V DC or 25 mA max. @ 25 V DC. |
| <b>Y</b>    | TIN <sup>2</sup>  | TIN <sup>2</sup> |                         |  |

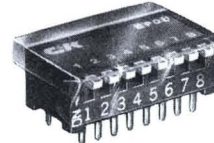
<sup>1</sup> CONTACTS: Gold over nickel over phosphor bronze.

<sup>2</sup> CONTACTS & ALL TERMINALS: Phosphor bronze, tin plated.

## SEAL

**E** (STD.) EPOXY TERMINAL SEAL, NO TAPE SEAL

**T** EPOXY TERMINAL SEAL, REMOVABLE TAPE ACTUATOR SEAL, SPLASH RESISTANT.



## HOW TO ORDER

All available BP SERIES SIDE ACTUATED DIP SWITCH options are listed on page E-7, and are described on pages E-7 and E-8. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

## SPECIFICATIONS

SWITCH FUNCTION: SPST- 1, 2, 3, 4, 5, 6, 7, 8, 10, & 12 positions available.

CONTACT RATING:

Carry: 100 mA max. @ 50 V DC.

Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles each circuit, models with gold contacts (K contact material).

1,000 cycles, models with tin contacts (Y contact material).

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -20°C to 60°C.

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

PACKAGING: Switches supplied in rigid dispensing tubes. Switch position 1 denotes pin no. 1. All switch actuators in 'OFF' position standard.

## MATERIALS

CASE: Glass filled polyester (PET), flame retardant (UL 94V-0).

COVER: Anodized aluminum.

ACTUATOR: Glass filled polyester (PET), flame retardant, (UL 94V-0).

CONTACTS: Gold over nickel over phosphor bronze (K contact material) or phosphor bronze, tin plated (Y contact material).

TERMINALS: All terminals phosphor bronze, tin plated.

TERMINAL SEAL: Epoxy.

TAPE SEAL: Metalized polyester.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

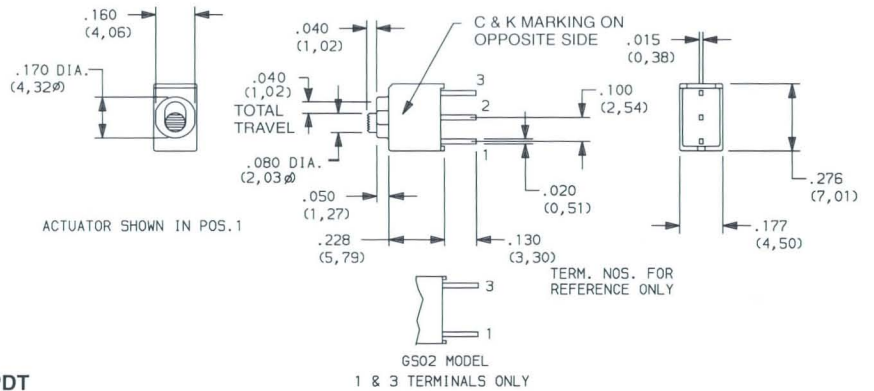




- **FOUR P.C. TERMINAL STYLES— .100 IN. TERMINAL SPACING**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY**
- **SPST AND SPDT MODELS AVAILABLE**
- **PROCESS COMPATIBLE—WITHSTANDS MACHINE SOLDERING TEMPERATURES AND PRESSURE WASH CLEANING METHODS—HIGH TEMPERATURE MATERIALS (UL 94V-0)**
- **SPLASHPROOF CONSTRUCTION—INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL**

### SP MODELS WITH C TERMINALS

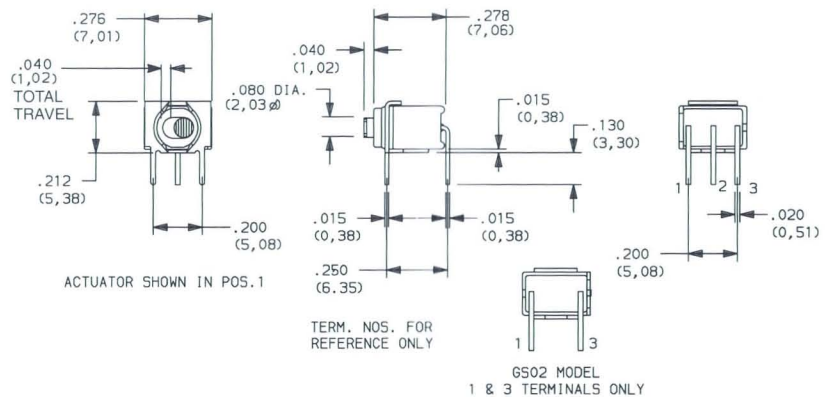
| PART NO.        | SWITCH FUNCTION |        |
|-----------------|-----------------|--------|
|                 | POS. 1          | POS. 2 |
| <b>GS01MCKE</b> | ON              | ON     |
| Conn. Terms.    | 2-1             | 2-3    |
| Schematic       |                 |        |
| SPDT            |                 |        |
| <b>GS02MCKE</b> | OFF             | ON     |
| Conn. Terms.    | OPEN            | 3-1    |
| Schematic       |                 |        |
| SPST            |                 |        |



SPST and SPDT

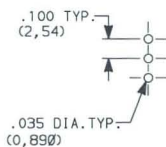
### SP MODELS WITH A TERMINALS

| PART NO.        | SWITCH FUNCTION |        |
|-----------------|-----------------|--------|
|                 | POS. 1          | POS. 2 |
| <b>GS01MAKE</b> | ON              | ON     |
| Conn. Terms.    | 2-1             | 2-3    |
| Schematic       |                 |        |
| SPDT            |                 |        |
| <b>GS02MAKE</b> | OFF             | ON     |
| Conn. Terms.    | OPEN            | 3-1    |
| Schematic       |                 |        |
| SPST            |                 |        |



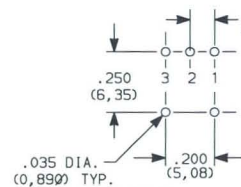
SPST and SPDT

#### C TERMINAL STYLE



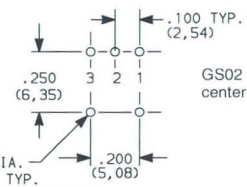
GS02 - omit center hole.

#### P.C. MOUNTING



GS02 - omit center hole 2.

#### A TERMINAL STYLE



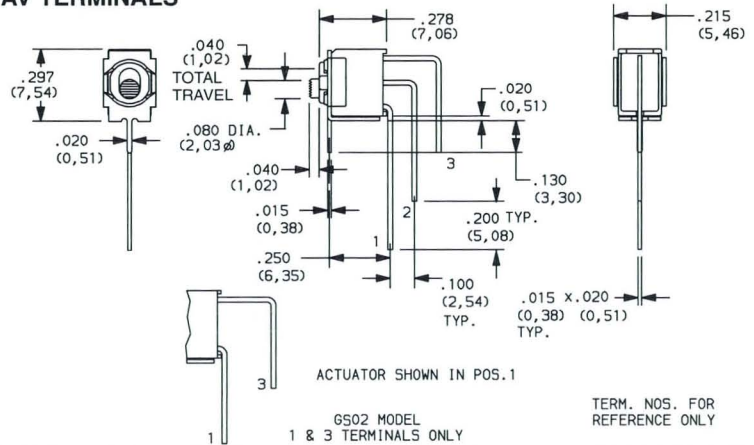


### SP MODELS WITH AV TERMINALS

| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GS01MAVKE</b> | ON              | ON     |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |
| <b>GS02MAVKE</b> | OFF             | ON     |
| Conn. Terms.     | OPEN            | 3-1    |
| Schematic        |                 |        |
| SPST             |                 |        |



SPST and SPDT

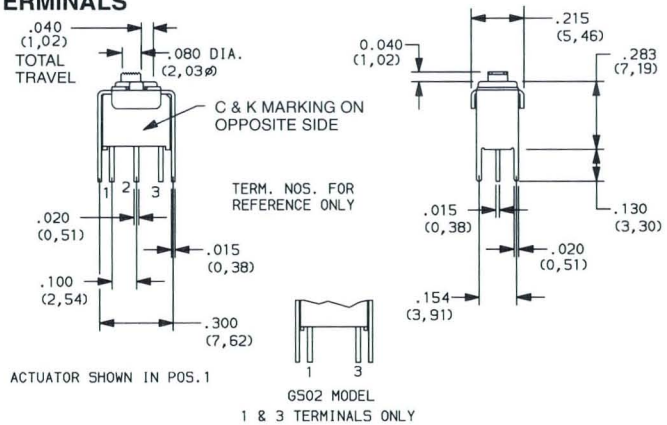


### SP MODELS WITH V3 TERMINALS

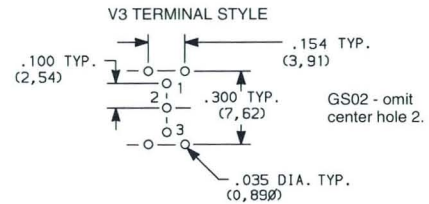
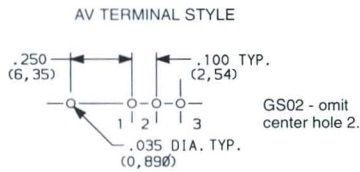
| PART NO.         | SWITCH FUNCTION |        |
|------------------|-----------------|--------|
|                  | POS. 1          | POS. 2 |
| <b>GS01MV3KE</b> | ON              | ON     |
| Conn. Terms.     | 2-1             | 2-3    |
| Schematic        |                 |        |
| SPDT             |                 |        |
| <b>GS02MV3KE</b> | OFF             | ON     |
| Conn. Terms.     | OPEN            | 3-1    |
| Schematic        |                 |        |
| SPST             |                 |        |



SPST and SPDT



### P.C. MOUNTING



### HOW TO ORDER

Complete part numbers for GS SERIES ULTRA-MINIATURE SLIDE SWITCHES are shown on pages E-9 and E-10. GS Series surface mount models also available—see catalog section A, pages A-11 thru A-13.

### SPECIFICATIONS

- CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
- MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.
- CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).
- PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A consult factory.

### MATERIALS

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

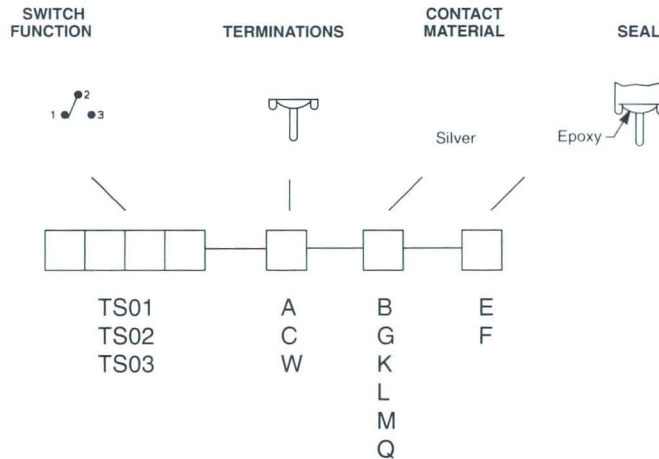
**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



 models available, see page E-12.

**Easy Build-A-Switch:**

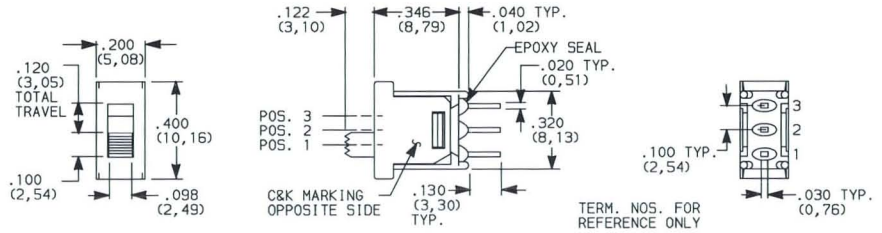
Below is a complete listing of available options for TS SERIES TINY SLIDE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switch with standard options is shown on page E-12; all available options are shown and described on pages E-12 and E-13. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page E-13. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



E



SWITCH WITH STANDARD OPTIONS



SPDT

Part No. Shown: TS01COE

SWITCH FUNCTION

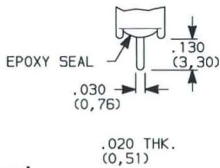
| NO. POLES | MODEL* NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |        | SCHEMATIC |
|-----------|------------|-----------------|--------|--------|---------------------|--------|--------|-----------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3 |           |
| SP        | TS01       | ON              | NONE   | ON     | 1-2                 | OPEN   | 2-3    | <br>SPDT  |
|           | TS03       | ON              | OFF    | ON     |                     |        |        |           |
|           | TS02       | OFF             | NONE   | ON     | OPEN                | N/A    | 3-1    | <br>SPST  |

\* All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

TS02 model not available with A terminations.

TERMINATIONS

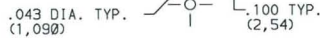
C (STD.)



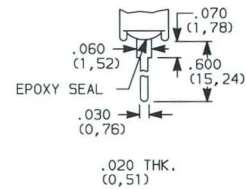
SPST and SPDT

Q contact material std.

P.C. MOUNTING



W WIRE WRAP



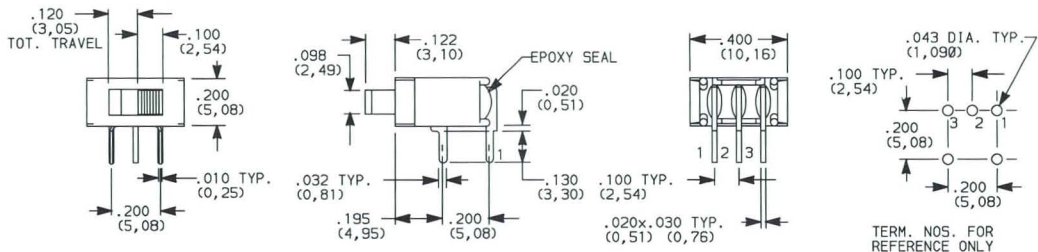
SPST and SPDT

B contact material std.

A



SPDT



Actuator shown in pos.1. B contact mat'l std. Not available with TS02 model.

Part No. Shown: TS01ABE

**CONTACT MATERIAL** 

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |  |
|-------------|---------------------------------|-----------------------|----------------------------------|--|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @20 V AC OR DC MAX.  |
| <b>K</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>Q</b>    | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | TS01 MODELS: 3 AMPS @ 120 V AC OR 28 V DC.<br>TS02, TS03 MODELS: 1 AMP @ 120 V AC OR 28 V DC.  |
| <b>M</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | TS01 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @ 120 V AC OR 28 V DC.<br>TS02, TS03 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC. |
| <b>L</b>    |                                 | TIN-LEAD <sup>6</sup> |                                  |  |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

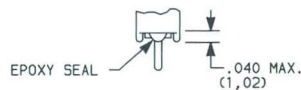
- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models  with all options when ordered with G, L, M or Q contact material. See pages E-12 and VIII.

B contact material standard with A and W terminations.  
Q contact material standard with C terminations.

**SEAL** 

**E** (STD.)



**F** SPLASHPROOF SILICONE RUBBER SEAL AND EPOXY TERMINAL SEAL



Silicone rubber seal peels off easily after installation. Epoxy terminal seal std.

Not available with A terminations.

**HOW TO ORDER**

All available TS SERIES TINY SLIDE SWITCH options are listed on page E-11, and are described on pages E-12 and E-13. Switch with standard options is shown on page E-12. When selecting options and building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods.  models available, see page E-12.

**SPECIFICATIONS**

- CONTACT RATING:  
TS01 MODELS: 3 AMPS @ 120 V AC or 28 V DC.  
TS02, TS03 MODELS: 1 AMP @ 120 V AC or 28 V DC (Q contact material).
- ELECTRICAL LIFE: TS01 MODELS: 60,000 make-and-break cycles at full load. TS02, TS03 MODELS: 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 85°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**MATERIALS**

- CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP), (UL 94V-0).
- ACTUATOR: Nylon, black standard.
- HOUSING: Stainless steel. Models with A termination options: stainless steel, nickel plated.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



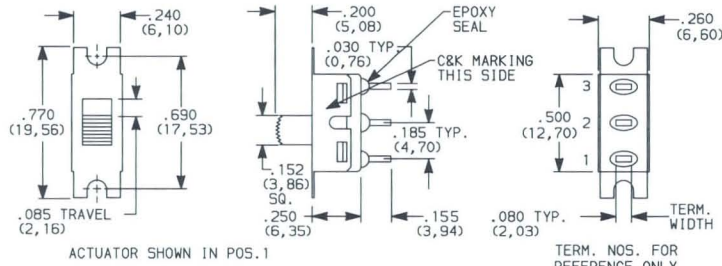
models available, see page E-15.

**Easy Build-A-Switch:**

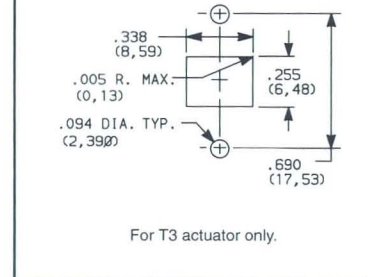
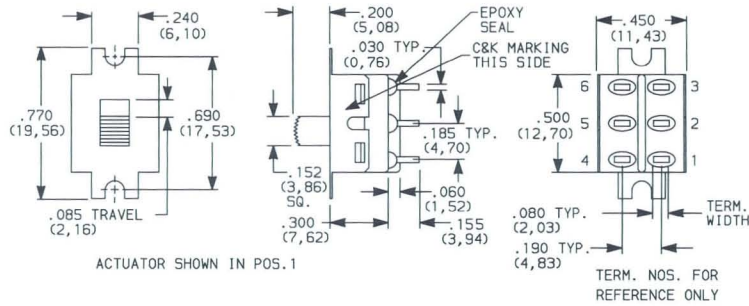
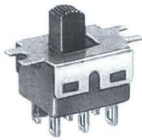
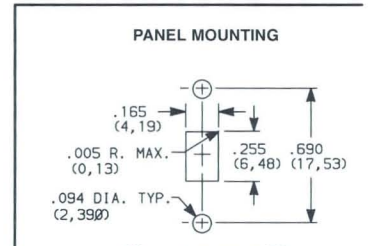
Below is a complete listing of available options for 1000 SERIES MINIATURE SLIDE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page E-15; all available options are shown and described on pages E-15 thru E-20. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page E-20. All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods.

| SWITCH FUNCTION | MOUNTING STYLE | ACTUATOR | TERMINATIONS | CONTACT MATERIAL | SEAL  | ACTUATOR COLOR |
|-----------------|----------------|----------|--------------|------------------|-------|----------------|
|                 | Panel Mount    |          |              | Silver           | Epoxy | Black          |
| 1101            | M1             | S1       | A            | B                | E     | 1              |
| 1103            | M2             | S2       | AV1          | G                | I     | 2              |
| 1108            |                | S3       | AV2          | K                |       | 3              |
| 1201            |                | S4       | AV4          | L                |       | 4              |
| 1203            |                | S5       | AV5          | M                |       | 5              |
|                 |                | S6       | AW           | Q                |       | 6              |
|                 |                | T3       | AW1          |                  |       | 7              |
|                 |                |          | AW3          |                  |       | 8              |
|                 |                |          | AW4          |                  |       | 9              |
|                 |                |          | AW5          |                  |       |                |
|                 |                |          | C            |                  |       |                |
|                 |                |          | V3           |                  |       |                |
|                 |                |          | V4           |                  |       |                |
|                 |                |          | W            |                  |       |                |
|                 |                |          | W1           |                  |       |                |
|                 |                |          | W3           |                  |       |                |
|                 |                |          | W4           |                  |       |                |
|                 |                |          | W5           |                  |       |                |
|                 |                |          | Z            |                  |       |                |
|                 |                |          | Z3           |                  |       |                |

## SWITCHES WITH STANDARD OPTIONS



SPDT



DPDT

## SWITCH FUNCTION

| NO. POLES | MODEL* NO. | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |         | SCHEMATIC   |
|-----------|------------|-----------------|--------|--------|---------------------|--------|---------|-------------|
|           |            | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3  |             |
| SP        | 1101       | ON              | NONE   | ON     |                     |        |         | <p>SPDT</p> |
|           | 1103       | ON              | OFF    | ON     | 1-2                 | OPEN   | 2-3     |             |
|           | 1108       | MOM.            | NONE   | ON     |                     |        |         |             |
| DP        | 1201       | ON              | NONE   | ON     | 2-1,5-4             | OPEN   | 2-3,5-6 | <p>DPDT</p> |
|           | 1203       | ON              | OFF    | ON     |                     |        |         |             |

MOM. = MOMENTARY

\* All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.



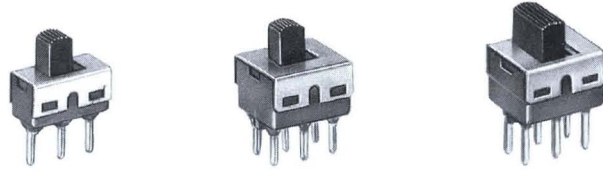
MOUNTING STYLE

**M1** (STD.) PANEL MOUNT



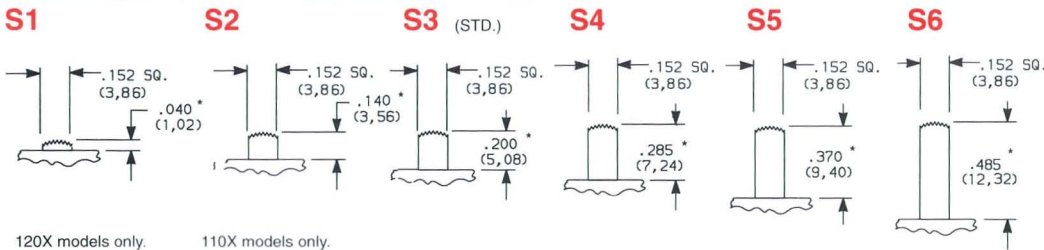
Available with Z, C, Z3, W-W5 terminations only. No mounting hardware supplied.

**M2** P.C. MOUNT



Available with C, W-W5, A, AW-AW5, AV1-AV5, V3-V4 terminations only.

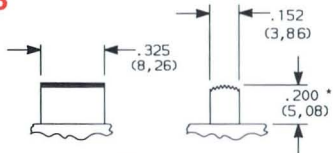
ACTUATOR



120X models only.

110X models only.

**T3**



120X models only

\* Subtract .014 (0,36) from actuator height – all models with A, AW-AW5, AV1-AV5, V3-V4 terminations.

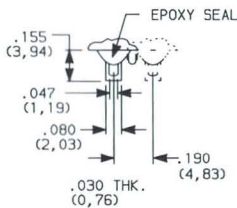
ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLORS |
|-------------|-----------------|
| 1           | WHITE           |
| 2           | BLACK (std.)    |
| 3           | RED             |
| 4           | ORANGE          |
| 5           | YELLOW          |
| 6           | GREEN           |
| 7           | BLUE            |
| 8           | BROWN           |
| 9           | GRAY            |

Select actuator color from chart. Place option code in appropriate box of ordering format. Some actuator / color combinations are special order, consult factory.

TERMINATIONS

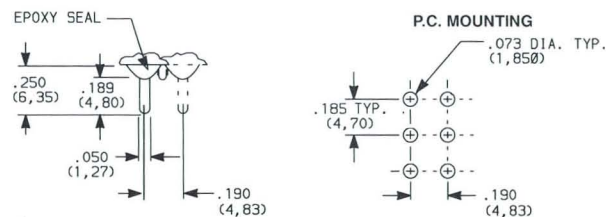
**Z** (STD.)



SPDT and DPDT

Q contact material std.  
Not avail. with K, L, or M contact material.

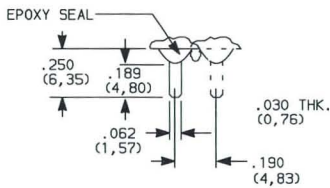
**C**



SPDT and DPDT

Q contact material std.

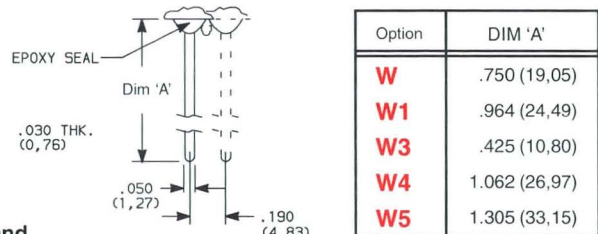
**Z3** QUICK CONNECT



SPDT and DPDT

Q contact material std.  
Mating quick connector available; order part no. 530100000.

**W-W1-W3-W4-W5** WIRE WRAP



SPDT and DPDT

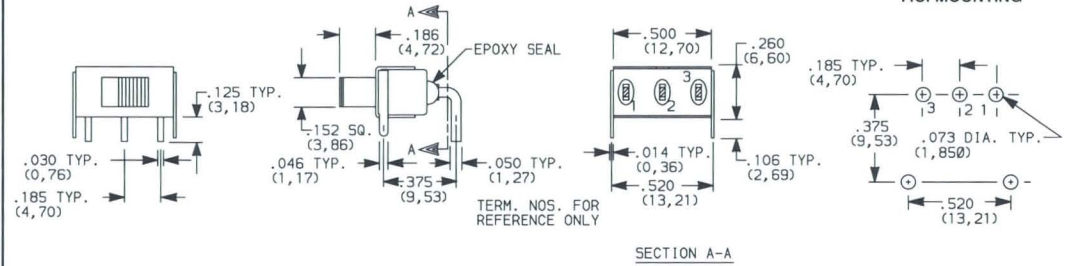
B contact material std.

| Option    | DIM 'A'       |
|-----------|---------------|
| <b>W</b>  | .750 (19,05)  |
| <b>W1</b> | .964 (24,49)  |
| <b>W3</b> | .425 (10,80)  |
| <b>W4</b> | 1.062 (26,97) |
| <b>W5</b> | 1.305 (33,15) |



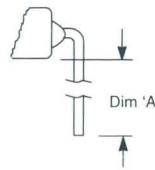
## TERMINATIONS

**A**



Part No. Shown: 1101M2S3ABE2

### AW-AW1-AW3-AW4-AW5 EXTENDED

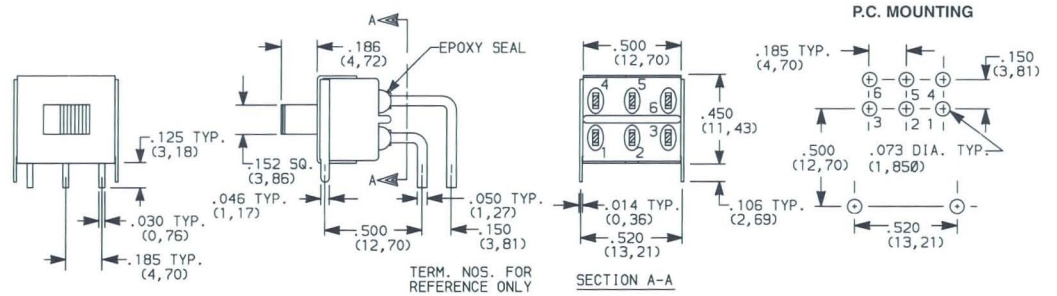


| Option     | DIM 'A'     |
|------------|-------------|
| <b>AW</b>  | .50 (12,7)  |
| <b>AW1</b> | .71 (18,0)  |
| <b>AW3</b> | .20 (5,1)   |
| <b>AW4</b> | .81 (20,6)  |
| <b>AW5</b> | 1.06 (26,9) |

**SPDT**

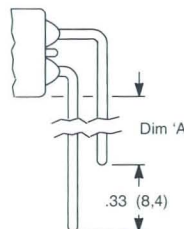
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.

**A**



Part No. Shown: 1201M2S3ABE2

### AW1-AW4-AW5 EXTENDED



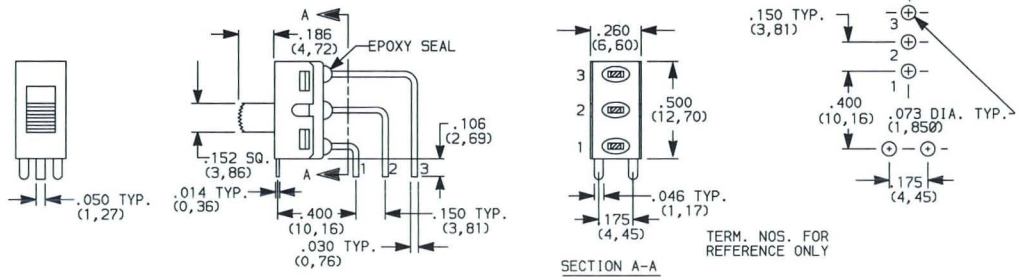
| Option     | DIM 'A'    |
|------------|------------|
| <b>AW1</b> | .35 (8,9)  |
| <b>AW4</b> | .46 (11,7) |
| <b>AW5</b> | .70 (17,8) |

**DPDT**

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.

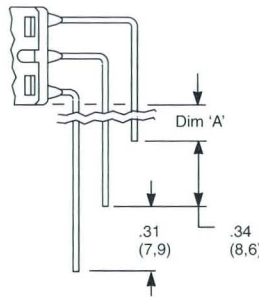
## TERMINATIONS

### AV2



Part No. Shown: 1101M2S3AV2BE2

### AV1-AV4-AV5 EXTENDED



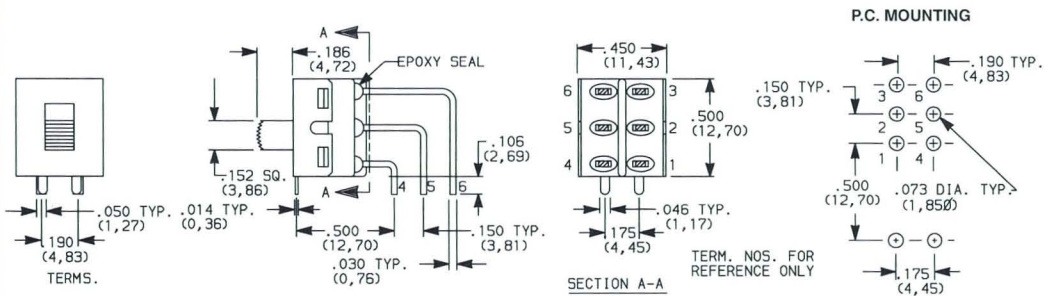
| Option     | DIM 'A'    |
|------------|------------|
| <b>AV1</b> | .13 (3,3)  |
| <b>AV4</b> | .22 (5,6)  |
| <b>AV5</b> | .46 (11,7) |

AV2

SPDT

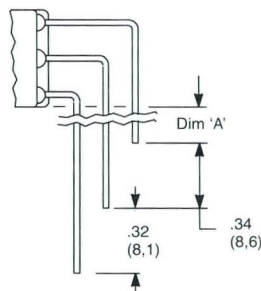
Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.

### AV2



Part No. Shown: 1201M2S3AV2BE2

### AV4-AV5 EXTENDED



| Option     | DIM 'A'    |
|------------|------------|
| <b>AV4</b> | .16 (4,1)  |
| <b>AV5</b> | .40 (10,2) |

AV2

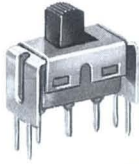
DPDT

Term. bend radii and lead-in mfg. option.  
Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.



TERMINATIONS

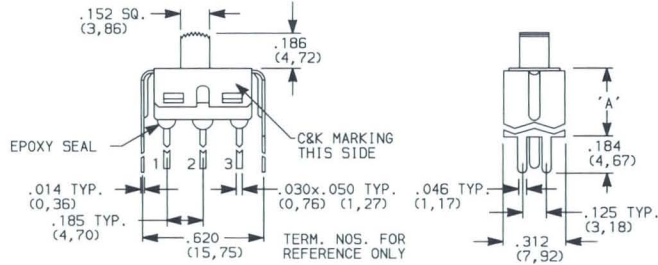
V3-V4



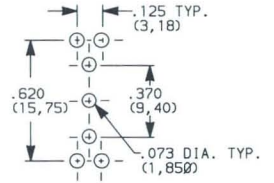
V3

SPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.



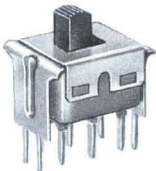
P.C.MOUNTING



| Option | DIM 'A'      |
|--------|--------------|
| V3     | .350 (8,89)  |
| V4     | .525 (13,34) |

Part No. Shown: 1101M2S3V\_BE2

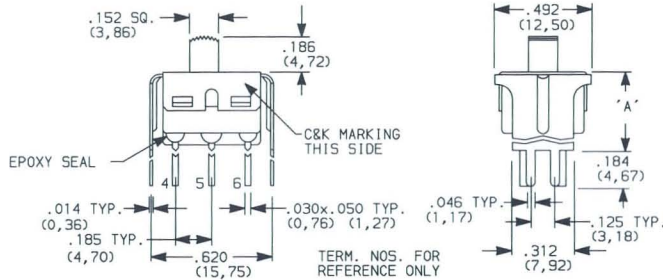
V3-V4



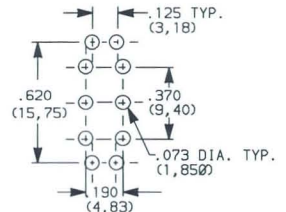
V3

DPDT

Actuator shown in pos.1.  
B contact material std.  
Not available with M1 mtg. style, I seal option.



P.C.MOUNTING



| Option | DIM 'A'      |
|--------|--------------|
| V3     | .400 (10,16) |
| V4     | .575 (14,61) |

Part No. Shown: 1201M2S3V\_BE2

CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                        |   |
|-------------|---------------------------------|-----------------------|--------------------------------|---|
| B           | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL/DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| K           |                                 | TIN-LEAD <sup>6</sup> |                                |   |
| Q           | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                          | 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.                                    |
| M           |                                 | TIN-LEAD <sup>6</sup> |                                |   |
| G           | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL/DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC. |
| L           |                                 | TIN-LEAD <sup>6</sup> |                                |   |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS—SEE CHART, PAGE X.

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

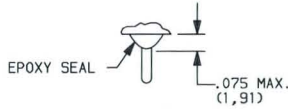
B contact material standard with all terminations except Z, C, Z3.  
Q contact material standard with Z, C, Z3 terminations.

K, L, M contact materials not available with Z terminations

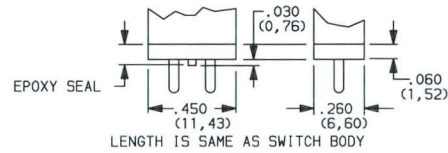
All models with all options when ordered with G, L, M or Q contact material. See pages AGENCY APPROVALS, page VIII.

## SEAL

**E** (STD.)



**I**



Available with Z, C, Z3, W-W5 terminations only.

## HOW TO ORDER

All available 1000 SERIES MINIATURE SLIDE SWITCH options are listed on page E-14, and are described on pages E-15 thru E-20. Switches with standard options are shown on page E-15. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models epoxy terminal seal, and are compatible with 'bottom wash' PC board cleaning methods. models available, see page E-15. No mounting hardware is supplied.

## SPECIFICATIONS

- CONTACT RATING: 6 AMPS @ 120 V AC or 28 V DC.  
3 AMPS @ 250 V AC (Q contact material).
- ELECTRICAL LIFE: 100,000 make-and-break cycles at full load on models with B or K contact material; 40,000 cycles on models with G, Q, L or M contact material.
- CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE:  $10^9$  ohms min.
- DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
- OPERATING TEMPERATURE: -30°C to 65°C.
- SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

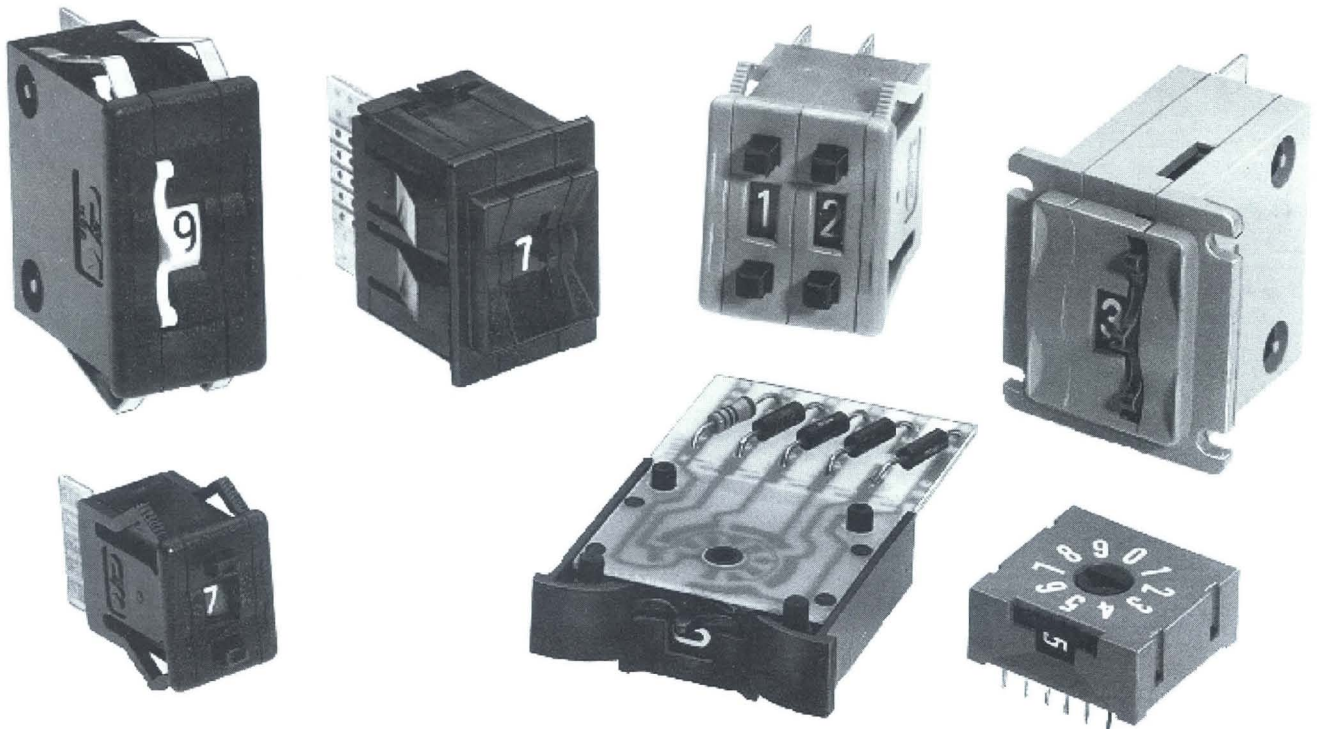
## MATERIALS

- CASE: Diallyl phthalate (DAP), (UL 94V-0).
- ACTUATOR: Nylon, black, standard.
- HOUSING: Stainless steel.
- SWITCH SUPPORT: Brass or steel, tin plated.
- END CONTACTS: Coin silver, silver plated (Q contact material).
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

# SECTION F

## CODED SWITCHES

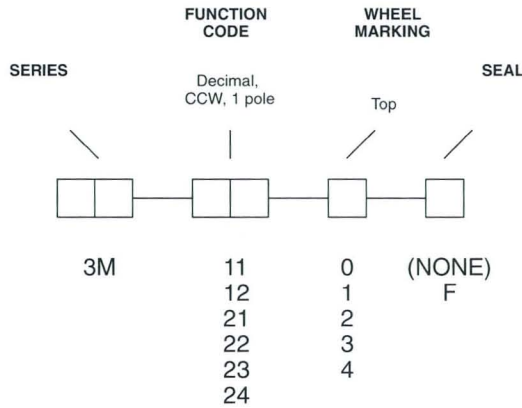


|              |                                  |                |
|--------------|----------------------------------|----------------|
| 3M Series    | Minithumbwheel Switches          | F-2 thru F-4   |
| 3U Series    | Tiny Pushwheel Switches          | F-5 thru F-9   |
| 3P Series    | Miniature Pushwheel Switches     | F-10 thru F-14 |
| S2 Series    | Subminiature Thumbwheel Switches | F-15 thru F-20 |
| SF/SR Series | Thumbwheel Switches              | F-21 thru F-31 |
| 3 Series     | Thumbwheel Switches              | F-32 thru F-44 |



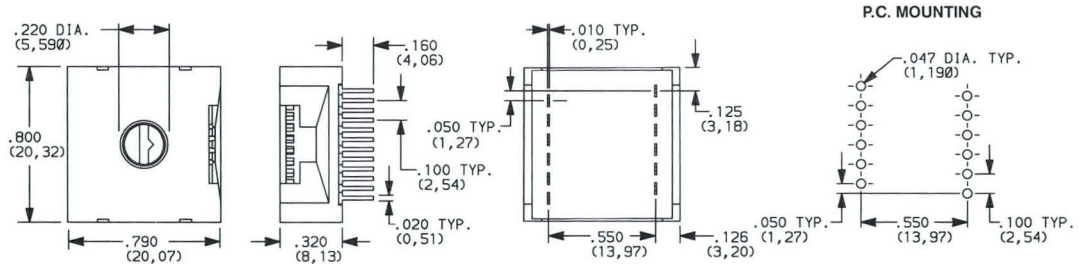
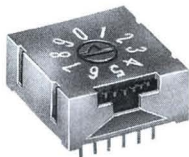
Easy Build-A-Switch:

Below is a complete listing of available options for 3M SERIES MINITHUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-2 thru F-4. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-4.



SERIES

3M

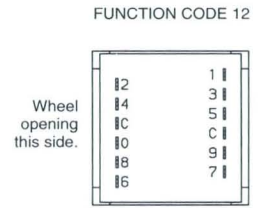
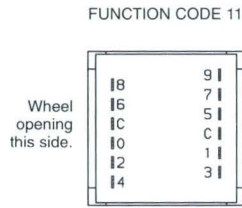


Part No. Shown: 3MXX0

## FUNCTION CODE

- 11** DECIMAL, CCW, 1 POLE
- 12** DECIMAL, CW, 1 POLE

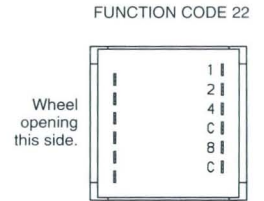
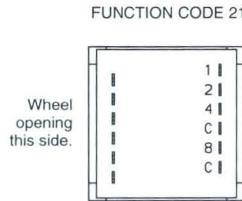
| W<br>H<br>E<br>E<br>L | COMMON (C) CONNECTED TO TERMINAL INDICATED |   |   |   |   |   |   |   |   |   |
|-----------------------|--|---|---|---|---|---|---|---|---|---|
|                       | 0  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0                     | ●  |   |   |   |   |   |   |   |   |   |
| 1                     |  | ● |   |   |   |   |   |   |   |   |
| 2                     |  |   | ● |   |   |   |   |   |   |   |
| 3                     |  |   |   | ● |   |   |   |   |   |   |
| 4                     |  |   |   |   | ● |   |   |   |   |   |
| 5                     |  |   |   |   |   | ● |   |   |   |   |
| 6                     |  |   |   |   |   |   | ● |   |   |   |
| 7                     |  |   |   |   |   |   |   | ● |   |   |
| 8                     |  |   |   |   |   |   |   |   | ● |   |
| 9                     |  |   |   |   |   |   |   |   |   | ● |



CCW: Counter clockwise rotation (viewed from top).  
 CW: Clockwise rotation (viewed from top).

- 21** BCD, CCW, 1 POLE
- 22** BCD, CW, 1 POLE

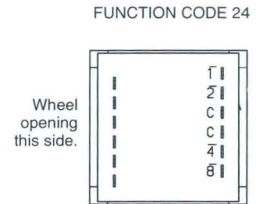
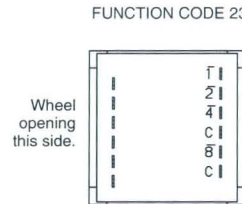
| W<br>H<br>E<br>E<br>L | COMM. (C) CONN TO TERM. IND. |   |   |   |
|-----------------------|------------------------------|---|---|---|
|                       | 1                            | 2 | 4 | 8 |
| 0                     |                              |   |   |   |
| 1                     | ●                            |   |   |   |
| 2                     |                              | ● |   |   |
| 3                     | ●                            |   |   |   |
| 4                     |                              |   | ● |   |
| 5                     | ●                            |   |   | ● |
| 6                     |                              |   |   | ● |
| 7                     | ●                            |   |   | ● |
| 8                     |                              |   |   | ● |
| 9                     | ●                            |   |   | ● |



CCW: Counter clockwise rotation (viewed from top).  
 CW: Clockwise rotation (viewed from top).  
 All unused terminals should not be connected.

- 23** COMPLEMENT OF BCD, CCW, 1 POLE
- 24** COMPLEMENT OF BCD, CW, 1 POLE

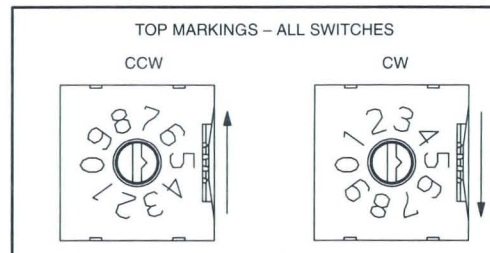
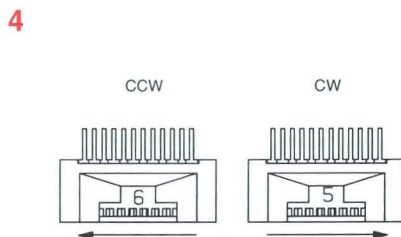
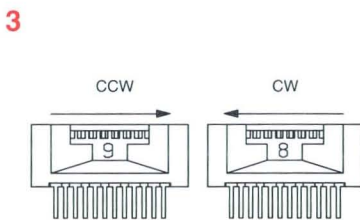
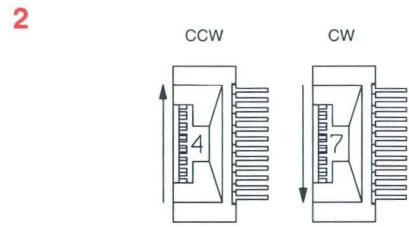
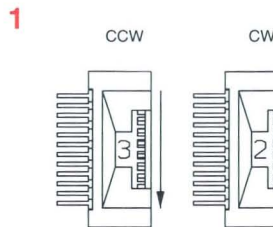
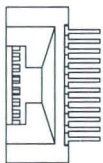
| W<br>H<br>E<br>E<br>L | COMM. (C) CONN TO TERM. IND. |   |   |   |
|-----------------------|------------------------------|---|---|---|
|                       | 1                            | 2 | 4 | 8 |
| 0                     | ●                            | ● | ● | ● |
| 1                     |                              |   |   |   |
| 2                     | ●                            |   |   |   |
| 3                     |                              |   |   |   |
| 4                     | ●                            |   |   |   |
| 5                     |                              |   |   | ● |
| 6                     | ●                            |   |   | ● |
| 7                     |                              |   |   | ● |
| 8                     | ●                            |   |   | ● |
| 9                     |                              |   |   | ● |



CCW: Counter clockwise rotation (viewed from top).  
 CW: Clockwise rotation (viewed from top).  
 All unused terminals should not be connected.

## WHEEL MARKING

- 0** NO WHEEL MARKING (STD.)



SEAL **(NONE)** NO SEAL**F** SPLASHPROOF SILICONE RUBBER SEAL AND EPOXY BASE SEAL**NEW**

Silicone rubber seal peels off easily after installation. Epoxy base seal standard.

**HOW TO ORDER**

All available 3M SERIES MINITHUMBWHEEL SWITCH options are listed on page F-2, and are described on pages F-2 thru F-4. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

**SPECIFICATIONS****CONTACT RATING:**

CARRY: 1 AMP continuous @28 V DC.  
SWITCH: 100 mA max. @28 V DC.

**ELECTRICAL LIFE:** 10<sup>5</sup> detent operations @ 25°C.**CONTACT RESISTANCE:** Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.**INSULATION RESISTANCE:** 10<sup>8</sup> ohms min. (dry).**DIELECTRIC STRENGTH:** 250 V RMS min. @ sea level.**OPERATING TEMPERATURE:** -10°C to 65°C.**MATERIALS****HOUSING:** Glass filled polyester (UL 94V-0).**BASE:** Glass filled nylon (UL 94V-0).**THUMBWHEEL:** Glass filled polyester (UL 94V-0).**ROTOR CONTACTS:** Hard gold over nickel over copper on epoxy fiberglass.**STATOR CONTACTS:** Copper alloy, with gold over nickel.**TERMINALS:** Solder clad over copper alloy. All terminals insert molded. All terminals present regardless of function.**BASE SEAL:** Epoxy.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.





3U Series

NEW ILLUMINATED MODELS

# Tiny Pushwheel Switches



## Easy Build-A-Switch:

Below is a complete listing of available options for 3U SERIES TINY PUSHWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-5 thru F-8. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-8. Use CONFIGURATION FORM, page F-9, for special instructions. Hardware is available separately, see catalog section H.

| SERIES               | NUMBER OF SECTIONS   | FUNCTION CODE        | MOUNTING STYLE       | TERMINATIONS         | COLOR/MARKING/STOPS     | DUST LENS            | ILLUMINATION         |
|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------------|----------------------|----------------------|
| 3U                   | One                  | Decimal 1 Pole       | Panel                |                      | Black w/ white Markings | No Lens              | None                 |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/>    | <input type="text"/> | <input type="text"/> |
| 3U                   | 0                    | 11                   | 0                    | 0                    | 0                       | 0                    | (NONE)               |
|                      | 1                    | 12                   |                      | 1                    | 1                       | 2                    | 3                    |
|                      | 2                    | 21                   |                      | 3                    | 9                       |                      | 5                    |
|                      | 3                    | 61                   |                      | 9                    |                         |                      | 6                    |
|                      | 4                    | 65                   |                      | A                    |                         |                      |                      |
|                      | 5                    | 91                   |                      | L                    |                         |                      |                      |
|                      | 6                    | 98                   |                      | P                    |                         |                      |                      |
|                      | 7                    | 99                   |                      |                      |                         |                      |                      |
|                      | 8                    |                      |                      |                      |                         |                      |                      |
|                      | 9                    |                      |                      |                      |                         |                      |                      |

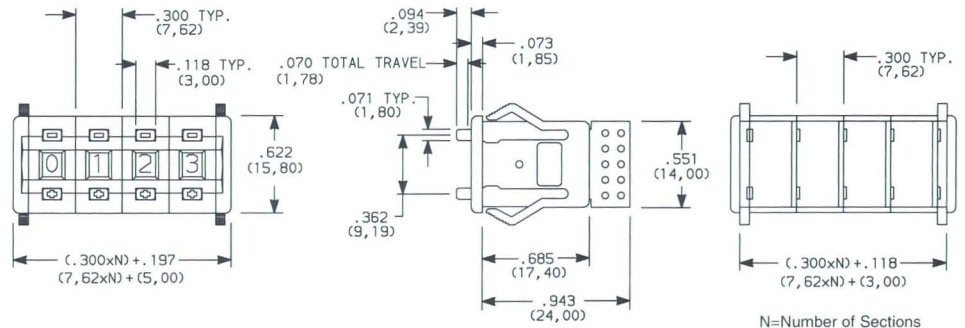
Special switch no. assigned by C&K.



Configuration form required, see page F-9.

SERIES

3U



Part No. Shown: 3U4210000

N=Number of Sections

## NUMBER OF SECTIONS

- 0** Switch section only, no endplates
- 1-8** Number of switch sections in assembly, includes endplates.
- 9** More than 8 switch sections, specify on CONFIGURATION FORM, page F-9 and consult factory.

**NOTE:** Endplates and blank sections available separately, see catalog section H.

## FUNCTION CODE

For terminal location diagrams, see page F-7

### 11 DECIMAL — 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS  
L, P

| W<br>H<br>M<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |    |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | C  |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    | ●  |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    | ●  |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    | ●  |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    | ●  |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    | ●  |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    | ●  |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    | ●  |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    | ●  |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    | ●  |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  | ●  |
|                       | 2                                    | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |   |    |    |    |

See fig. 3, page F-7.

### 12 DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS  
L, P

| W<br>H<br>M<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |    |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | C  |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    | ●  |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    | ●  |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    | ●  |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    | ●  |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    | ●  |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    | ●  |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    | ●  |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    | ●  |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    | ●  |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  | ●  |
|                       | 2                                    | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |   |    |    |    |

See fig. 3, page F-7.

### 21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS  
0, 1, 3, A, L, P

| W<br>H<br>M<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 | C |
| 0                     |                               |   |   |   | ● |
| 1                     | ●                             |   |   |   | ● |
| 2                     |                               | ● |   |   | ● |
| 3                     |                               |   | ● |   | ● |
| 4                     |                               |   |   | ● | ● |
| 5                     |                               |   |   |   | ● |
| 6                     | ●                             | ● | ● | ● | ● |
| 7                     | ●                             | ● | ● | ● | ● |
| 8                     |                               |   |   |   | ● |
| 9                     | ●                             |   |   |   | ● |
|                       | 1                             | 2 | 3 | 4 | 5 |
|                       | TERM. LOCATION                |   |   |   |   |

See figs. 2 & 3, page F-7.

### 61 SPDT REPEATING; 10 POSITION PLUS (+) AND MINUS (-) ALTERNATING

AVAILABLE TERMINATIONS  
0, 1, 3, A, L, P

| W<br>H<br>M<br>E<br>L | SIG. CONN. TO C |   |   |
|-----------------------|-----------------|---|---|
|                       | +               | - | C |
| 0                     | ●               | ● | ● |
| 1                     | ●               | ● | ● |
| 2                     | ●               | ● | ● |
| 3                     | ●               | ● | ● |
| 4                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
| 6                     | ●               | ● | ● |
| 7                     | ●               | ● | ● |
| 8                     | ●               | ● | ● |
| 9                     | ●               | ● | ● |
|                       | 2               | 3 | 4 |
|                       | TERM. LOC.      |   |   |

See figs. 2 & 3, page F-7.

### 65 SPDT REPEATING; 10 POSITION ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS  
0, 1, 3, A, L, P

| W<br>H<br>M<br>E<br>L | SIG. CONN. TO C |   |   |
|-----------------------|-----------------|---|---|
|                       | 0               | 5 | C |
| 0                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
| 0                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
| 0                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
| 0                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
| 0                     | ●               | ● | ● |
| 5                     | ●               | ● | ● |
|                       | 2               | 3 | 4 |
|                       | TERM. LOC.      |   |   |

See figs. 2 & 3, page F-7.

### 91 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS  
9

### 98 IC ROM, 32 WORD X 8 BIT, USER PROGRAMMABLE, ADDRESS 0 THRU 9

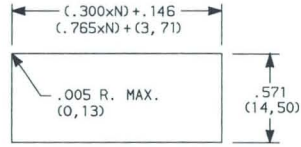
AVAILABLE TERMINATIONS  
L, P

### 99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-9 AND CONSULT FACTORY.

F

## MOUNTING STYLE

### 0 SNAP-IN FRONT MOUNTING



RECOMMENDED PANEL THICKNESS

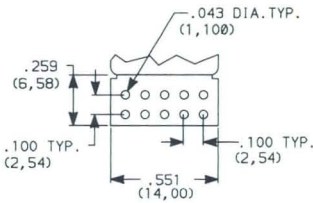
.039 - .156  
(0,99) - (3,95)

N = Number of sections.

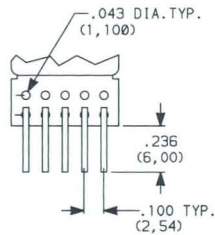
## TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

### 0 (STD.)

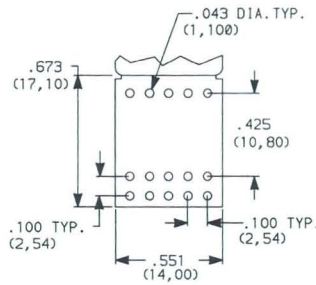


### 3 TYPE 0 WITH SOLDER PINS



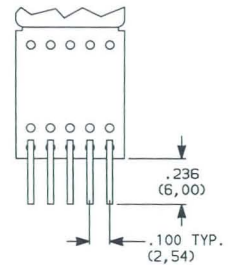
See fig. 1, below.

### 1 EXTENDED BOARD W/PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.  
Signal traces cut except for common(s).

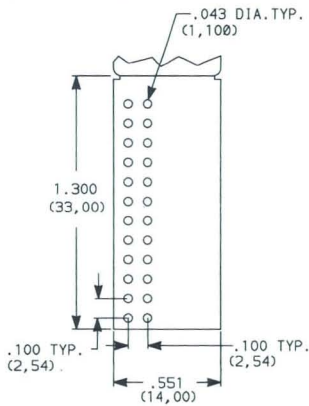
### A TYPE 1 WITH SOLDER PINS



See fig. 1, below.

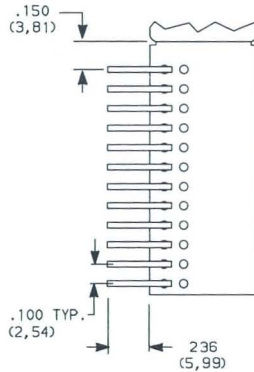
P.C. BOARD 1/32" (0,79) THK.

### L RIGHT ANGLE BOARD



P.C. BOARD 1/32" (0,79) THK.

### P TYPE L WITH SOLDER PINS



See fig. 1, below.  
Unsuitable for panel mounting.

### 9 ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS.

SPECIFY ON CONFIGURATION FORM,  
PAGE F-9 AND CONSULT FACTORY

### SOLDER PINS

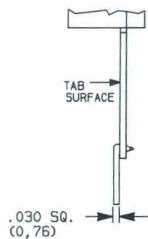


Fig. 1

### TERMINAL LOCATION NUMBERS

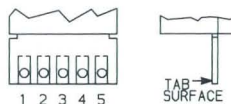


Fig. 2

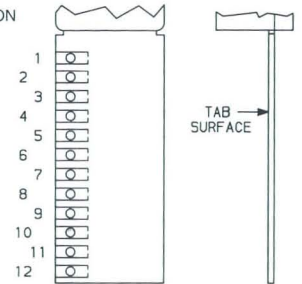


Fig. 3

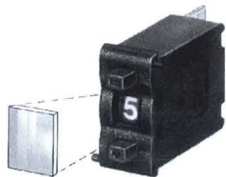
See function codes, page F-6 for signal locations.



## COLOR/MARKING/STOPS

- 0** (STD.) Matte black housing; Gloss black wheel with white characters; Black pushbuttons; No stops.
- 1** Matte gray housing; Gloss black wheel with white characters; Black pushbuttons; No stops.
- 9** Special colors, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-9 and consult factory.

## DUST LENS



- 0** (STD.) No Lens.
- 2** Dust Lens (protects character face of the wheel from abrasion and dust).

## ILLUMINATION

- NEW (NONE)** (STD.) No illumination
- 3** Red LED
- 5** Yellow LED
- 6** Green LED

Internal LED illuminates wheel character for low-light visibility.

### HOW TO ORDER

All available 3U SERIES TINY PUSHWHEEL SWITCH options are listed on page F-5, and are described on pages F-5 thru F-8. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-9, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

### SPECIFICATIONS

- CONTACT RATING:  
CARRY: 1 AMP continuous.  
SWITCH: 100 mA max.
- OPERATING VOLTAGE: 50 mV to 28 V DC.
- ELECTRICAL LIFE: 100,000 actuations through revolutions of 360° thru a total of 1,000,000 detents.
- CONTACT RESISTANCE: Below 300 milliohms typ. initial @ 2-4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min. (dry).
- DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.
- OPERATING TEMPERATURE: -10°C to 65°C.

### MATERIALS

- SWITCH BODY: ABS plastic.
- PUSHWHEEL: Acetal.
- PUSHBUTTON: Acetal.
- ROTOR CONTACTS: Gold over nickel over copper alloy.
- STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



# Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO.

C&K PART NUMBER

3 U [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

C&K PART NUMBER

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

COMPANY NAME \_\_\_\_\_

REVISION: [ ]

















ADDRESS \_\_\_\_\_ TEL.# \_\_\_\_\_

CUSTOMER CONTACT \_\_\_\_\_ DATE \_\_\_\_\_

DETAILS:

ORIGINATED BY \_\_\_\_\_ SALES REP. \_\_\_\_\_

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

| PUSHWHEEL SECTIONS  | NO. OF SEC. | FUNCTION CODE — TERMINATIONS — COLOR/MARKING/STOPS — DUST LENS<br><small>ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-6).</small> | DESCRIBE IN APPROPRIATE ROW |
|---|-------------|---|-----------------------------|
|  1   | 1           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  2   | 2           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  3   | 3           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  4  | 4           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  5 | 5           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  6 | 6           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  7 | 7           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  8 | 8           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  9 | 9           | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  0 | 10          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  1 | 11          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  2 | 12          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  3 | 13          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  4 | 14          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  5 | 15          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |
|  6 | 16          | 3 U - [ ] [ ] - [ ] [ ] [ ] [ ]   |                             |

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET \_\_\_\_ OF \_\_\_\_



Easy Build-A-Switch:

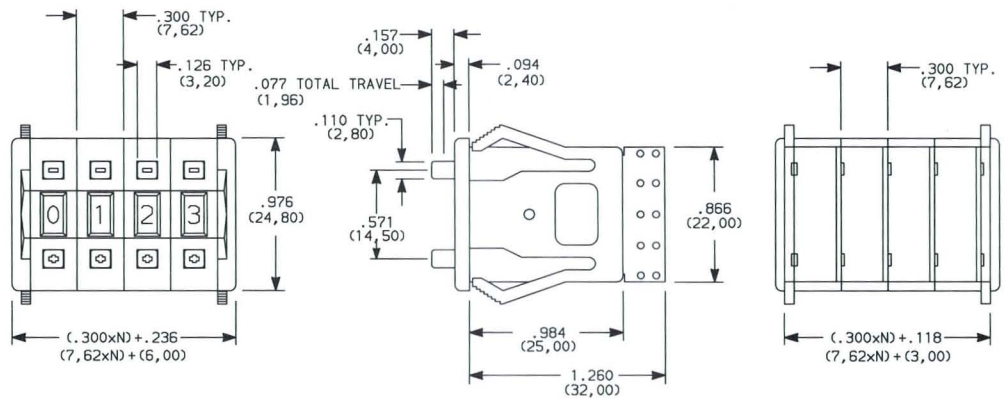
Below is a complete listing of available options for 3P SERIES MINIATURE PUSHWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-10 thru F-13. When building a part number, some ordering format boxes may be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-13. Use CONFIGURATION FORM, page F-14, for special instructions. Hardware is available separately, see catalog section H.

| SERIES | NUMBER OF SECTIONS | FUNCTION CODE  | MOUNTING STYLE | TERMINATIONS | COLOR/MARKING/STOPS     | DUST LENS | ILLUMINATION |
|--------|--------------------|----------------|----------------|--------------|-------------------------|-----------|--------------|
| 3P     | One                | Decimal 1 Pole | Panel          |              | Black w/ white Markings | No Lens   | None         |
|        |                    |                |                |              |                         |           |              |
| 3P     | 0                  | 11             | 0              | 0            | 0                       | 0         | (NONE)       |
|        | 1                  | 12             | 3              | 1            | 1                       | 2         | 3            |
|        | 2                  | 21             |                | 3            | 9                       |           | 5            |
|        | 3                  | 23             |                | 9            |                         |           | 6            |
|        | 4                  | 61             |                | A            |                         |           |              |
|        | 5                  | 65             |                | L            |                         |           |              |
|        | 6                  | 91             |                | P            |                         |           |              |
|        | 7                  | 98             |                | W            |                         |           |              |
|        | 8                  | 99             |                | Y            |                         |           |              |
|        | 9                  |                |                |              |                         |           |              |

Special switch no. assigned by C&K. Configuration form required, see page F-14.

SERIES

3P



Part No. Shown: 3P4210000

N = Number of Sections

## NUMBER OF SECTIONS

- 0** Switch section only, no endplates
- 1-8** Number of switch sections in assembly, includes endplates.
- 9** More than 8 switch sections, specify on CONFIGURATION FORM, page F-14 and consult factory.

**NOTE:** Endplates and blank sections available separately, see catalog section H.

## FUNCTION CODE

For terminal location diagrams, see page F-13

### 11 DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |    |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  |    |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    |    |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    |    |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    |    |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    |    |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    |    |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    |    |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    |    |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    |    |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    |    |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  |    |
|                       | 2                                    | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |   |    |    |    |

See fig. 3, page F-13.

### 12 DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |    |    |    |   |
|-----------------------|--------------------------------------|---|---|---|---|---|---|----|----|----|---|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8  | 9  |   |
| 0                     | ●                                    |   |   |   |   |   |   |    |    |    |   |
| 1                     |                                      | ● |   |   |   |   |   |    |    |    |   |
| 2                     |                                      |   | ● |   |   |   |   |    |    |    |   |
| 3                     |                                      |   |   | ● |   |   |   |    |    |    |   |
| 4                     |                                      |   |   |   | ● |   |   |    |    |    |   |
| 5                     |                                      |   |   |   |   | ● |   |    |    |    |   |
| 6                     |                                      |   |   |   |   |   | ● |    |    |    |   |
| 7                     |                                      |   |   |   |   |   |   | ●  |    |    |   |
| 8                     |                                      |   |   |   |   |   |   |    | ●  |    |   |
| 9                     |                                      |   |   |   |   |   |   |    |    | ●  |   |
|                       | 2                                    | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 6 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |    |    |    |   |

See fig. 3, page F-13.

### 21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 |   |
| 0                     | ●                             |   |   |   |   |
| 1                     |                               | ● |   |   |   |
| 2                     |                               |   | ● |   |   |
| 3                     |                               |   |   | ● |   |
| 4                     | ●                             | ● | ● | ● |   |
| 5                     | ●                             | ● | ● | ● |   |
| 6                     | ●                             | ● | ● | ● |   |
| 7                     | ●                             | ● | ● | ● |   |
| 8                     | ●                             | ● | ● | ● |   |
| 9                     | ●                             | ● | ● | ● |   |
|                       | 1                             | 3 | 5 | 7 | 9 |
|                       | TERM. LOCATION                |   |   |   |   |

See figs. 2 & 3, page F-13.

### 23 COMPLEMENT OF BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 |   |
| 0                     | ●                             | ● | ● | ● |   |
| 1                     | ●                             | ● | ● | ● |   |
| 2                     | ●                             | ● | ● | ● |   |
| 3                     | ●                             | ● | ● | ● |   |
| 4                     | ●                             | ● | ● | ● |   |
| 5                     | ●                             | ● | ● | ● |   |
| 6                     | ●                             | ● | ● | ● |   |
| 7                     | ●                             | ● | ● | ● |   |
| 8                     | ●                             | ● | ● | ● |   |
| 9                     | ●                             | ● | ● | ● |   |
|                       | 1                             | 7 | 9 | 3 | 5 |
|                       | TERM. LOCATION                |   |   |   |   |

See figs. 2 & 3, page F-13.

### 61 SPDT REPEATING; 10 POSITION PLUS (+) AND MINUS (-) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIG. CONN. TO C |   |   |
|-----------------------|-----------------|---|---|
|                       | +               | - |   |
| +                     | ●               | ● |   |
| -                     | ●               | ● |   |
| +                     | ●               | ● |   |
| -                     | ●               | ● |   |
| +                     | ●               | ● |   |
| -                     | ●               | ● |   |
| +                     | ●               | ● |   |
| -                     | ●               | ● |   |
| +                     | ●               | ● |   |
| -                     | ●               | ● |   |
|                       | 3               | 5 | 7 |
|                       | TERM. LOC.      |   |   |

See figs. 2 & 3, page F-13.

### 65 SPDT REPEATING; 10 POSITION ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

| W<br>H<br>E<br>E<br>L | SIG. CONN. TO C |   |   |
|-----------------------|-----------------|---|---|
|                       | 0               | 5 |   |
| 0                     | ●               | ● |   |
| 5                     | ●               | ● |   |
| 0                     | ●               | ● |   |
| 5                     | ●               | ● |   |
| 0                     | ●               | ● |   |
| 5                     | ●               | ● |   |
| 0                     | ●               | ● |   |
| 5                     | ●               | ● |   |
| 0                     | ●               | ● |   |
| 5                     | ●               | ● |   |
|                       | 3               | 5 | 7 |
|                       | TERM. LOC.      |   |   |

See figs. 2 & 3, page F-13.

### 91 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

### 98 IC ROM, 32 WORD X 8 BIT, USER PROGRAMMABLE, ADDRESS 0 THRU 9

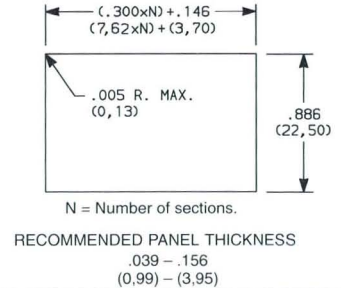
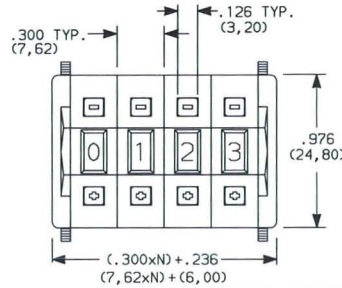
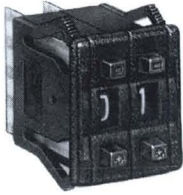
AVAILABLE TERMINATIONS

L, P

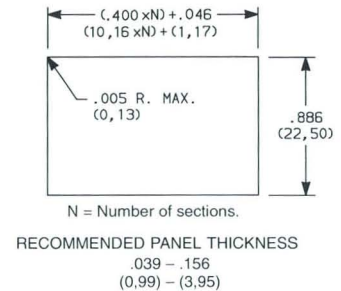
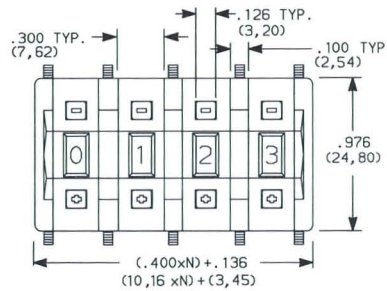
### 99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-14 AND CONSULT FACTORY.

## MOUNTING STYLE

**0** SNAP-IN FRONT MOUNTING  
SECTION PITCH: 300 (7,62) EA. SECTION



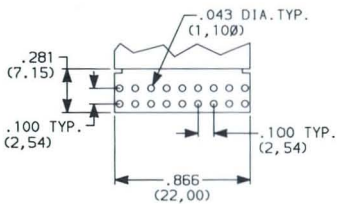
**3** SNAP-IN FRONT MOUNTING W/ SPACER-SECTION PITCH:  
400 (70,16) EA. SECTION (LAST SECTION .300 (7,62))



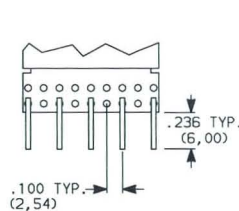
## TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

**0** (STD.)



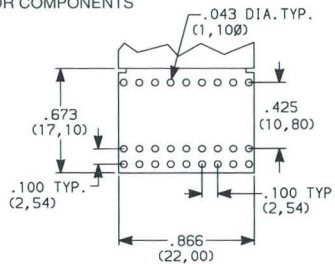
**3** TYPE 0 W/ SOLDER PINS



See fig. 1, page F-13.

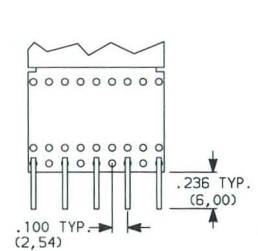
P.C. BOARD 1/32" (0,79) THK.

**1** EXTENDED BOARD W/ PROVISION FOR COMPONENTS



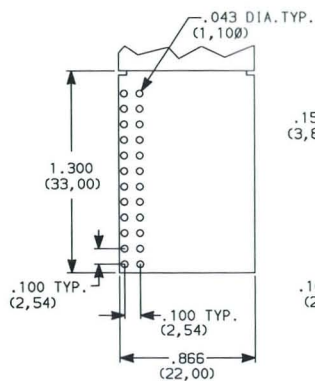
P.C. BOARD 1/32" (0,79) THK.  
Signal traces cut except for common(s).

**A** TYPE 1 W/ SOLDER PINS



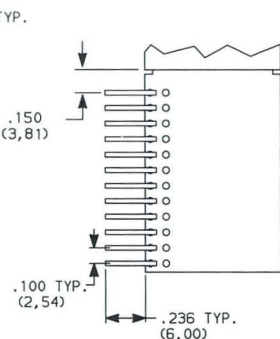
See fig. 1, page F-13.

**L** RIGHT ANGLE BOARD



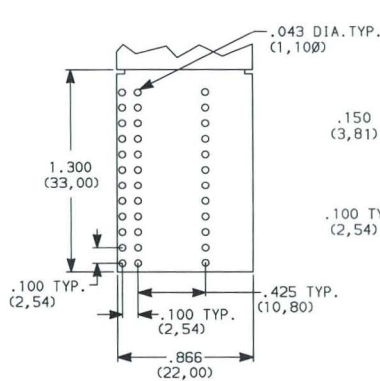
P.C. BOARD 1/32" (0,79) THK.

**P** TYPE L W/ SOLDER PINS



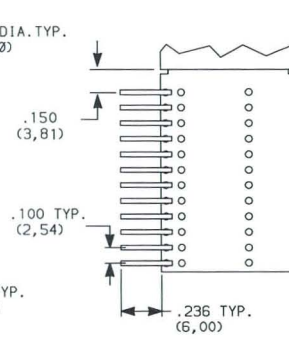
See fig. 1, page F-13.  
Unsuitable for panel mounting.

**W** RIGHT ANGLE BOARD W/ PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.  
Signal traces cut except for common(s).

**Y** TYPE W W/ SOLDER PINS

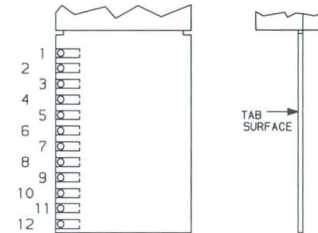
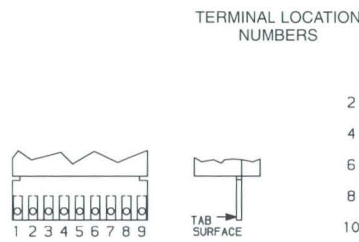
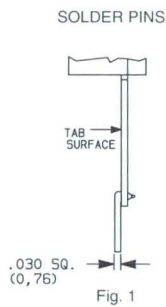


See fig. 1, page F-13.  
Unsuitable for panel mounting.

**9** ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS.

SPECIFY ON CONFIGURATION FORM, PAGE F-14 AND CONSULT FACTORY





See function codes, page F-11 for signal locations.

## COLOR/MARKING/STOPS

- 0** (STD.) Matte black housing; Gloss black wheel with white characters; Black pushbuttons; No stops.
- 1** Matte gray housing; Gloss black wheel with white characters; Black pushbuttons; No stops.
- 9** Special colors, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-14 and consult factory.

## DUST LENS



- 0** (STD.) No Lens.
- 2** Dust Lens (protects character face of the wheel from abrasion and dust).

## ILLUMINATION

- NEW (NONE)** (STD.) No illumination
- 3** Red LED
- 5** Yellow LED
- 6** Green LED

Internal LED illuminates wheel character for low-light visibility.

## HOW TO ORDER

All available 3P SERIES MINIATURE PUSHWHEEL SWITCH options are listed on page F-10, and are described on pages F-10 thru F-13. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-14, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

## SPECIFICATIONS

- CONTACT RATING:  
CARRY: 1 AMP continuous.  
SWITCH: 100 mA max.
- OPERATING VOLTAGE: 50 mV to 28 V DC.
- ELECTRICAL LIFE: 100,000 actuations through revolutions of 360° thru a total of 1,000,000 detents.
- CONTACT RESISTANCE: Below 300 milliohms typ. initial @ 2-4 V DC, 100 mA.
- INSULATION RESISTANCE: 10<sup>9</sup> ohms min. (dry).
- DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.
- OPERATING TEMPERATURE: -10°C to 65°C.

## MATERIALS

- SWITCH BODY: ABS plastic.
- PUSHWHEEL: Acetal.
- PUSHBUTTON: Acetal.
- ROTOR CONTACTS: Gold over nickel over copper alloy.
- STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO.

3 P [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

C&K PART NUMBER

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

C&K PART NUMBER

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

COMPANY NAME \_\_\_\_\_

REVISION: [ ]

ADDRESS \_\_\_\_\_ TEL.# \_\_\_\_\_

CUSTOMER CONTACT \_\_\_\_\_ DATE \_\_\_\_\_

DETAILS: [ ]

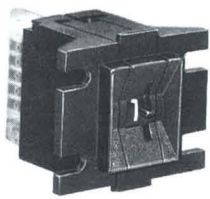
ORIGINATED BY \_\_\_\_\_ SALES REP. \_\_\_\_\_

| PUSHWHEEL SECTIONS                                  | NO. OF SEC. | FUNCTION CODE—TERMINATIONS—COLOR/MARKING/STOPS—DUST LENS<br><small>ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-11).</small> | DESCRIBE IN APPROPRIATE ROW |
|---|-------------|--|-----------------------------|
| <input type="checkbox"/> 1 <input type="checkbox"/> | 1           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 2 <input type="checkbox"/> | 2           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 3 <input type="checkbox"/> | 3           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 4 <input type="checkbox"/> | 4           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 5 <input type="checkbox"/> | 5           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 6 <input type="checkbox"/> | 6           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 7 <input type="checkbox"/> | 7           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 8 <input type="checkbox"/> | 8           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 9 <input type="checkbox"/> | 9           | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 0 <input type="checkbox"/> | 10          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 1 <input type="checkbox"/> | 11          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 2 <input type="checkbox"/> | 12          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 3 <input type="checkbox"/> | 13          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 4 <input type="checkbox"/> | 14          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 5 <input type="checkbox"/> | 15          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |
| <input type="checkbox"/> 6 <input type="checkbox"/> | 16          | 3 P - [ ] [ ] - [ ] [ ] [ ] [ ]  |                             |

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET \_\_\_\_ OF \_\_\_\_



**Easy Build-A-Switch:**

Below is a complete listing of available options for S2 SERIES SUBMINIATURE THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-16 thru F-19. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-19. Use CONFIGURATION FORM, page F-20, for special instructions. Hardware is available separately, see catalog section H.

| MOUNTING STYLE | FUNCTION CODE  | TERMINATIONS | COLOR/MARKING/STOPS     | NUMBER OF SECTIONS |
|----------------|----------------|--------------|-------------------------|--------------------|
| Front Mount    | Decimal 1 Pole |              | Black w/ white Markings | One                |

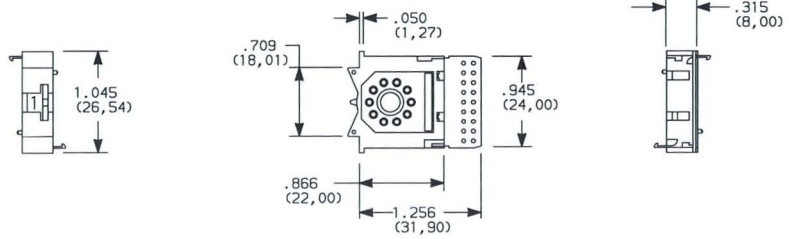
  

| MOUNTING STYLE | FUNCTION CODE | TERMINATIONS | COLOR/MARKING/STOPS | NUMBER OF SECTIONS |
|----------------|---------------|--------------|---------------------|--------------------|
| S2D            | 012           | 9            | 0                   | 0                  |
| S2F            | 018           | A            | 9                   | 1                  |
| S2R            | 021           | B            |                     | 2                  |
| S2S            | 022           | C            |                     | 3                  |
| S2T            | 054           | E            |                     | 4                  |
|                | 057           | L            |                     | 5                  |
|                | 091           | P            |                     | 6                  |
|                | 092           | S            |                     | 7                  |
|                | 099           | T            |                     | 8                  |
|                | 120           |              |                     | 9                  |
|                | 121           |              |                     |                    |
|                | 122           |              |                     |                    |

Special switch no. assigned by C&K.  
  
 Configuration form required, see page F-20.

## MOUNTING STYLE

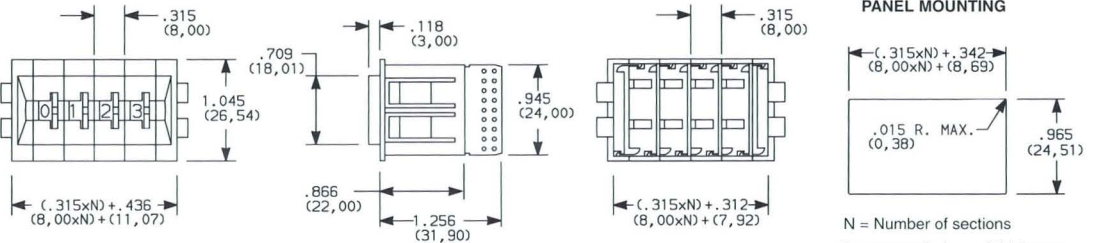
### S2D SWITCH SECTION ONLY (ENDPLATES NOT SUPPLIED)



MUST BE ORDERED WITH 0 NUMBER OF SECTIONS OPTION. SEE PAGE F-19.

Part No. Shown: S2DXXXS00

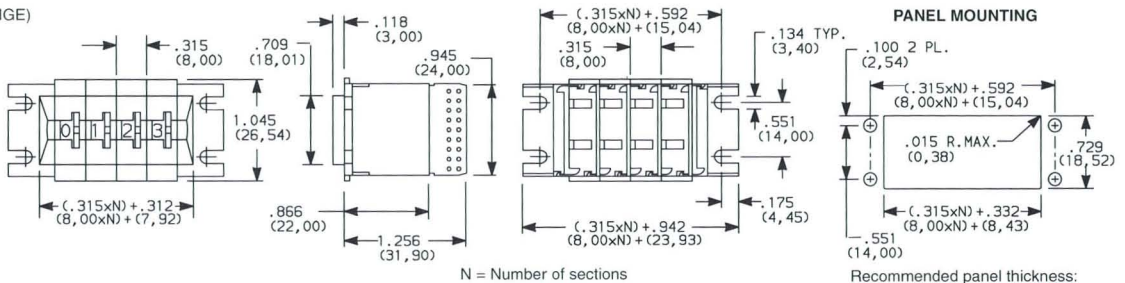
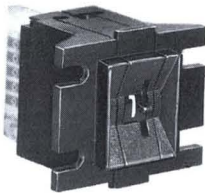
### S2F SNAP-IN FRONT MOUNTING



Part No. Shown: S2FXXXS04

N = Number of sections  
Recommended panel thickness:  
.046 - .125  
(1,16 - 3,18)

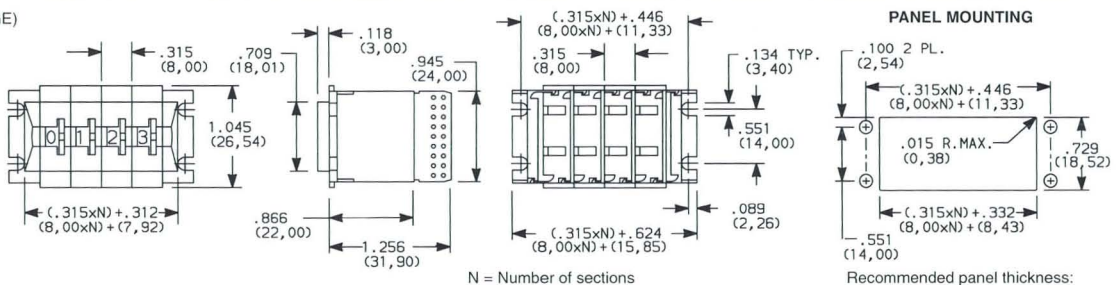
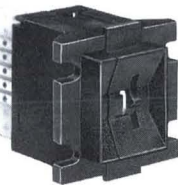
### S2R REAR MOUNT (8MM FLANGE)



Part No. Shown: S2RXXXS04

N = Number of sections  
Recommended panel thickness:  
.046 - .125  
(1,16 - 3,18)

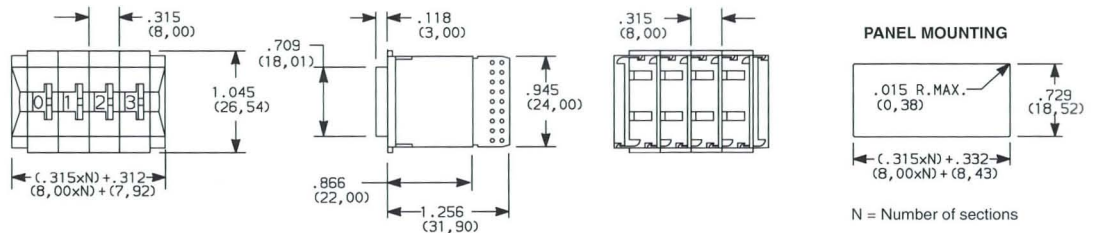
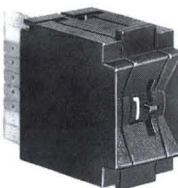
### S2S REAR MOUNT (4MM FLANGE)



Part No. Shown: S2SXXXS04

N = Number of sections  
Recommended panel thickness:  
.046 - .125  
(1,16 - 3,18)

### S2T REAR MOUNT (NO FLANGE)



Part No. Shown: S2TXXXS04

N = Number of sections  
Recommended panel thickness:  
.046 - .125  
(1,16 - 3,18)

## FUNCTION CODE

For terminal location diagrams, see page F-19.

### 012 DECIMAL — 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

E, S

| WHEEL | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |   |
|-------|--------------------------------------|---|---|---|---|---|---|---|----|----|---|
|       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | C |
| 0     | ●                                    |   |   |   |   |   |   |   |    |    | ● |
| 1     |                                      | ● |   |   |   |   |   |   |    |    | ● |
| 2     |                                      |   | ● |   |   |   |   |   |    |    | ● |
| 3     |                                      |   |   | ● |   |   |   |   |    |    | ● |
| 4     |                                      |   |   |   | ● |   |   |   |    |    | ● |
| 5     |                                      |   |   |   |   | ● |   |   |    |    | ● |
| 6     |                                      |   |   |   |   |   | ● |   |    |    | ● |
| 7     |                                      |   |   |   |   |   |   | ● |    |    | ● |
| 8     |                                      |   |   |   |   |   |   |   | ●  |    | ● |
| 9     |                                      |   |   |   |   |   |   |   |    | ●  | ● |
|       | 1                                    | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 6 |
|       | TERM. LOCATION                       |   |   |   |   |   |   |   |    |    |   |

See fig. 2, page F-19.

### 018 COMPLEMENT OF BCD; 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

C, E, L, P, S, T

| WHEEL | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |
|-------|--------------------------------|---|---|---|---|
|       | 1                              | 2 | 4 | 8 | C |
| 0     | ●                              |   |   |   | ● |
| 1     |                                | ● |   |   | ● |
| 2     |                                |   | ● |   | ● |
| 3     |                                |   |   | ● | ● |
| 4     | ●                              |   |   |   | ● |
| 5     |                                | ● |   |   | ● |
| 6     |                                |   | ● |   | ● |
| 7     |                                |   |   | ● | ● |
| 8     | ●                              |   |   |   | ● |
| 9     |                                | ● |   |   | ● |
|       | 4                              | 5 | 6 | 7 | 3 |
|       | TERM. LOCATION                 |   |   |   |   |

Terminal locations for L or P termination options only.

See figs. 1 & 3, page F-19.

### 021 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, L, P, S, T

| WHEEL | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |
|-------|--------------------------------|---|---|---|---|
|       | 1                              | 2 | 4 | 8 | C |
| 0     |                                |   |   |   | ● |
| 1     | ●                              |   |   |   | ● |
| 2     |                                | ● |   |   | ● |
| 3     |                                |   | ● |   | ● |
| 4     |                                |   |   | ● | ● |
| 5     | ●                              |   |   |   | ● |
| 6     |                                | ● |   |   | ● |
| 7     |                                |   | ● |   | ● |
| 8     |                                |   |   | ● | ● |
| 9     | ●                              |   |   |   | ● |
|       | 4                              | 5 | 6 | 7 | 3 |
|       | TERM. LOCATION                 |   |   |   |   |

Terminal locations for L or P termination options only.

See figs. 1 & 3, page F-19.

### 022 BCD; 1-2-4-8 W/ COMPLEMENT, ONE COMMON; 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, S, T

| WHEEL | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |   |
|-------|--------------------------------------|---|---|---|---|---|---|---|---|
|       | 1                                    | 2 | 4 | 8 | 1 | 2 | 4 | 8 | C |
| 0     |                                      |   |   |   | ● | ● | ● | ● | ● |
| 1     | ●                                    |   |   |   | ● | ● | ● | ● | ● |
| 2     |                                      | ● |   |   | ● | ● | ● | ● | ● |
| 3     |                                      |   | ● |   | ● | ● | ● | ● | ● |
| 4     |                                      |   |   | ● | ● | ● | ● | ● | ● |
| 5     | ●                                    |   |   |   | ● | ● | ● | ● | ● |
| 6     |                                      | ● |   |   | ● | ● | ● | ● | ● |
| 7     |                                      |   | ● |   | ● | ● | ● | ● | ● |
| 8     |                                      |   |   | ● | ● | ● | ● | ● | ● |
| 9     | ●                                    |   |   |   | ● | ● | ● | ● | ● |
|       | 9                                    | 8 | 7 | 6 | 1 | 2 | 3 | 4 | 5 |
|       | TERM. LOCATION                       |   |   |   |   |   |   |   |   |

See fig. 1, page F-19.

### 054 BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0, 9, A-F

### 057 BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0-15

AVAILABLE TERMINATIONS

A, B, C, E, S, T

| WHEEL | WHEEL | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |
|-------|-------|--------------------------------|---|---|---|---|
|       |       | 1                              | 2 | 4 | 8 | C |
| 0     | 0     |                                |   |   |   | ● |
| 1     | 1     | ●                              |   |   |   | ● |
| 2     | 2     |                                | ● |   |   | ● |
| 3     | 3     |                                |   | ● |   | ● |
| 4     | 4     |                                |   |   | ● | ● |
| 5     | 5     | ●                              |   |   |   | ● |
| 6     | 6     |                                | ● |   |   | ● |
| 7     | 7     |                                |   | ● |   | ● |
| 8     | 8     |                                |   |   | ● | ● |
| 9     | 9     | ●                              |   |   |   | ● |
| A     | 10    |                                | ● |   |   | ● |
| B     | 11    |                                |   | ● |   | ● |
| C     | 12    |                                |   |   | ● | ● |
| D     | 13    | ●                              |   |   |   | ● |
| E     | 14    |                                | ● |   |   | ● |
| F     | 15    |                                |   | ● |   | ● |
|       |       | 4                              | 5 | 6 | 7 | 3 |
|       |       | TERM. LOCATION                 |   |   |   |   |

See fig. 1, page F-19.

### 120 1 POLE; 10 POSITION MINUS (-) AND PLUS (+) ALTERNATING

### 121 1 POLE; 10 POSITION ZERO (0) AND ONE (1) ALTERNATING

### 122 1 POLE; 10 POSITION ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS

A, B, C, S,

| WHEEL | WHEEL | WHEEL | COMMON (C) CONNECTED TO TERMINALS INDICATED |   |   |
|-------|-------|-------|---|---|---|
|       |       |       | 1   | 2 | C |
| -     | 0     | 0     | ●   |   | ● |
| +     | 1     | 5     |   | ● | ● |
| -     | 0     | 0     | ●   |   | ● |
| +     | 1     | 5     |   | ● | ● |
| -     | 0     | 0     | ●   |   | ● |
| +     | 1     | 5     |   | ● | ● |
| -     | 0     | 0     | ●   |   | ● |
| +     | 1     | 5     |   | ● | ● |
|       |       |       | 5   | 6 | 3 |
|       |       |       | TERM. LOCATION                              |   |   |

See fig. 1, page F-19.

### 091 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

### 092 BLANK SECTION W/ RIBBED CENTER (INACTIVE)

AVAILABLE TERMINATIONS

9

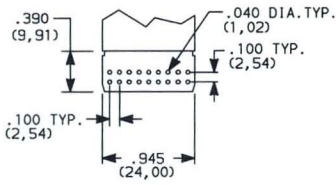
### 099 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-20 AND CONSULT FACTORY.

## TERMINATIONS

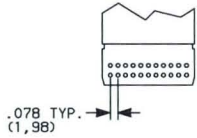
NOTE: All terminal holes shown may not be present for all function codes, consult factory.

### S (STD.)

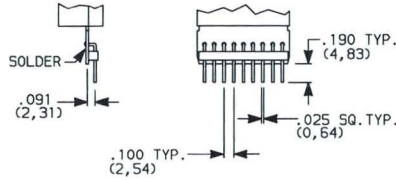
For all function codes except 012.



For function code 012.

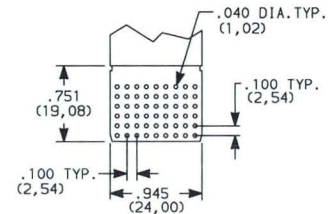


### C TYPE S W/ SOLDER PINS (HEADER)

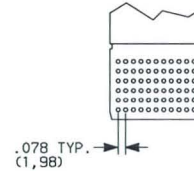


### E EXTENDED BOARD

For all function codes except 012.

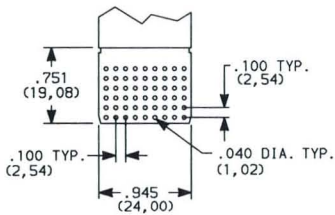


For function code 012.

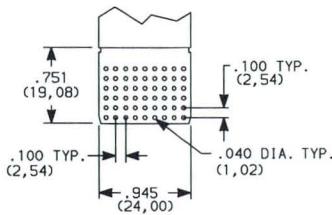


P.C. BOARD 1/32" (0,79) THK.

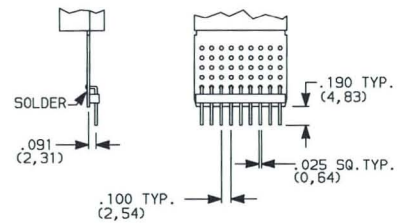
### A W/ PROVISIONS FOR COMPONENTS



### B W/ COMPONENTS MOUNTED (CONFIGURATION FORM REQUIRED, SEE PAGE F-20.)



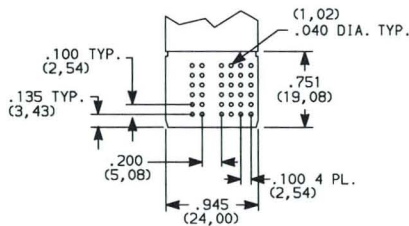
### T TYPE E W/ SOLDER PINS (HEADER)



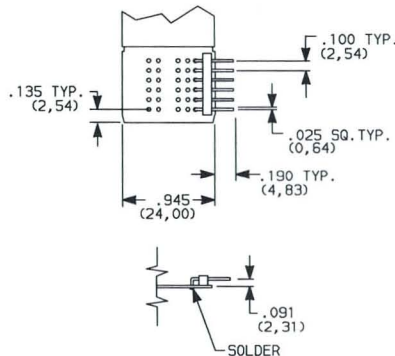
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK

### L RIGHT ANGLE



### P TYPE L W/ SOLDER PINS (HEADER)



Unsuitable for panel mounting.

P.C. BOARD 1/32" (0,79) THK.

### 9 ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS. ALSO SPECIFIED WITH FUNCTION CODES 091 AND 092.

SPECIFY ON CONFIGURATION FORM, PAGE F-20 AND CONSULT FACTORY

TERMINAL LOCATION NUMBERS

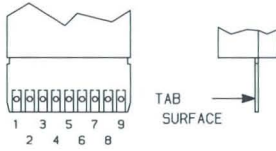


Fig. 1

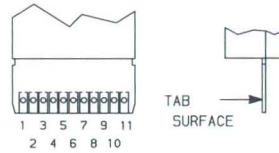


Fig. 2

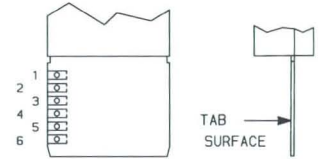


Fig. 3

See function codes, page F-17, for signal locations.

**COLOR/MARKING/STOPS**

- 0** (STD.) Matte black housing; Gloss black wheel with white characters; No stops.
- 9** Special colors, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-20 and consult factory.

**NUMBER OF SECTIONS**

- 0** Switch section only, no endplates (must be ordered with S2D mounting style, see page F-16).
- 1-8** Number of switch sections in assembly, includes endplates.
- 9** More than 8 switch sections, specify on CONFIGURATION FORM, page F-20 and consult factory.

**NOTE:** Endplates and blank sections available separately, see catalog section H.

**HOW TO ORDER**

All available S2 SERIES SUBMINIATURE THUMBWHEEL SWITCH options are listed on page F-15, and are described on pages F-16 thru F-19. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-20, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

**SPECIFICATIONS**

CONTACT RATING:  
 CARRY: 3 AMPS continuous.  
 SWITCH: 50 mA max.  
 OPERATING VOLTAGE: 50 mV to 50 V AC or DC.  
 CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.  
 INSULATION RESISTANCE: 10<sup>9</sup> ohms min. (dry).  
 DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.  
 OPERATING TEMPERATURE: -40°C to 70°C.

**MATERIALS**

SWITCH BODY: Polycarbonate.  
 THUMBWHEEL: Acetal.  
 ROTOR CONTACTS: Precious metal on copper alloy.  
 STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO.

C&K PART NUMBER

Grid for C&K Catalog Part No. (S 2) and C&K Part Number.

C&K PART NUMBER

Vertical grid for C&K Part Number.

COMPANY NAME \_\_\_\_\_

REVISION:

ADDRESS \_\_\_\_\_ TEL.# \_\_\_\_\_

CUSTOMER CONTACT \_\_\_\_\_ DATE \_\_\_\_\_

DETAILS:

ORIGINATED BY \_\_\_\_\_ SALES REP. \_\_\_\_\_

Table with 4 columns: THUMBWHEEL SECTIONS, NO. OF SEC., FUNCTION CODE—TERMINATIONS—COLOR/MARKING/STOPS, and DESCRIBE IN APPROPRIATE ROW. Rows 1-16.

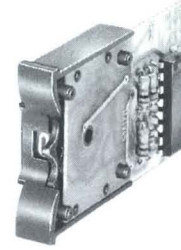
FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET \_\_\_\_ OF \_\_\_\_







**Easy Build-A-Switch:**

Below is a complete listing of available options for SF/SR SERIES THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-22 thru F-30. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-30. Use CONFIGURATION FORM, page F-31, for special instructions. Hardware is available separately, see catalog section H.

| MOUNTING STYLE | FUNCTION CODE  | TERMINATIONS | COLOR/MARKING/STOPS/SEAL | NUMBER OF SECTIONS |
|----------------|----------------|--------------|--------------------------|--------------------|
| Front Mount    | Decimal 1 Pole |              | Black w/ white Markings  | One                |

| MOUNTING STYLE | FUNCTION CODE | TERMINATIONS | COLOR/MARKING/STOPS/SEAL | NUMBER OF SECTIONS |
|----------------|---------------|--------------|--------------------------|--------------------|
| SF             | 012           | 160          | 9                        | 0                  |
| SR             | 013           | 161          | A                        | 9                  |
|                | 014           | 163          | B                        | J                  |
|                | 017           | 164          | C                        |                    |
|                | 018           | 165          | D                        |                    |
|                | 019           | 166          | E                        |                    |
|                | 020           | 167          | F                        |                    |
|                | 021           | 168          | N                        |                    |
|                | 022           | 169          | R                        |                    |
|                | 023           | 170          | S                        |                    |
|                | 048           | 171          | T                        |                    |
|                | 050           | 172          |                          |                    |
|                | 052           | 173          |                          |                    |
|                | 053           | 174          |                          |                    |
|                | 054           | 176          |                          |                    |
|                | 055           | 177          |                          |                    |
|                | 056           | 178          |                          |                    |
|                | 057           | 179          |                          |                    |
|                | 060           | 180          |                          |                    |
|                | 061           | 181          |                          |                    |
|                | 066           | 182          |                          |                    |
|                | 072           | 183          |                          |                    |
|                | 074           | 184          |                          |                    |
|                | 091           | 185          |                          |                    |
|                | 092           | 187          |                          |                    |
|                | 099           |              |                          |                    |

Special switch no. assigned by C&K.

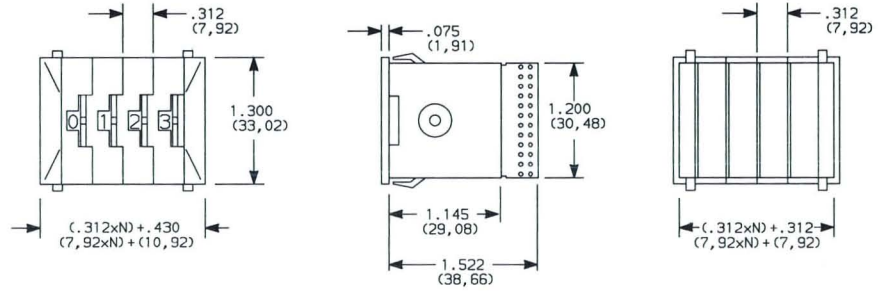


Configuration form required, see page F-31.



MOUNTING STYLE

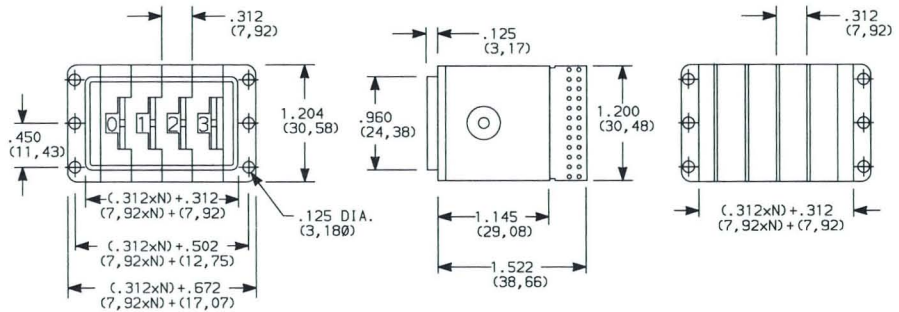
SF SNAP-IN FRONT MOUNTING



N = Number of Sections

Part No. Shown: SFXXS04

SR REAR MOUNTING (8MM FLANGE)

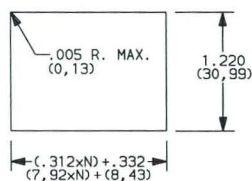


N = Number of Sections

Part No. Shown: SRXXS04

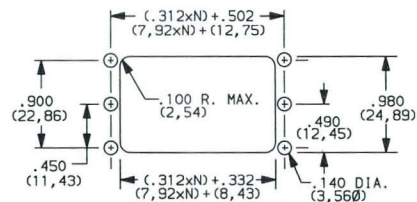
PANEL MOUNTING

SF



N = Number of sections

SR



Recommended Panel Thickness: .046 - .125 (1,16 - 3,18)



FUNCTION CODE

For terminal location diagram, see Fig.1, page F-29.

012 DECIMAL—1 POLE; 10 POSITION

014 DECIMAL—1 POLE; 10 POSITION, MAKE BEFORE BREAK

013 DECIMAL—2 POLE; 10 POSITION, SEPARATE COMMONS

AVAILABLE TERMINATIONS 012 MODELS

A, B, C, E, N, R, S, T

Configuration form required for B and R terminations, see page F-31.

AVAILABLE TERMINATIONS 014 MODELS

C, S

Table with 10 rows (WHEEL 0-9) and 11 columns (SIGNALS CONNECTED TO COMMON SIGNAL C 0-10). Shows signal connections for models 012 and 014.

See fig. 1, page F-29.

AVAILABLE TERMINATIONS

D, E

Table with 10 rows (WHEEL 0-9) and 21 columns (COMMON (C) CONN. TO TERMS. INDICATED C' 0' 1' 2' 3' 4' 5' 6' 7' 8' 9'). Shows signal connections for models 013 and 014.

FOR TERMINAL LOCATIONS CONSULT C & K.

017 BCD W/ EXCESS 3 NOTATION; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, S

Configuration form required for B terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 5 columns (SIGNALS CONN. TO COMM. SIG. C 1 2 4 8 C). Shows signal connections for model 017.

See fig. 1, page F-29.

018 COMPLEMENT OF BCD; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, N, R, S

Configuration form required for B and R terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 5 columns (SIGNALS CONN. TO COMM. SIG. C 1 2 4 8 C). Shows signal connections for model 018.

See fig. 1, page F-29.

019 BCD W/ ODD BIT PARITY; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, S

Configuration form required for B terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 6 columns (SIGNALS CONNECTED TO COMMON SIGNAL C 1 2 4 8 P C). Shows signal connections for model 019.

See fig. 1, page F-29.

020 BCD W/ 10 AT 0; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, N, R

Configuration form required for B and R terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 5 columns (SIGNALS CONN. TO COMM. SIG. C 1 2 4 8 C). Shows signal connections for model 020.

See fig. 1, page F-29.

021 BCD 0-9; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, N, R, S, T

Configuration form required for B and R terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 5 columns (SIGNALS CONN. TO COMM. SIG. C 1 2 4 8 C). Shows signal connections for model 021.

See fig. 1, page F-29.

022 BCD W/ COMPLEMENT 0-9; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, N, R, S

Configuration form required for B and R terminations, see page F-31.

Table with 10 rows (WHEEL 0-9) and 11 columns (SIGNALS CONNECTED TO COMMON SIGNAL C 1 2 4 8 1' 2' 4' 8' C). Shows signal connections for model 022.

See fig. 1, page F-29.



## FUNCTION CODE

For terminal location diagram, see Fig. 1, page F-29.

**023** AIKEN CODE 1-2-4-2'; 10 POSITION

**048** DECIMAL—1 POLE; 11 POSITION,

### AVAILABLE TERMINATIONS

A, B, C, E, N, R, S, T

Configuration form required for B and R terminations, see page F-31.

| WHEEL          | SIGNALS CONN. TO COMM. SIG. C |   |   |                    |
|----------------|-------------------------------|---|---|--------------------|
|                | 1                             | 2 | 4 | 2' C               |
| 0              |                               |   |   | ●                  |
| 1              | ●                             |   |   | ●                  |
| 2              |                               | ● |   | ●                  |
| 3              | ●                             | ● |   | ●                  |
| 4              |                               |   | ● | ●                  |
| 5              | ●                             | ● | ● | ●                  |
| 6              |                               | ● | ● | ●                  |
| 7              | ●                             |   | ● | ●                  |
| 8              | ●                             | ● | ● | ●                  |
| 9              | ●                             | ● | ● | ●                  |
| TERM. LOCATION |                               |   |   |                    |
|                |                               |   |   | 10 7, 8, 4, 5 2 12 |

See fig. 1, page F-29.

### AVAILABLE TERMINATIONS

C, S

| WHEEL                      | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |   |   |   |   |   |    |   |
|----------------------------|-------------------------------|---|---|---|---|---|---|---|---|---|----|---|
|                            | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | C |
| 0                          | ●                             |   |   |   |   |   |   |   |   |   |    | ● |
| 1                          |                               | ● |   |   |   |   |   |   |   |   |    | ● |
| 2                          |                               |   | ● |   |   |   |   |   |   |   |    | ● |
| 3                          |                               |   |   | ● |   |   |   |   |   |   |    | ● |
| 4                          |                               |   |   |   | ● |   |   |   |   |   |    | ● |
| 5                          |                               |   |   |   |   | ● |   |   |   |   |    | ● |
| 6                          |                               |   |   |   |   |   | ● |   |   |   |    | ● |
| 7                          |                               |   |   |   |   |   |   | ● |   |   |    | ● |
| 8                          |                               |   |   |   |   |   |   |   | ● |   |    | ● |
| 9                          |                               |   |   |   |   |   |   |   |   | ● |    | ● |
| 10                         |                               |   |   |   |   |   |   |   |   |   | ●  | ● |
| TERM. LOCATION             |                               |   |   |   |   |   |   |   |   |   |    |   |
| 12 11 10 9 8 7 6 5 4 3 2 1 |                               |   |   |   |   |   |   |   |   |   |    |   |

See fig. 1, page F-29.

**052** DECIMAL — 1 POLE; 16 POSITION 0-9, A-F

**053** HEXADECIMAL COMPLEMENT; 1 POLE, 16 POSITION 0-9, A-F

**055** DECIMAL — 1 POLE; 16 POSITION 0-15

**056** HEXADECIMAL COMPLEMENT; 1 POLE, 16 POSITION 0-15

### AVAILABLE TERMINATIONS

F

|                                       |       | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |
|---------------------------------------|-------|--------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|---|
| WHEEL                                 | WHEEL | 0                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | C |
| 0                                     | 0     | ●                              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | ● |
| 1                                     | 1     |                                | ● |   |   |   |   |   |   |   |   |    |    |    |    |    |    | ● |
| 2                                     | 2     |                                |   | ● |   |   |   |   |   |   |   |    |    |    |    |    |    | ● |
| 3                                     | 3     |                                |   |   | ● |   |   |   |   |   |   |    |    |    |    |    |    | ● |
| 4                                     | 4     |                                |   |   |   | ● |   |   |   |   |   |    |    |    |    |    |    | ● |
| 5                                     | 5     |                                |   |   |   |   | ● |   |   |   |   |    |    |    |    |    |    | ● |
| 6                                     | 6     |                                |   |   |   |   |   | ● |   |   |   |    |    |    |    |    |    | ● |
| 7                                     | 7     |                                |   |   |   |   |   |   | ● |   |   |    |    |    |    |    |    | ● |
| 8                                     | 8     |                                |   |   |   |   |   |   |   | ● |   |    |    |    |    |    |    | ● |
| 9                                     | 9     |                                |   |   |   |   |   |   |   |   | ● |    |    |    |    |    |    | ● |
| A                                     | 10    |                                |   |   |   |   |   |   |   |   |   | ●  |    |    |    |    |    | ● |
| B                                     | 11    |                                |   |   |   |   |   |   |   |   |   |    | ●  |    |    |    |    | ● |
| C                                     | 12    |                                |   |   |   |   |   |   |   |   |   |    |    | ●  |    |    |    | ● |
| D                                     | 13    |                                |   |   |   |   |   |   |   |   |   |    |    |    | ●  |    |    | ● |
| E                                     | 14    |                                |   |   |   |   |   |   |   |   |   |    |    |    |    | ●  |    | ● |
| F                                     | 15    |                                |   |   |   |   |   |   |   |   |   |    |    |    |    |    | ●  | ● |
| FOR TERMINAL LOCATIONS CONSULT C & K. |       |                                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |

### AVAILABLE TERMINATIONS

A, B, C, N, R, S

Configuration form required for B and R terminations, see page F-31.

|                |       | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |
|----------------|-------|--------------------------------|---|---|---|---|
| WHEEL          | WHEEL | 1                              | 2 | 4 | 8 | C |
| 0              | 0     | ●                              | ● | ● | ● | ● |
| 1              | 1     |                                | ● | ● | ● | ● |
| 2              | 2     |                                |   | ● | ● | ● |
| 3              | 3     |                                |   |   | ● | ● |
| 4              | 4     |                                |   |   |   | ● |
| 5              | 5     |                                |   |   |   | ● |
| 6              | 6     |                                |   |   |   | ● |
| 7              | 7     |                                |   |   |   | ● |
| 8              | 8     |                                |   |   |   | ● |
| 9              | 9     |                                |   |   |   | ● |
| A              | 10    |                                |   |   |   | ● |
| B              | 11    |                                |   |   |   | ● |
| C              | 12    |                                |   |   |   | ● |
| D              | 13    |                                |   |   |   | ● |
| E              | 14    |                                |   |   |   | ● |
| F              | 15    |                                |   |   |   | ● |
| TERM. LOCATION |       |                                |   |   |   |   |
| 10 8 6 2 4     |       |                                |   |   |   |   |

See fig. 1, page F-29.

**054** BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0-9, A-F

**091** BLANK SECTION (INACTIVE)

**057** BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0-15

### AVAILABLE TERMINATIONS

9

### AVAILABLE TERMINATIONS

A, B, C, E, N, R, S, T

Configuration form required for B and R terminations, see page F-31.

|                |       | SIGNALS CONN. TO COMMON SIG. C |   |   |   |   |
|----------------|-------|--------------------------------|---|---|---|---|
| WHEEL          | WHEEL | 1                              | 2 | 4 | 8 | C |
| 0              | 0     |                                |   |   |   | ● |
| 1              | 1     | ●                              |   |   |   | ● |
| 2              | 2     |                                | ● |   |   | ● |
| 3              | 3     | ●                              | ● |   |   | ● |
| 4              | 4     |                                |   | ● |   | ● |
| 5              | 5     | ●                              |   | ● |   | ● |
| 6              | 6     |                                | ● | ● |   | ● |
| 7              | 7     | ●                              | ● | ● |   | ● |
| 8              | 8     |                                |   |   | ● | ● |
| 9              | 9     | ●                              |   |   |   | ● |
| A              | 10    |                                | ● |   |   | ● |
| B              | 11    | ●                              |   |   |   | ● |
| C              | 12    |                                |   | ● |   | ● |
| D              | 13    | ●                              |   |   |   | ● |
| E              | 14    |                                | ● |   |   | ● |
| F              | 15    | ●                              | ● | ● | ● | ● |
| TERM. LOCATION |       |                                |   |   |   |   |
| 10 8 6 2 4     |       |                                |   |   |   |   |

See fig. 1, page F-29.

**092** BLANK SECTION W/ RIBBED CENTER (INACTIVE)

### AVAILABLE TERMINATIONS

9

**099** INTERMIXED SECTIONS

SPECIFY ON CONFIGURATION FORM, PAGE F-31 AND CONSULT FACTORY.

## FUNCTION CODE

For terminal location diagram, see Fig.1, page F-29.

### 061

#### AVAILABLE TERMINATIONS

B, R

Configuration form required for B and R terminations, see page F-31.



### KELVIN-VARLEY VOLTAGE DIVIDER

The Kelvin-Varley Voltage Divider contains the lowest component count in the industry to assure maximum reliability and long life. These dividers use a cascade arrangement of resistors to accurately divide voltages.

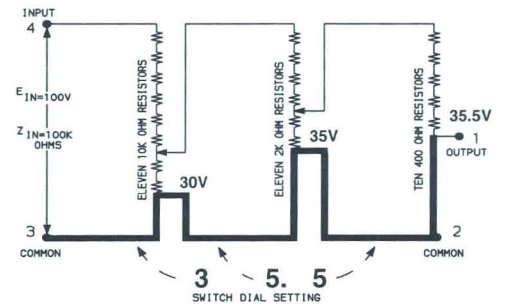
The accuracy and the resolution is not solely dependent on the accuracy of the resistors used, but mainly in the number of decades used. For example: a 100 volt signal can be divided in 10 volt steps with a 10 volt resolution with only one decade; or 1 volt steps with a 1 volt resolution with 2 decades; or the same 100 volt signal can be divided in 1mV steps with 1mV resolution using a 5 decade bank. All this is accomplished while the input impedance of the divider remains constant.

In each decade, all the resistors have the same values. The accuracy of these dividers is always defined as a percentage of "full scale voltage", not of "setting". For instance, an accuracy of 0.01% of full scale of a 100V signal input is +/- 10mV at any setting.

A value must be supplied for Input Resistance and Accuracy (%) Full Scale Voltage. A configuration form must be completed (see page F-31).

| W<br>H<br>E<br>E<br>L | PINS 1 AND 2 CONNECTED ACROSS RESISTORS INDICATED |    |    |    |    |    |    |    |    |    | TERM. LOCATION |   |   |   |   |
|-----------------------|---|----|----|----|----|----|----|----|----|----|----------------|---|---|---|---|
|                       | R0  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | 10             | 1 | 2 | 3 | 4 |
| 0                     | ●   | ●  |    |    |    |    |    |    |    |    |                |   |   |   |   |
| 1                     |   | ●  | ●  |    |    |    |    |    |    |    |                |   |   |   |   |
| 2                     |   |    | ●  | ●  |    |    |    |    |    |    |                |   |   |   |   |
| 3                     |   |    |    | ●  | ●  |    |    |    |    |    |                |   |   |   |   |
| 4                     |   |    |    |    | ●  | ●  |    |    |    |    |                |   |   |   |   |
| 5                     |   |    |    |    |    | ●  | ●  |    |    |    |                |   |   |   |   |
| 6                     |   |    |    |    |    |    | ●  | ●  |    |    |                |   |   |   |   |
| 7                     |   |    |    |    |    |    |    | ●  | ●  |    |                |   |   |   |   |
| 8                     |   |    |    |    |    |    |    |    | ●  | ●  |                |   |   |   |   |
| 9                     |   |    |    |    |    |    |    |    |    | ●  | ●              |   |   |   |   |

See fig. 1, page F-29.



Typical three decade connection (rear view).

INPUT RESISTANCE - 1K to 100K ohms  
 ACCURACY (%) FULL SCALE VOLTAGE - 0.1, 0.5 and 1.0

### 066 9' S COMPLEMENT OF BCD; 10 POSITION

#### AVAILABLE TERMINATIONS

A, B, C, N, R, S

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   | TERM. LOCATION |   |
|-----------------------|-------------------------------|---|---|---|----------------|---|
|                       | 1                             | 2 | 4 | 8 | 10             | 2 |
| 0                     | ●                             |   |   |   |                |   |
| 1                     |                               | ● |   |   |                |   |
| 2                     | ●                             | ● |   |   |                |   |
| 3                     |                               | ● | ● |   |                |   |
| 4                     | ●                             |   | ● |   |                |   |
| 5                     |                               | ● |   | ● |                |   |
| 6                     | ●                             | ● |   |   |                |   |
| 7                     |                               | ● |   | ● |                |   |
| 8                     | ●                             |   |   |   |                |   |
| 9                     |                               | ● |   |   |                |   |

See fig. 1, page F-29.

### 074 RESISTANCE DECADE; 1-2-3-6 CODE, 10 POSITION (W/O COMPONENTS)

#### AVAILABLE TERMINATIONS

A, B, N, R

Configuration form required for B and R terminations, see page F-31.

| W<br>H<br>E<br>E<br>L | RESISTORS IN CIRCUIT |    |    |    |   |   | TERM. LOCATION |   |
|-----------------------|----------------------|----|----|----|---|---|----------------|---|
|                       | R1                   | R2 | R3 | R6 | A | B | 10             | 2 |
| 0                     |                      |    |    |    | ● | ● |                |   |
| 1                     | ●                    |    |    |    |   |   |                |   |
| 2                     |                      | ●  |    |    |   |   |                |   |
| 3                     |                      |    | ●  |    |   |   |                |   |
| 4                     | ●                    |    |    | ●  |   |   |                |   |
| 5                     |                      | ●  |    |    |   |   |                |   |
| 6                     |                      |    | ●  |    |   |   |                |   |
| 7                     | ●                    |    |    |    | ● |   |                |   |
| 8                     |                      | ●  |    |    |   |   |                |   |
| 9                     |                      |    | ●  |    |   |   |                |   |

See fig. 1, page F-29.



## FUNCTION CODE

For terminal location diagram, see Fig.1, page F-29.

### 072, 160, 161, 163, 164, 165

### CAPACITANCE DECADE

This switch uses a 1-2-3-4 code specifically for low component count and high reliability. All capacitors are of high quality type (consult factory for capacitor specifications), and are fully tested before and after assembly. For best results, paralleling the commons of all the switches will obtain a high accuracy and resolution as shown in the schematic.

AVAILABLE TERMINATIONS  
160, 161, 163, 164, 165 MODELS

B

AVAILABLE TERMINATIONS  
072 MODELS

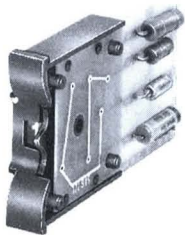
A, B

Configuration form required for 072 models when ordered with B terminations, see page F-31.

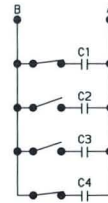
FUNCTION CODE      CAPACITANCE RANGE      MAXIMUM VOLTAGE

|     |                        |          |
|-----|------------------------|----------|
| 072 | Without Components     |          |
| 160 | 10 to 90.0 $\mu$ f     | 10 V DC  |
| 161 | 1 to 9.0 $\mu$ f       | 15 V DC  |
| 163 | 0.1 to 0.9 $\mu$ f     | 25 V DC  |
| 164 | 0.01 to 0.09 $\mu$ f   | 50 V DC  |
| 165 | 0.001 to 0.009 $\mu$ f | 100 V DC |

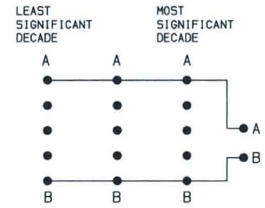
Other capacitors available, consult factory.



| W<br>H<br>E<br>E<br>L | CAPACITORS IN CIRCUIT |    |    |    |    |
|-----------------------|-----------------------|----|----|----|----|
|                       | C1                    | C2 | C3 | C4 | B  |
| 0                     |                       |    |    |    | ●  |
| 1                     | ●                     |    |    |    | ●  |
| 2                     |                       | ●  |    |    | ●  |
| 3                     |                       |    | ●  |    | ●  |
| 4                     |                       |    |    | ●  | ●  |
| 5                     | ●                     |    |    |    | ●  |
| 6                     |                       | ●  |    |    | ●  |
| 7                     |                       |    | ●  |    | ●  |
| 8                     | ●                     |    |    |    | ●  |
| 9                     |                       |    |    | ●  | ●  |
|                       | 10                    | 7  | 4  | 2  | 12 |
|                       | TERM. LOCATION        |    |    |    |    |



SCHEMATIC



Typical three decade connection (rear view).

See fig. 1, page F-29.

### 060, 166, 167, 168, 169, 170, 171, 172

### RESISTANCE DECADE

The Resistance Decade Switch is a precision built switch which includes high quality built-in resistors. This switch converts the number displayed at the window of the switch to its decimal equivalent in resistance. Resistance decade switches are fully assembled and tested with C&K's high quality precision components and equipment. A variety of resistance decades are available in a range from 0 ohms to 1M ohms, see below for specific ranges.

AVAILABLE TERMINATIONS  
166 THRU 172 MODELS

B, R

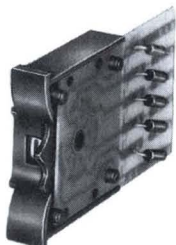
AVAILABLE TERMINATIONS  
060 MODELS

A, N

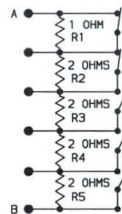
1, 2, 2, 2, 2 CODE

FUNCTION CODE      RESISTANCE RANGE

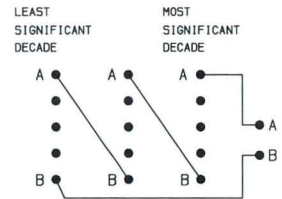
|     |                                  |
|-----|----------------------------------|
| 060 | Without Components               |
| 166 | 0 to 9M ohms in 1M ohm steps     |
| 167 | 0 to 900K ohms in 100K ohm steps |
| 168 | 0 to 90K ohms in 10K ohm steps   |
| 169 | 0 to 9K ohms in 1K ohm steps     |
| 170 | 0 to 900 ohms in 100 ohm steps   |
| 171 | 0 to 90 ohms in 10 ohm steps     |
| 172 | 0 to 9 ohms in 1 ohm steps       |



| W<br>H<br>E<br>E<br>L | RESISTORS IN CIRCUIT BETWEEN A & B |           |    |    |   |    |
|-----------------------|------------------------------------|-----------|----|----|---|----|
|                       | R1                                 | R2        | R3 | R4 | A | B  |
| 0                     |                                    |           |    |    |   |    |
| 1                     | ●                                  |           |    |    |   |    |
| 2                     |                                    | ●         |    |    |   |    |
| 3                     |                                    |           | ●  |    |   |    |
| 4                     |                                    |           |    | ●  |   |    |
| 5                     | ●                                  |           |    |    |   |    |
| 6                     |                                    | ●         |    |    |   |    |
| 7                     |                                    |           | ●  |    |   |    |
| 8                     |                                    |           |    | ●  |   |    |
| 9                     | ●                                  |           |    |    |   |    |
|                       | 2, 4, 6, 8                         | 8, 10, 12 |    |    | 2 | 12 |
|                       | TERM. LOCATION                     |           |    |    |   |    |



SCHEMATIC



Typical three decade connection (rear view).

See fig. 1, page F-29.

All resistors except for those used with section type 172 are 1% metal film rated at 1/8 watt @ 25°C type rn 55, other resistors are available depending on application, consult factory.

## FUNCTION CODE

For terminal location diagram, see Fig.1, page F-29.

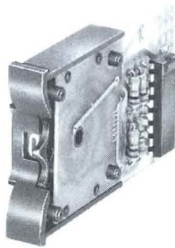
### 173, 174, 176, 177

AVAILABLE TERMINATIONS  
174, 176, 177 MODELS

B, R

AVAILABLE TERMINATIONS  
173 MODELS

A, N,



### SEVEN SEGMENT DRIVER

This Seven Segment Driver has a built-in decoder driver. The decimal number displayed is converted to BCD and supplied to the decoder's BCD inputs. The Seven Segment (A thru G) lines are available at the P.C. board terminals in addition to the V<sub>cc</sub>, ground, ripple blanking input and lamp test. This switch features active low outputs designed for driving common-anode LED's or incandescent indicators directly.

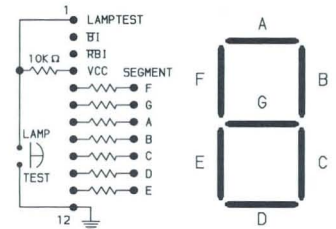
| FUNCTION CODE | LOGIC TYPE         | I.C. TYPE | OPERATING VOLTAGE | CURRENT SINK/SOURCE | MAXIMUM VOLTAGE |
|---------------|--------------------|-----------|-------------------|---------------------|-----------------|
| 173           | Without Components |           |                   |                     |                 |
| 174           | CMOS               | 14511B    | 10VDC+/-5VDC      | 20 mA source        | 20V             |
| 176           | TTL                | 7446      | 5VDC+/-5%         | 40 mA sink          | 30V             |
| 177           | TTL                | 7447      | 5VDC+/-5%         | 40 mA sink          | 15V             |

Other I.C.'s available, consult factory.

| W<br>H<br>E<br>E<br>L | ● DENOTES SEGMENT "ON" DIAL |   |   |    |    |   |   |                 |                |                |           |     |  |
|-----------------------|-----------------------------|---|---|----|----|---|---|-----------------|----------------|----------------|-----------|-----|--|
|                       | A                           | B | C | D  | E  | F | G | V <sub>cc</sub> | B <sub>0</sub> | B <sub>1</sub> | LAMP TEST | GND |  |
| 0                     | ●                           | ● | ● | ●  | ●  | ● |   |                 |                |                |           |     |  |
| 1                     |                             | ● | ● |    |    |   |   |                 |                |                |           |     |  |
| 2                     | ●                           | ● | ● | ●  | ●  |   |   |                 |                |                |           |     |  |
| 3                     | ●                           | ● |   | ●  | ●  |   |   |                 |                |                |           |     |  |
| 4                     | ●                           | ● | ● | ●  |    | ● |   |                 |                |                |           |     |  |
| 5                     | ●                           |   | ● | ●  | ●  | ● |   |                 |                |                |           |     |  |
| 6                     | ●                           | ● | ● | ●  | ●  | ● |   |                 |                |                |           |     |  |
| 7                     | ●                           | ● |   |    |    |   |   |                 |                |                |           |     |  |
| 8                     | ●                           | ● | ● | ●  | ●  | ● |   |                 |                |                |           |     |  |
| 9                     | ●                           | ● | ● | ●  | ●  | ● |   |                 |                |                |           |     |  |
|                       | 7                           | 8 | 9 | 10 | 11 | 5 | 6 | 4               | 3              | 2              | 1         | 12  |  |
| TERM. LOCATION        |                             |   |   |    |    |   |   |                 |                |                |           |     |  |

See fig. 1, page F-29.

For typical application, the blanking inputs are not connected but may be used for special applications. External resistors must be used to limit the LED current at outputs A thru G.



Typical connection for section types 176 and 177; for other connections, consult factory.

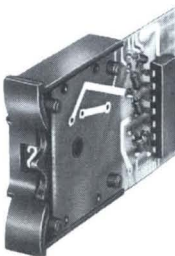
### 050, 178, 179

AVAILABLE TERMINATIONS  
178, 179 MODELS

B, R

AVAILABLE TERMINATIONS  
050 MODELS

A, N



### COUNTER/TIMER DECADE

When the BCD of the counter is equal to the BCD equivalent of the decimal number displayed by the switch, an "Equal" signal at the common of the switch is generated. Blocking diodes are connected between the counter's BCD output and the switch's coded input to assure proper decoding. The "Equal" output has provisions for a "Pull-up" (R<sub>p</sub>) resistor for cascading purposes. Carry out, count input, reset, 9's preset, equal output, in addition to power inputs are available at the P.C. board terminals.

### APPLICATION

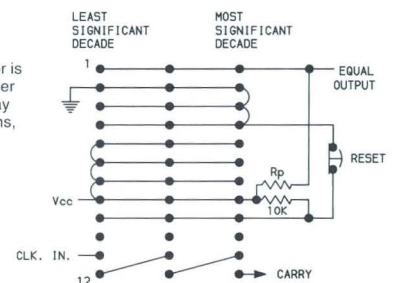
Pulses applied at the count input of the LSD switch are counted and converted to BCD; the "BCD 8" output of the LSD, and so forth; when the accumulated count in the decade counter equals the number displayed by the switches, an "Equal" signal is generated at the "Equal" output.

| FUNCTION CODE | LOGIC TYPE         | I.C. TYPE | OPERATING VOLTAGE | R <sub>p</sub> |
|---------------|--------------------|-----------|-------------------|----------------|
| 050           | Without Components |           |                   |                |
| 178           | TTL                | 7490A     | 5VDC+/-5%         | 510 ohms       |
| 179           | CMOS               | 74C90     | 3 to 15 V DC      | 47K ohms       |

Other I.C.'s available, consult factory.

| TERM NO. | FUNCTION         |
|----------|------------------|
| 1        | EQUAL OUTPUT OUT |
| 2        | GROUND           |
| 3        | GROUND           |
| 4        | 9 COMPLEMENT     |
| 5        | V <sub>cc</sub>  |
| 6        | V <sub>cc</sub>  |
| 7        | V <sub>cc</sub>  |
| 8        | V <sub>cc</sub>  |
| 9        | RESET            |
| 10       | N. O.            |
| 11       | CLOCK INPUT IN   |
| 12       | CLOCK OUTPUT OUT |

Only one "Pull-up" (R<sub>p</sub>) resistor is recommended per system, other resistors of different values may be used for specific applications, consult factory.



Typical three decade connection (rear view). For typical application, C&K suggests terminal #4 be grounded.



## FUNCTION CODE

For terminal location diagram, see Fig. 1, page F-29.

**180, 181, 182, 183, 184, 185, 187**

### DIGITAL COMPARATOR

AVAILABLE TERMINATIONS  
180 THRU 185 MODELS

B, R

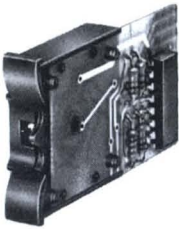
AVAILABLE TERMINATIONS  
187 MODELS

A, N

These switches have a BCD decade comparator. The switch converts the decimal number displayed by the switch into a BCD (1,2,4,8) format which is presented as Word "B" to the comparator IC. Word "A" is presented at the P.C. board terminals in addition to the "High", "Equal" and "Low" carry inputs. "High", "Equal" and "Low" carry outputs are also available at the P.C. board to enable cascading of more than one decade to form multidecade digital comparators. "Pull-up" resistors are provided at the switch end for greater noise immunity.

### APPLICATION

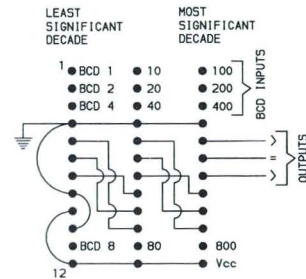
1. Unused input should be connected to ground.
2. Unused decades: BCD inputs should be connected to ground and corresponding switch set to zero.
3. Unused polarity inputs: (+) is Low and (-) is High. If it is not to be used, connect the (+) input to  $V_{cc}$  through 1K ohm resistor and set switch on "-"; if the switch is to be placed on "+", ground the (+) input.



| FUNCTION CODE | LOGIC TYPE         | I.C. TYPE | NO. OF POSITIONS | WHEEL MARKING | OPERATING VOLTAGE |
|---------------|--------------------|-----------|------------------|---------------|-------------------|
| 180           | TTL                | 7485      | 10               | 0 - 9         | 5 V dc ± 5%       |
| 181           | CMOS               | 4063B     | 10               | 0 - 9         | 6 to 15 V dc      |
| 182           | TTL                | 7485      | 2                | 0/1 stopped   | 5 V dc ± 5%       |
| 183           | CMOS               | 4063B     | 2                | 0/1 stopped   | 6 to 15 V dc      |
| 184           | TTL                | 7485      | 2                | +/- stopped   | 5 V dc ± 5%       |
| 185           | CMOS               | 4063B     | 2                | +/- stopped   | 6 to 15 V dc      |
| 187           | Without Components |           |                  |               |                   |

Other I.C.'s available, consult factory.

| TERM NO. | FUNCTION     |     |
|----------|--------------|-----|
| 1        | BCD 1        | IN  |
| 2        | BCD 2        | IN  |
| 3        | BCD 4        | IN  |
| 4        | GROUND       |     |
| 5        | LESS THAN    | OUT |
| 6        | EQUAL TO     | OUT |
| 7        | GREATER THAN | OUT |
| 8        | GREATER THAN | IN  |
| 9        | EQUAL TO     | IN  |
| 10       | LESS THAN    | IN  |
| 11       | BCD 4        | IN  |
| 12       | Vcc          |     |



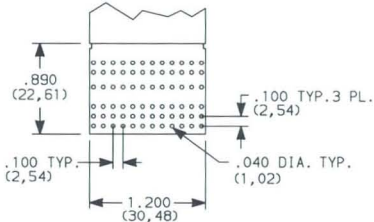
Typical three decade connection (rear view).



## TERMINATIONS

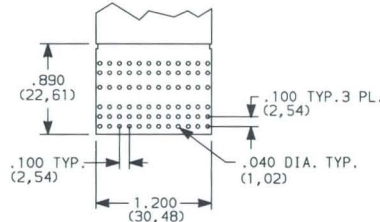
NOTE: All terminal holes shown may not be present for all function codes, consult factory.

**A** EXTENDED BOARD W/ PROVISIONS FOR COMPONENTS

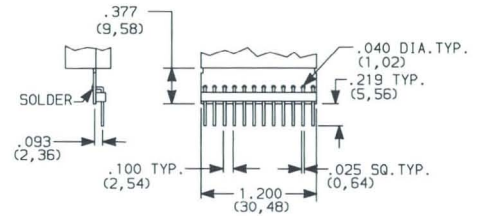


Signal traces cut except for common(s).

**B** EXTENDED BOARD W/ COMPONENTS MOUNTED

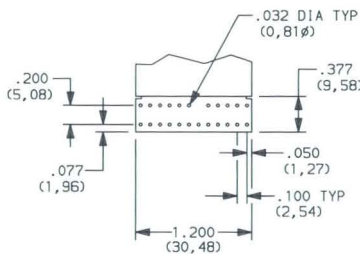


**C** TYPE S W/ SOLDER PINS (HEADER)



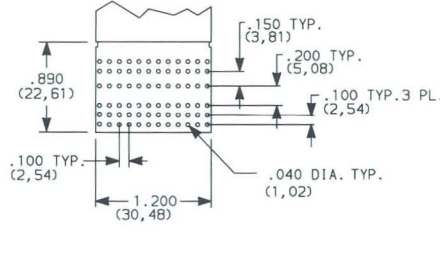
P.C. BOARD 1/32" (0,79) THK

**D** FOR 013 CODE ONLY



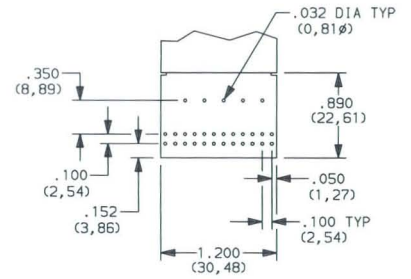
For terminal locations, consult factory.

**E** EXTENDED BOARD



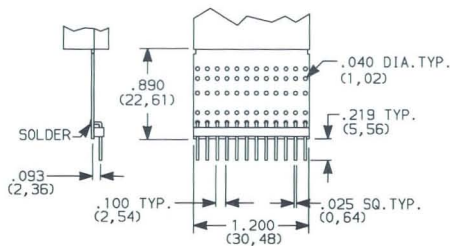
P.C. BOARD 1/32" (0,79) THK

**F** FOR 052, 055 CODES ONLY



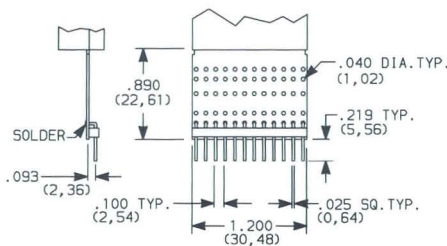
For terminal locations, consult factory.

**N** TYPE A W/ SOLDER PINS (HEADER) AND PROVISION FOR COMPONENTS



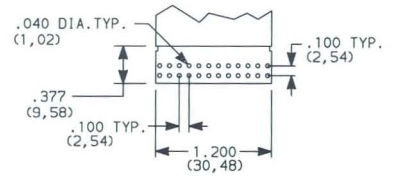
Signal traces cut except for common(s).

**R** TYPE B W/ SOLDER PINS (HEADER) AND COMPONENTS MOUNTED

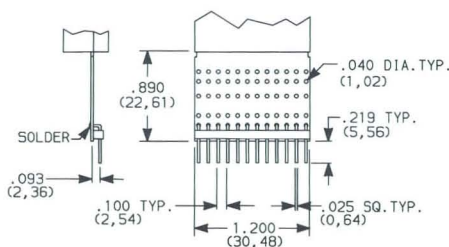


P.C. BOARD 1/32" (0,79) THK

**S** (STD.)



**T** TYPE E W/ SOLDER PINS (HEADER)



**9** ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS. ALSO SPECIFIED W/ FUNCTION CODES 091 AND 092.

SPECIFY ON CONFIGURATION FORM, PAGE F-31 AND CONSULT FACTORY

### TERMINAL LOCATION NUMBERS



Fig. 1

See function codes, pages F-23 thru F-28, for signal locations.



## COLOR/MARKING/STOPS/SEAL

- 0** (STD.) Matte black housing; Gloss black wheel with white characters; No stops.
- J** Dust lens (protects the character face of the wheel from abrasion and dust).
- 9** Special colors, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-31 and consult factory.

## NUMBER OF SECTIONS

- 0** Switch section only, no assembly (Blank bodies are considered sections. Endplates are not sections).
- 1-8** Number of switch sections in assembly, includes endplates.
- 9** More than 8 switch sections, specify on CONFIGURATION FORM, page F-31 and consult factory.

**NOTE:** Endplates and blank sections available separately, see catalog section H.

### HOW TO ORDER

All available SF/SR SERIES THUMBWHEEL SWITCH options are listed on page F-21, and are described on pages F-22 thru F-30. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-31, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

### SPECIFICATIONS

CONTACT RATING:  
 CARRY: 2 AMPS continuous  
 SWITCH: 50 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC or 120 V AC.

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

INSULATION RESISTANCE: 10<sup>9</sup> ohms min. (dry).

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: -40°C to 70°C.

### MATERIALS

SWITCH BODY: ABS plastic (UL 94V-0).

THUMBWHEEL: ABS plastic (UL 94V-0).

ROTOR CONTACTS: Precious metal on copper alloy.

STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO.

C&K PART NUMBER

Form fields for C&K Catalog Part No. (starting with 'S') and C&K Part Number.

C&K PART NUMBER

Vertical form field for C&K Part Number.

COMPANY NAME \_\_\_\_\_ REVISION:

ADDRESS \_\_\_\_\_ TEL.# \_\_\_\_\_

CUSTOMER CONTACT \_\_\_\_\_ DATE \_\_\_\_\_

ORIGINATED BY \_\_\_\_\_ SALES REP. \_\_\_\_\_

DETAILS:

| THUMBWHEEL SECTIONS | NO. OF SEC. | FUNCTION CODE — TERMINATIONS — COLOR/MARKING/STOPS/SEAL<br><small>ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-24).</small> | DESCRIBE IN APPROPRIATE ROW |
|---------------------|-------------|---|-----------------------------|
|                     | 1           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 2           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 3           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 4           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 5           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 6           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 7           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 8           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 9           | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 10          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 11          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 12          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 13          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 14          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 15          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |
|                     | 16          | S - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> -   |                             |

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET \_\_\_\_\_ OF \_\_\_\_\_



Easy Build-A-Switch:

Below is a complete listing of available options for 3 SERIES THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are described on pages F-33 thru F-43. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-43. Use CONFIGURATION FORM, page F-44, for special instructions. Hardware is available separately, see catalog section H.

| SERIES | NUMBER OF SECTIONS | FUNCTION CODE  | MOUNTING STYLE | TERMINATIONS | COLOR/MARKING/STOPS     | SEALS    | ILLUMINATION |
|--------|--------------------|----------------|----------------|--------------|-------------------------|----------|--------------|
| 3      | One                | Decimal 1 Pole | Front Mount    |              | Black w/ white Markings | Unsealed | None         |

| SERIES | NUMBER OF SECTIONS | FUNCTION CODE | MOUNTING STYLE | TERMINATIONS | COLOR/MARKING/STOPS | SEALS | ILLUMINATION |
|--------|--------------------|---------------|----------------|--------------|---------------------|-------|--------------|
| 3      | 0                  | 11 42         | 00             | 0            | 0                   | 0     | (NONE)       |
|        | 1                  | 12 45         | 03             | 1            | 1                   | 1     | 3            |
|        | 2                  | 13 51         | 04             | 3            | 9                   | 2     | 5            |
|        | 3                  | 14 52         | 09             | 4            |                     | 3     | 6            |
|        | 4                  | 16 58         | 10             | 5            |                     | 9     |              |
|        | 5                  | 21 59         | 14             | 6            |                     |       |              |
|        | 6                  | 22 61         | 19             | 7            |                     |       |              |
|        | 7                  | 23 70         | 20             | 9            |                     |       |              |
|        | 8                  | 24 71         | 24             | A            |                     |       |              |
|        | 9                  | 26 72         | 29             | B            |                     |       |              |
|        |                    | 27 81         | 30             | C            |                     |       |              |
|        |                    | 28 83         | 33             | D            |                     |       |              |
|        |                    | 29 91         | 34             | E            |                     |       |              |
|        |                    | 31 92         |                | F            |                     |       |              |
|        |                    | 32 99         |                | G            |                     |       |              |
|        |                    | 33            |                | H            |                     |       |              |
|        |                    | 34            |                | J            |                     |       |              |
|        |                    | 35            |                | M            |                     |       |              |
|        |                    | 41            |                | U            |                     |       |              |

Special switch no. assigned by C&K.



Configuration form required, see page F-44.

## SERIES

**3** Series thumbwheel switches

## NUMBER OF SECTIONS

**0** Switch section only, no assembly (Blank bodies are considered sections. Endplates are not sections). Must be ordered with 09, 19, mounting style options, see pages F-37 and F-38.

**1-8** Number of switch sections in assembly, includes endplates.

**9** More than 8 switch sections, specify on CONFIGURATION FORM, page F-44 and consult factory.

**NOTE:** Endplates and blank sections available separately, see catalog section H.

## FUNCTION CODE

For terminal location diagram, see page F-42.

**11** DECIMAL — 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |   |    |    |    |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | C  |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    | ●  |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    | ●  |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    | ●  |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    | ●  |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    | ●  |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    | ●  |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    | ●  |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    | ●  |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    | ●  |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  | ●  |
|                       | 2                                    | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |   |    |    |    |

See fig.1, page F-42.

**12** DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

1, 4, 5, A, D, E

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL C |   |   |   |   |   |   |    |    |    |   |
|-----------------------|--------------------------------------|---|---|---|---|---|---|----|----|----|---|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8  | 9  | C |
| 0                     | ●                                    |   |   |   |   |   |   |    |    |    | ● |
| 1                     |                                      | ● |   |   |   |   |   |    |    |    | ● |
| 2                     |                                      |   | ● |   |   |   |   |    |    |    | ● |
| 3                     |                                      |   |   | ● |   |   |   |    |    |    | ● |
| 4                     |                                      |   |   |   | ● |   |   |    |    |    | ● |
| 5                     |                                      |   |   |   |   | ● |   |    |    |    | ● |
| 6                     |                                      |   |   |   |   |   | ● |    |    |    | ● |
| 7                     |                                      |   |   |   |   |   |   | ●  |    |    | ● |
| 8                     |                                      |   |   |   |   |   |   |    | ●  |    | ● |
| 9                     |                                      |   |   |   |   |   |   |    |    | ●  | ● |
|                       | 2                                    | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 6 |
|                       | TERM. LOCATION                       |   |   |   |   |   |   |    |    |    |   |

See fig.1, page F-42.

**13** DECIMAL — 2 POLE; 10 POSITION

AVAILABLE TERMINATIONS

M, U

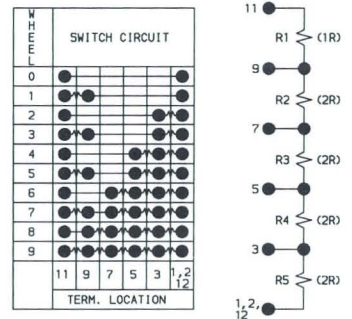
| W<br>H<br>E<br>E<br>L | COMMON A<br>CONN. TO:      | COMMON B<br>CONN. TO: |
|-----------------------|----------------------------|-----------------------|
| 0                     | 0                          | 0                     |
| 1                     | 1                          | 1                     |
| 2                     | 2                          | 2                     |
| 3                     | 3                          | 3                     |
| 4                     | 4                          | 4                     |
| 5                     | 5                          | 5                     |
| 6                     | 6                          | 6                     |
| 7                     | 7                          | 7                     |
| 8                     | 8                          | 8                     |
| 9                     | 9                          | 9                     |
|                       | FOR TERM. LOC. CONSULT C&K |                       |

Special board, request terminal location, mechanical and electrical specifications from factory.

**14** RESISTOR DECADE; 1-2-2-2 CODE (RESISTORS NOT SUPPLIED)

AVAILABLE TERMINATIONS

1, A



See fig.1, page F-42.

## FUNCTION CODE

For terminal location diagram, see page F-42.

**16** DECIMAL—1 POLE; 11 POSITION

**21** BCD 1-2-4-8; 10 POSITION

**22** OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

4, D

| W<br>H<br>E<br>E<br>L | SIGNALS CONNECTED TO COMMON SIGNAL A |   |   |   |   |   |   |   |    |    |    |   |
|-----------------------|--------------------------------------|---|---|---|---|---|---|---|----|----|----|---|
|                       | 0                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | 10 | A |
| 0                     | ●                                    |   |   |   |   |   |   |   |    |    |    | ● |
| 1                     |                                      | ● |   |   |   |   |   |   |    |    |    | ● |
| 2                     |                                      |   | ● |   |   |   |   |   |    |    |    | ● |
| 3                     |                                      |   |   | ● |   |   |   |   |    |    |    | ● |
| 4                     |                                      |   |   |   | ● |   |   |   |    |    |    | ● |
| 5                     |                                      |   |   |   |   | ● |   |   |    |    |    | ● |
| 6                     |                                      |   |   |   |   |   | ● |   |    |    |    | ● |
| 7                     |                                      |   |   |   |   |   |   | ● |    |    |    | ● |
| 8                     |                                      |   |   |   |   |   |   |   | ●  |    |    | ● |
| 9                     |                                      |   |   |   |   |   |   |   |    | ●  |    | ● |
| 10                    |                                      |   |   |   |   |   |   |   |    |    | ●  | ● |
| 11                    |                                      |   |   |   |   |   |   |   |    |    |    | ● |
| 12                    |                                      |   |   |   |   |   |   |   |    |    |    | ● |
| 13                    |                                      |   |   |   |   |   |   |   |    |    |    | ● |
| TERM. LOCATION        |                                      |   |   |   |   |   |   |   |    |    |    |   |
|                       | 1                                    | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 6 |

See fig.1, page F-42.

AVAILABLE TERMINATIONS

0, 1, 3, A

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |    |   |
|-----------------------|-------------------------------|---|---|----|---|
|                       | 1                             | 2 | 4 | 8  | C |
| 0                     |                               |   |   |    | ● |
| 1                     | ●                             |   |   |    | ● |
| 2                     |                               | ● |   |    | ● |
| 3                     | ●                             | ● |   |    | ● |
| 4                     |                               |   | ● |    | ● |
| 5                     | ●                             |   |   | ●  | ● |
| 6                     | ●                             | ● |   |    | ● |
| 7                     | ●                             | ● |   |    | ● |
| 8                     |                               |   |   | ●  | ● |
| 9                     | ●                             |   |   |    | ● |
| 10                    |                               |   |   |    | ● |
| 11                    |                               |   |   |    | ● |
| 12                    |                               |   |   |    | ● |
| 13                    |                               |   |   |    | ● |
| TERM. LOCATION        |                               |   |   |    |   |
|                       | 3                             | 5 | 7 | 11 | 9 |

See fig.1, page F-42.

**23** COMPLEMENT OF BCD 1-2-4-8; 10 POSITION

**26** COMPLEMENT OF BCD 1-2-4-8; 10 POSITION

**27** BCD 1-2-4-8; 10 POSITION

**24** COMPLEMENT OF OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, A

AVAILABLE TERMINATIONS

6, B

AVAILABLE TERMINATIONS

6, B

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |    |   |   |
|-----------------------|-------------------------------|---|----|---|---|
|                       | 1                             | 2 | 4  | 8 | C |
| 0                     | ●                             | ● | ●  | ● | ● |
| 1                     | ●                             | ● | ●  | ● | ● |
| 2                     | ●                             | ● | ●  | ● | ● |
| 3                     | ●                             | ● | ●  | ● | ● |
| 4                     | ●                             | ● | ●  | ● | ● |
| 5                     | ●                             | ● | ●  | ● | ● |
| 6                     | ●                             | ● | ●  | ● | ● |
| 7                     | ●                             | ● | ●  | ● | ● |
| 8                     | ●                             | ● | ●  | ● | ● |
| 9                     | ●                             | ● | ●  | ● | ● |
| 10                    | ●                             | ● | ●  | ● | ● |
| 11                    | ●                             | ● | ●  | ● | ● |
| 12                    | ●                             | ● | ●  | ● | ● |
| 13                    | ●                             | ● | ●  | ● | ● |
| TERM. LOCATION        |                               |   |    |   |   |
|                       | 3                             | 9 | 11 | 5 | 7 |

See fig.1, page F-42.

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 | C |
| 0                     | ●                             | ● | ● | ● | ● |
| 1                     | ●                             | ● | ● | ● | ● |
| 2                     | ●                             | ● | ● | ● | ● |
| 3                     | ●                             | ● | ● | ● | ● |
| 4                     | ●                             | ● | ● | ● | ● |
| 5                     | ●                             | ● | ● | ● | ● |
| 6                     | ●                             | ● | ● | ● | ● |
| 7                     | ●                             | ● | ● | ● | ● |
| 8                     | ●                             | ● | ● | ● | ● |
| 9                     | ●                             | ● | ● | ● | ● |
| 10                    | ●                             | ● | ● | ● | ● |
| 11                    | ●                             | ● | ● | ● | ● |
| 12                    | ●                             | ● | ● | ● | ● |
| 13                    | ●                             | ● | ● | ● | ● |
| TERM. LOCATION        |                               |   |   |   |   |
|                       | 4                             | 5 | 1 | 2 | 3 |

See fig.2, page F-42.

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 | C |
| 0                     |                               |   |   |   | ● |
| 1                     | ●                             |   |   |   | ● |
| 2                     |                               | ● |   |   | ● |
| 3                     | ●                             | ● |   |   | ● |
| 4                     |                               |   | ● |   | ● |
| 5                     | ●                             |   |   | ● | ● |
| 6                     | ●                             | ● |   |   | ● |
| 7                     | ●                             | ● |   |   | ● |
| 8                     |                               |   |   | ● | ● |
| 9                     | ●                             |   |   |   | ● |
| 10                    |                               |   |   |   | ● |
| 11                    |                               |   |   |   | ● |
| 12                    |                               |   |   |   | ● |
| 13                    |                               |   |   |   | ● |
| TERM. LOCATION        |                               |   |   |   |   |
|                       | 4                             | 5 | 1 | 2 | 3 |

See fig.2, page F-42.

**28** COMPLEMENT OF 9'S COMPLEMENT; 10 POSITION

**29** BCD 1-2-4-8; 10 POSITION

**31** BCD 1-2-4-8; 10 POSITION

**32** OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

7, C

AVAILABLE TERMINATIONS

6, B

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 | C |
| 0                     | ●                             | ● | ● | ● | ● |
| 1                     | ●                             | ● | ● | ● | ● |
| 2                     | ●                             | ● | ● | ● | ● |
| 3                     | ●                             | ● | ● | ● | ● |
| 4                     | ●                             | ● | ● | ● | ● |
| 5                     | ●                             | ● | ● | ● | ● |
| 6                     | ●                             | ● | ● | ● | ● |
| 7                     | ●                             | ● | ● | ● | ● |
| 8                     | ●                             | ● | ● | ● | ● |
| 9                     | ●                             | ● | ● | ● | ● |
| 10                    | ●                             | ● | ● | ● | ● |
| 11                    | ●                             | ● | ● | ● | ● |
| 12                    | ●                             | ● | ● | ● | ● |
| 13                    | ●                             | ● | ● | ● | ● |
| TERM. LOCATION        |                               |   |   |   |   |
|                       | 2                             | 1 | 5 | 4 | 3 |

See fig.2, page F-42.

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |
|-----------------------|-------------------------------|---|---|---|---|
|                       | 1                             | 2 | 4 | 8 | C |
| 0                     |                               |   |   |   | ● |
| 1                     | ●                             |   |   |   | ● |
| 2                     |                               | ● |   |   | ● |
| 3                     | ●                             | ● |   |   | ● |
| 4                     |                               |   | ● |   | ● |
| 5                     | ●                             |   |   | ● | ● |
| 6                     | ●                             | ● |   |   | ● |
| 7                     | ●                             | ● |   |   | ● |
| 8                     |                               |   |   | ● | ● |
| 9                     | ●                             |   |   |   | ● |
| 10                    |                               |   |   |   | ● |
| 11                    |                               |   |   |   | ● |
| 12                    |                               |   |   |   | ● |
| 13                    |                               |   |   |   | ● |
| TERM. LOCATION        |                               |   |   |   |   |
|                       | 2                             | 3 | 4 | 5 | 1 |

See fig.2, page F-42.

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |    |   |   |
|-----------------------|-------------------------------|---|----|---|---|
|                       | 1                             | 2 | 4  | 8 | C |
| 0                     |                               |   |    |   | ● |
| 1                     | ●                             |   |    |   | ● |
| 2                     |                               | ● |    |   | ● |
| 3                     | ●                             | ● |    |   | ● |
| 4                     |                               |   | ●  |   | ● |
| 5                     | ●                             |   |    | ● | ● |
| 6                     | ●                             | ● |    |   | ● |
| 7                     | ●                             | ● |    |   | ● |
| 8                     |                               |   |    | ● | ● |
| 9                     | ●                             |   |    |   | ● |
| 10                    |                               |   |    |   | ● |
| 11                    |                               |   |    |   | ● |
| 12                    |                               |   |    |   | ● |
| 13                    |                               |   |    |   | ● |
| TERM. LOCATION        |                               |   |    |   |   |
|                       | 2                             | 3 | 11 | 9 | 8 |

See fig.1, page F-42.

## FUNCTION CODE

For terminal location diagram, see page F-42.

- 33** COMPLEMENT OF BCD 1-2-4-8; 10 POSITION
- 34** COMPLEMENT OF OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

- 35** BCD 1-2-4-8 W/ SEPARATE COMMON TO NOT TRUE BITS, 10 POSITION

- 41** BCD 1-2-4-8 W/ COMPLEMENT, 10 POSITION
- 42** OCTAL 1-2-4 W/ COMPLEMENT, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

1, 4, 5, A, D, E

| W<br>H<br>M<br>L | SIGNALS CONN. TO COMM. SIG. C |   |    |   |
|------------------|-------------------------------|---|----|---|
|                  | 1                             | 2 | 4  | 8 |
| 0                | ●                             | ● | ●  | ● |
| 1                | ●                             | ● | ●  | ● |
| 2                | ●                             | ● | ●  | ● |
| 3                | ●                             | ● | ●  | ● |
| 4                | ●                             | ● | ●  | ● |
| 5                | ●                             | ● | ●  | ● |
| 6                | ●                             | ● | ●  | ● |
| 7                | ●                             | ● | ●  | ● |
| 8                | ●                             | ● | ●  | ● |
| 9                | ●                             | ● | ●  | ● |
|                  | 2                             | 3 | 11 | 9 |
|                  | TERM. LOCATION                |   |    |   |

See fig. 1, page F-42.

AVAILABLE TERMINATIONS

0, 1, 3, A

| W<br>H<br>M<br>L | SIGNALS CONN. TO COMMON SIGNALS |   |   |   |    |
|------------------|---------------------------------|---|---|---|----|
|                  | 1                               | 2 | 4 | 8 | X  |
| 0                | ○                               | ○ | ○ | ○ | ○  |
| 1                | ○                               | ○ | ○ | ○ | ○  |
| 2                | ○                               | ○ | ○ | ○ | ○  |
| 3                | ○                               | ○ | ○ | ○ | ○  |
| 4                | ○                               | ○ | ○ | ○ | ○  |
| 5                | ○                               | ○ | ○ | ○ | ○  |
| 6                | ○                               | ○ | ○ | ○ | ○  |
| 7                | ○                               | ○ | ○ | ○ | ○  |
| 8                | ○                               | ○ | ○ | ○ | ○  |
| 9                | ○                               | ○ | ○ | ○ | ○  |
|                  | 8                               | 6 | 4 | 2 | 12 |
|                  | TERM. LOCATION                  |   |   |   |    |

See fig. 1, page F-42.

AVAILABLE TERMINATIONS

0, 1, 3, A

| W<br>H<br>M<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |   |   |   |   |
|------------------|-------------------------------|---|---|---|---|---|---|---|
|                  | 1                             | 2 | 4 | 8 | T | Z | 4 | 8 |
| 0                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 1                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 2                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 3                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 4                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 5                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 6                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 7                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 8                | ●                             | ● | ● | ● | ● | ● | ● | ● |
| 9                | ●                             | ● | ● | ● | ● | ● | ● | ● |
|                  | 10                            | 9 | 8 | 7 | 3 | 4 | 5 | 6 |
|                  | TERM. LOCATION                |   |   |   |   |   |   |   |

See fig. 1, page F-42.

- 45** BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0,3

| W<br>H<br>M<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |
|------------------|-------------------------------|---|---|---|
|                  | 1                             | 2 | 4 | 8 |
| 0                | ●                             | ● | ● | ● |
| 1                | ●                             | ● | ● | ● |
| 2                | ●                             | ● | ● | ● |
| 3                | ●                             | ● | ● | ● |
| 4                | ●                             | ● | ● | ● |
| 5                | ●                             | ● | ● | ● |
| 6                | ●                             | ● | ● | ● |
| 7                | ●                             | ● | ● | ● |
| 8                | ●                             | ● | ● | ● |
| 9                | ●                             | ● | ● | ● |
|                  | 5                             | 6 | 7 | 8 |
|                  | TERM. LOCATION                |   |   |   |

See fig. 1, page F-42.

- 51** BCD 1-2-4-8 W/ COMPLEMENT, ONE COMMON, 10 POSITION

- 52** OCTAL 1-2-4 W/ COMPLEMENT, ONE COMMON, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

| W<br>H<br>M<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |    |   |   |   |
|------------------|-------------------------------|---|---|---|----|---|---|---|
|                  | 1                             | 2 | 4 | 8 | T  | Z | 4 | 8 |
| 0                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 1                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 2                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 3                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 4                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 5                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 6                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 7                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 8                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
| 9                | ●                             | ● | ● | ● | ●  | ● | ● | ● |
|                  | 5                             | 4 | 3 | 2 | 10 | 9 | 8 | 7 |
|                  | TERM. LOCATION                |   |   |   |    |   |   |   |

See fig. 1, page F-42.

- 58** SEVEN SEGMENT DECODER W/ BLANK AND BCD OUTPUT (TTL) SPECIAL BOARD, I.C. NOT SUPPLIED, CONSULT FACTORY

AVAILABLE TERMINATIONS

F, H

| W<br>H<br>M<br>L | SIGNALS CONNECT TO COMMON GROUND   |   |   |   |   |   |   |         |
|------------------|------------------------------------|---|---|---|---|---|---|---------|
|                  | a                                  | b | c | d | e | f | g | 8nd/Vcc |
| 0                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 1                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 2                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 3                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 4                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 5                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 6                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 7                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 8                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
| 9                | ●                                  | ● | ● | ● | ● | ● | ● | ●       |
|                  | FOR TERMINAL LOCATIONS CONSULT C&K |   |   |   |   |   |   |         |

NOTE: Connections for RBO and RBI supplied.

- 59** SEVEN SEGMENT DECODER (TTL) SPECIAL BOARD, I.C. NOT SUPPLIED, CONSULT FACTORY

AVAILABLE TERMINATIONS

G, J



| W<br>H<br>M<br>L | COMMON (C) CONNECTED TO TERMINAL INDICATED |   |   |   |   |   |   |         |
|------------------|--|---|---|---|---|---|---|---------|
|                  | a  | b | c | d | e | f | g | 8nd/Vcc |
| 0                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 1                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 2                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 3                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 4                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 5                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 6                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 7                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 8                | ●  | ● | ● | ● | ● | ● | ● | ●       |
| 9                | ●  | ● | ● | ● | ● | ● | ● | ●       |
|                  | 6  | 5 | 4 | 3 | 2 | 8 | 7 | 1       |
|                  | TERM. LOCATION                             |   |   |   |   |   |   |         |

See fig. 1, page F-42.

NOTE: IC not supplied, use decoder type 7446/7 or equivalent.

## FUNCTION CODE

For terminal location diagram, see page F-42.

**61** SPDT REPEATING; PLUS (+) AND MINUS (-) ALTERNATING, 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

| W<br>H<br>E<br>E<br>L | SIG. CONN. TO C |   |   |
|-----------------------|-----------------|---|---|
|                       | +               | - | C |
| +                     | ●               |   |   |
| -                     |                 | ● |   |
| +                     | ●               |   |   |
| -                     |                 | ● |   |
| +                     | ●               |   |   |
| -                     |                 | ● |   |
| +                     | ●               |   |   |
| -                     |                 | ● |   |
| +                     | ●               |   |   |
| -                     |                 | ● |   |
| 9                     | 8               | 2 |   |
| TERM. LOCATION        |                 |   |   |

See fig.1, page F-42.

**70** COMPLEMENT OF BINARY CODED HEXADECIMAL W/ PARITY BIT, 16 POSITION

AVAILABLE TERMINATIONS

0, 3

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |    |   |     |
|-----------------------|-------------------------------|---|----|---|-----|
|                       | 1                             | 2 | 4  | 8 | P C |
| 0                     | ●                             | ● | ●  | ● | ●   |
| 1                     |                               | ● | ●  | ● | ●   |
| 2                     | ●                             |   | ●  | ● | ●   |
| 3                     |                               | ● |    | ● | ●   |
| 4                     | ●                             |   | ●  |   | ●   |
| 5                     |                               | ● |    | ● |     |
| 6                     | ●                             |   | ●  |   |     |
| 7                     |                               | ● |    | ● |     |
| 8                     | ●                             |   | ●  |   |     |
| 9                     |                               | ● |    | ● |     |
| A                     | ●                             |   | ●  |   |     |
| B                     |                               | ● |    | ● |     |
| C                     | ●                             |   | ●  |   |     |
| D                     |                               | ● |    | ● |     |
| E                     | ●                             |   | ●  |   |     |
| F                     |                               | ● |    | ● |     |
| 3                     | 5                             | 7 | 11 | 1 | 9   |
| TERM. LOCATION        |                               |   |    |   |     |

See fig.1, page F-42.

**71** BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |    |     |
|-----------------------|-------------------------------|---|----|-----|
|                       | 1                             | 2 | 4  | 8 C |
| 0                     |                               |   |    | ●   |
| 1                     | ●                             |   |    |     |
| 2                     |                               | ● |    |     |
| 3                     | ●                             |   |    |     |
| 4                     |                               | ● |    |     |
| 5                     | ●                             |   |    |     |
| 6                     |                               | ● |    |     |
| 7                     | ●                             |   |    |     |
| 8                     |                               |   |    | ●   |
| 9                     | ●                             |   |    |     |
| A                     |                               | ● |    |     |
| B                     | ●                             |   |    |     |
| C                     |                               | ● |    |     |
| D                     | ●                             |   |    |     |
| E                     |                               | ● |    |     |
| F                     | ●                             |   |    |     |
| 3                     | 5                             | 7 | 11 | 9   |
| TERM. LOCATION        |                               |   |    |     |

See fig.1, page F-42.

**72** BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

6, B

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |   |
|-----------------------|-------------------------------|---|---|---|
|                       | 1                             | 2 | 4 | 8 |
| 0                     |                               |   |   | ● |
| 1                     | ●                             |   |   |   |
| 2                     |                               | ● |   |   |
| 3                     | ●                             |   |   |   |
| 4                     |                               | ● |   |   |
| 5                     | ●                             |   |   |   |
| 6                     |                               | ● |   |   |
| 7                     | ●                             |   |   |   |
| 8                     |                               |   |   | ● |
| 9                     | ●                             |   |   |   |
| A                     |                               | ● |   |   |
| B                     | ●                             |   |   |   |
| C                     |                               | ● |   |   |
| D                     | ●                             |   |   |   |
| E                     |                               | ● |   |   |
| F                     | ●                             |   |   |   |
| 2                     | 3                             | 4 | 5 | 1 |
| TERM. LOCATION        |                               |   |   |   |

See fig.2, page F-42.

**81** BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

6, B

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |     |
|-----------------------|-------------------------------|---|---|-----|
|                       | 1                             | 2 | 4 | 8 C |
| 0                     |                               |   |   | ●   |
| 1                     | ●                             |   |   |     |
| 2                     |                               | ● |   |     |
| 3                     | ●                             |   |   |     |
| 4                     |                               | ● |   |     |
| 5                     | ●                             |   |   |     |
| 6                     |                               | ● |   |     |
| 7                     | ●                             |   |   |     |
| 8                     |                               |   |   | ●   |
| 9                     | ●                             |   |   |     |
| 1                     | 2                             | 3 | 5 | 4   |
| TERM. LOCATION        |                               |   |   |     |

See fig.2, page F-42.

**83** BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

6, B

| W<br>H<br>E<br>E<br>L | SIGNALS CONN. TO COMM. SIG. C |   |   |     |
|-----------------------|-------------------------------|---|---|-----|
|                       | 1                             | 2 | 4 | 8 C |
| 0                     |                               |   |   | ●   |
| 1                     | ●                             |   |   |     |
| 2                     |                               | ● |   |     |
| 3                     | ●                             |   |   |     |
| 4                     |                               | ● |   |     |
| 5                     | ●                             |   |   |     |
| 6                     |                               | ● |   |     |
| 7                     | ●                             |   |   |     |
| 8                     |                               |   |   | ●   |
| 9                     | ●                             |   |   |     |
| A                     |                               | ● |   |     |
| B                     | ●                             |   |   |     |
| C                     |                               | ● |   |     |
| D                     | ●                             |   |   |     |
| E                     |                               | ● |   |     |
| F                     | ●                             |   |   |     |
| 1                     | 2                             | 3 | 5 | 4   |
| TERM. LOCATION        |                               |   |   |     |

See fig.2, page F-42.

**91** BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

**92** BLANK SECTION W/ RIBBED CENTER (INACTIVE)

AVAILABLE TERMINATIONS

9

**99** INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-44 AND CONSULT FACTORY

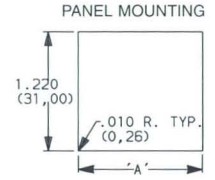
AVAILABLE TERMINATIONS

CONSULT FACTORY.



## MOUNTING STYLE

### TYPE 0 SNAP-IN FRONT MOUNTING

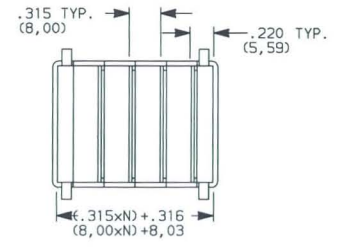
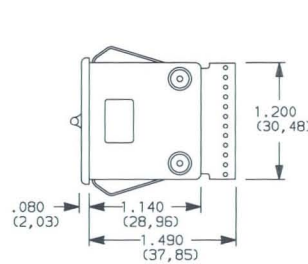
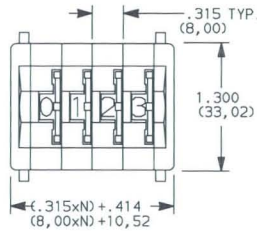


| DIM. A  | MOUNTING STYLE |
|---|----------------|
| $(.315 \times N) + .326$<br>(8,0 x N) + (8,28)  | 00             |
| $(.394 \times N) + .326$<br>(10,0 x N) + (8,28) | 03             |
| $(.500 \times N) + .326$<br>(12,7 x N) + (8,28) | 04             |

N = Number of sections

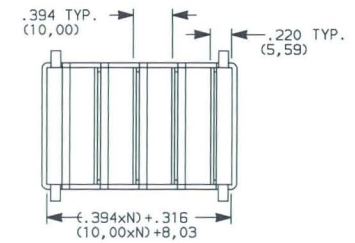
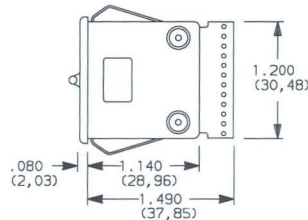
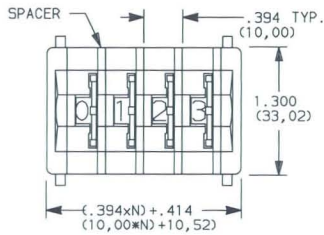
Recommended Panel Thickness:  
.046 - .125 (1,16 - 3,18)

### 00 SWITCH ASSEMBLY W/ ENDPLATES — .315 (8,00) SECTION PITCH



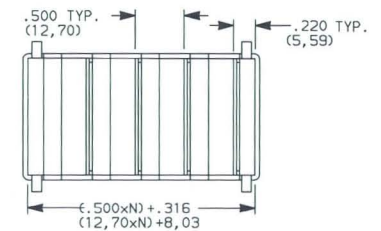
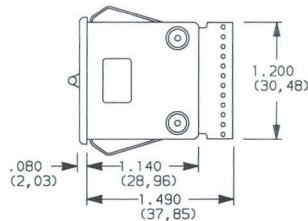
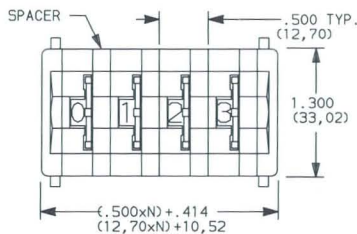
N = Number of sections

### 03 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — 10mm SECTION PITCH



N = Number of sections

### 04 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — .500 (12,70) SECTION PITCH



N = Number of sections

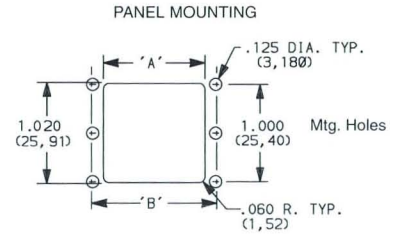
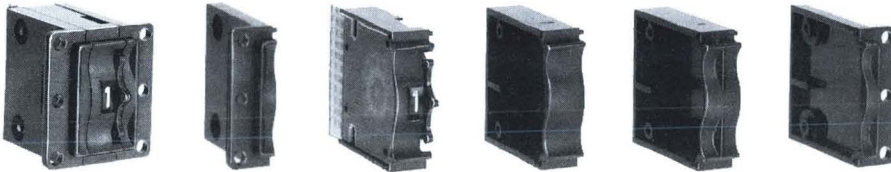
### 09

Switch section only — unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

## MOUNTING STYLE

### TYPE 1 REAR MOUNTING

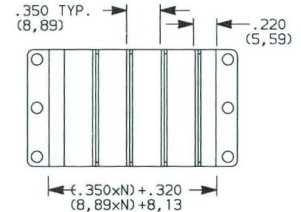
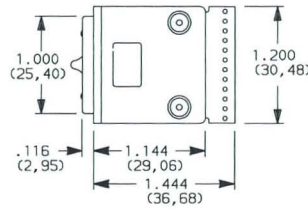
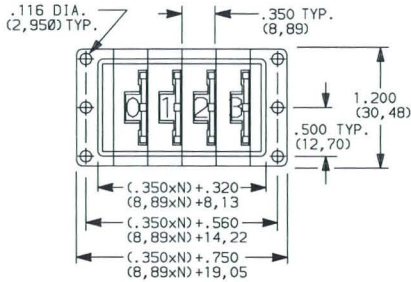


| DIM. A  | DIM. B  | MOUNTING STYLE |
|---|---|----------------|
| $(.350 \times N) + .340$<br>(8,89 x N) + (8,64) | $(.350 \times N) + .560$<br>(8,89) x N) + (14,22) | 10             |
| $(.500 \times N) + .340$<br>(12,7 x N) + (8,64) | $(.500 \times N) + .560$<br>(12,7 x N) + (14,22)  | 14             |

N = Number of sections

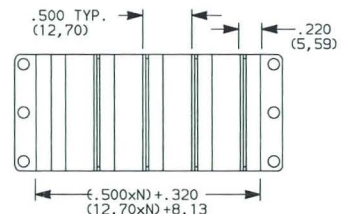
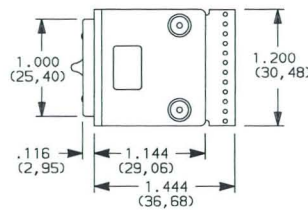
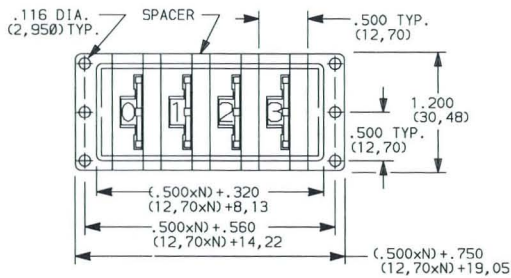
Recommended Panel Thickness:  
.046 - .125 (1,16 - 3,18)

### 10 SWITCH ASSEMBLY W/ ENDPLATES — .350 (8,89) SECTION PITCH



N = Number of sections

### 14 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — .500 (12,70) SECTION PITCH



N = Number of sections

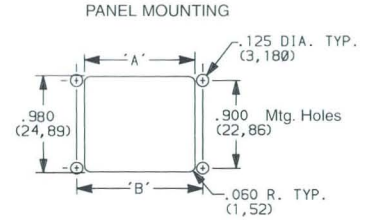
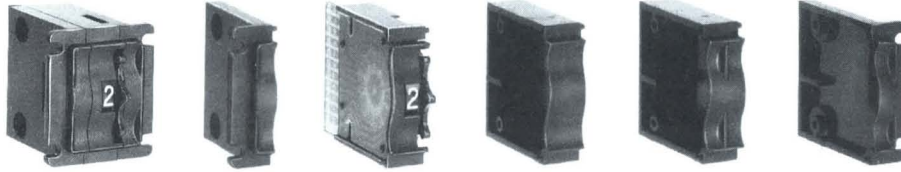
### 19

Switch section only — unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

## MOUNTING STYLE

### TYPE 2 REAR MOUNTING

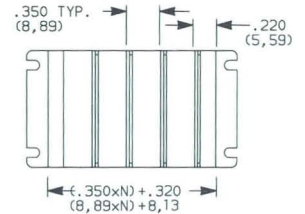
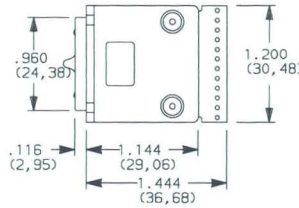
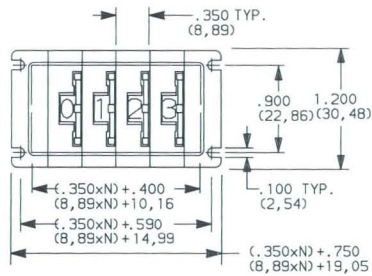


| DIM. A   | DIM. B   | MOUNTING STYLE |
|--|--|----------------|
| $(.350 \times N) + .420$<br>(8.89 x N) + (10.67) | $(.350 \times N) + .590$<br>(8.89 x N) + (14.99) | 20             |
| $(.500 \times N) + .420$<br>(12.7 x N) + (10.67) | $(.500 \times N) + .590$<br>(12.7 x N) + (14.99) | 24             |

N = Number of sections

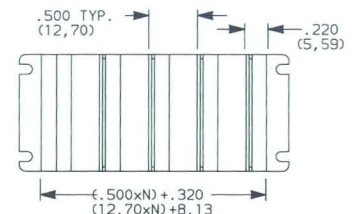
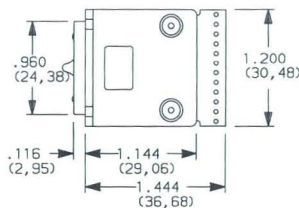
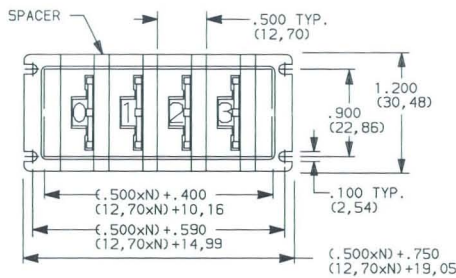
Recommended Panel Thickness:  
.046 - .125 (1,16 - 3,18)

### 20 SWITCH ASSEMBLY W/ ENDPLATES — .350 (8,89) SECTION PITCH



N = Number of sections

### 24 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — .500 (12,70) SECTION PITCH



N = Number of sections

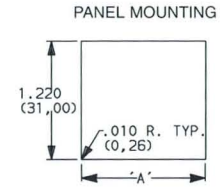
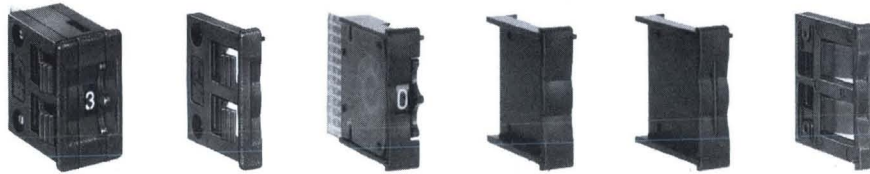
### 29

Switch section only—unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

## MOUNTING STYLE

### TYPE 3 SNAP-IN FRONT MOUNTING

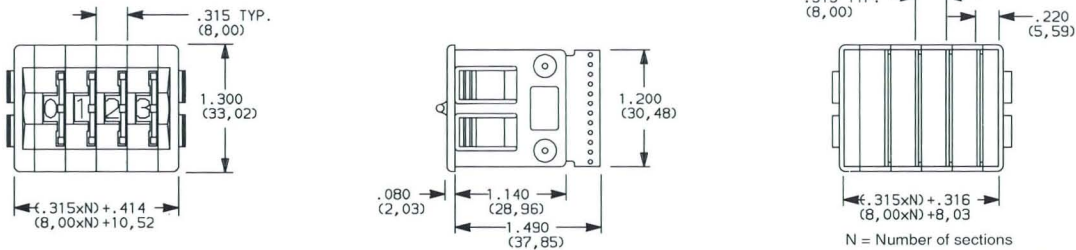


| DIM. A   | MOUNTING STYLE |
|--|----------------|
| $(.315 \times N) + .360$<br>$(8.0 \times N) + (9.14)$  | 30             |
| $(.394 \times N) + .360$<br>$(10.0 \times N) + (9.14)$ | 33             |
| $(.500 \times N) + .360$<br>$(12.7 \times N) + (9.14)$ | 34             |

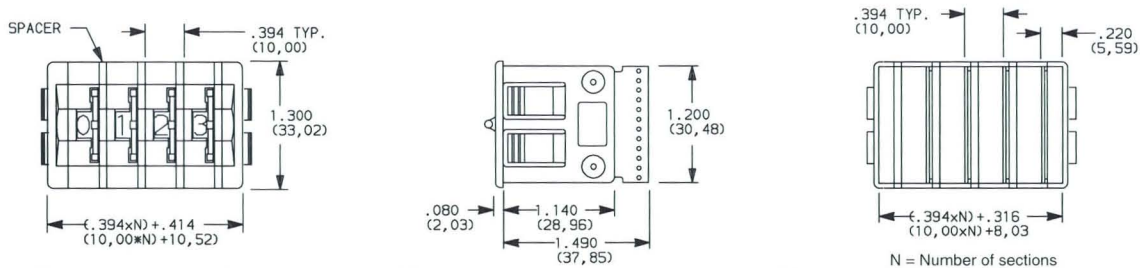
N = Number of sections

Recommended Panel Thickness:  
.046 - .125 (1.16 - 3.18)

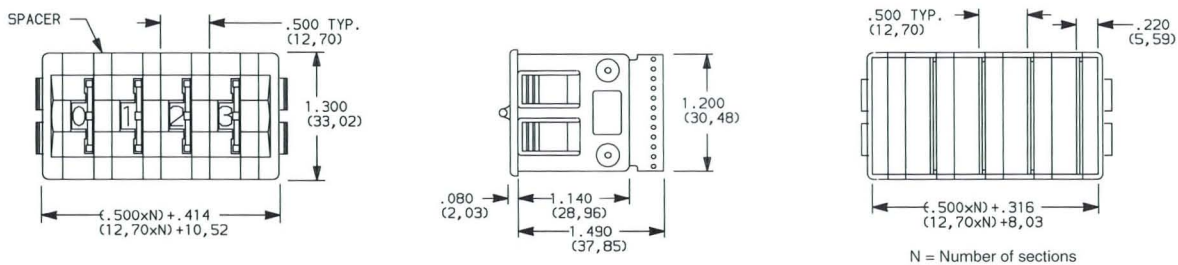
### 30 SWITCH ASSEMBLY W/ ENDPLATES — .315 (8.00) SECTION PITCH



### 33 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — 10mm SECTION PITCH



### 34 SWITCH ASSEMBLY W/ ENDPLATES AND SPACER(S) — .500 (12.70) SECTION PITCH



### 09

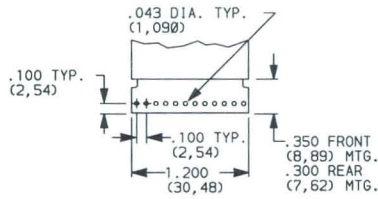
Switch section only — unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

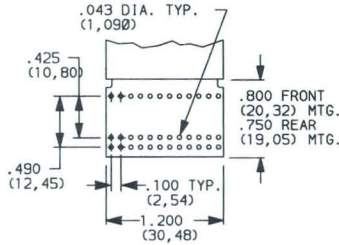
**TERMINATIONS**

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

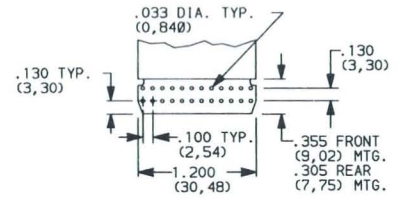
**0** (STD.)



**1**



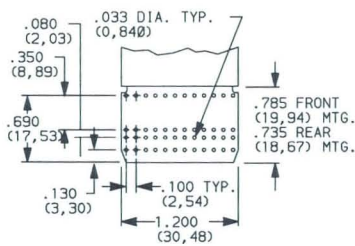
**4**



Signal traces cut except for common(s).

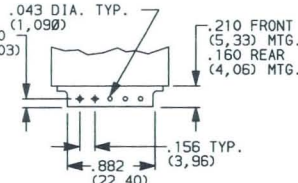
P.C. BOARD 1/32" (0,79) THK.

**5**



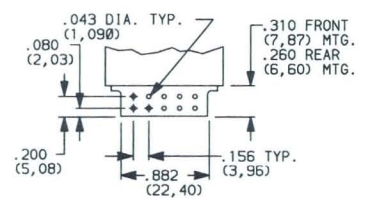
Signal traces cut except for common(s).

**6**

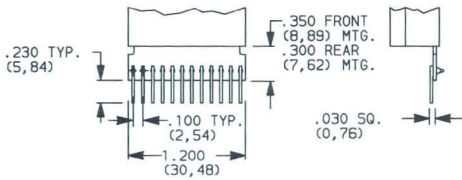


P.C. BOARD 1/32" (0,79) THK.

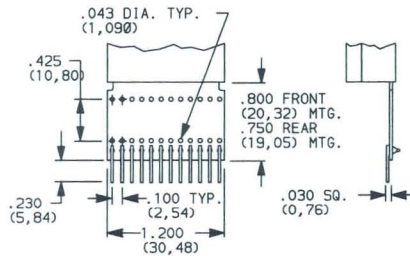
**7**



**3** TYPE 0 WITH SOLDER PINS



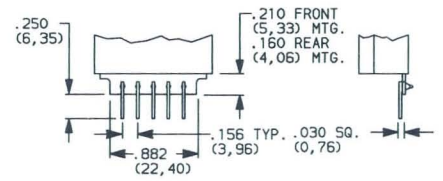
**A** TYPE 1 WITH SOLDER PINS



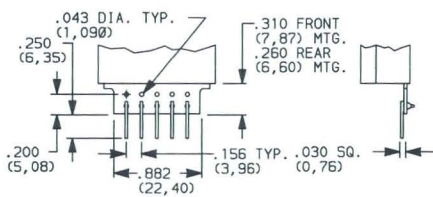
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

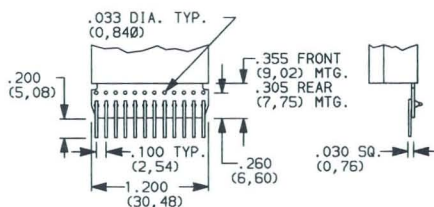
**B** TYPE 6 WITH SOLDER PINS



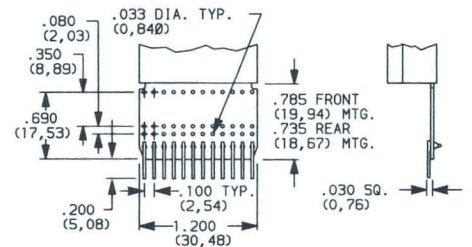
**C** TYPE 7 WITH SOLDER PINS



**D** TYPE 4 WITH SOLDER PINS



**E** TYPE 5 WITH SOLDER PINS



Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

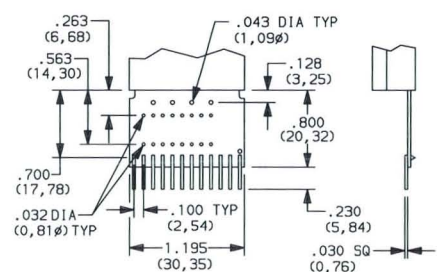
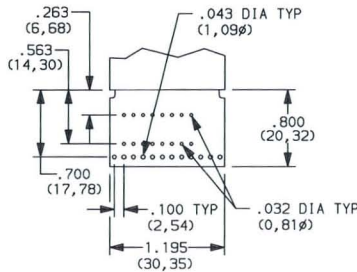
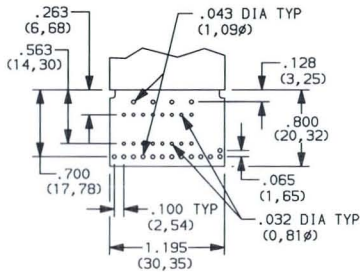
**TERMINATIONS** ■■■■ □□□□

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

**F** FOR 58 CODE ONLY

**G** FOR 59 CODE ONLY

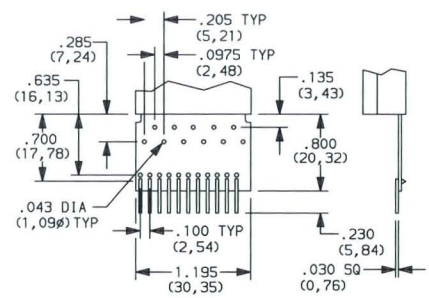
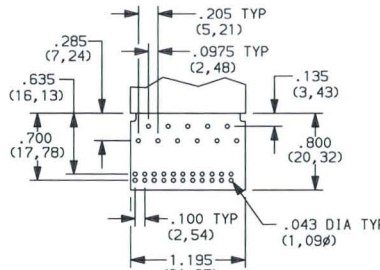
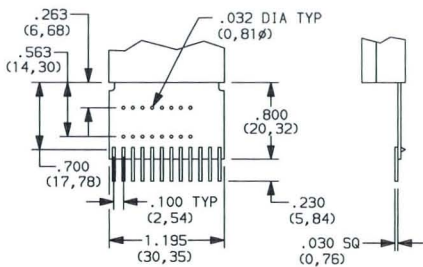
**H** TYPE F WITH SOLDER PINS FOR 58 CODE ONLY



**J** TYPE G WITH SOLDER PINS FOR 59 CODE ONLY

**M** FOR 13 CODE ONLY

**U** TYPE M WITH SOLDER PINS FOR 13 CODE ONLY



**9** ANY COMBINATION OF TERMINATION CONFIGURATIONS OR SPECIAL TERMINATIONS. ALSO USED WITH FUNCTION CODES 91 AND 92.

CONNECTOR

SPECIFY ON CONFIGURATION FORM, PAGE F-44 AND CONSULT FACTORY.

TERMINAL CONNECTOR AVAILABLE FOR TERMINATION OPTIONS 0, 1, 4, 5. SEE CATALOG SECTION H.

**TERMINAL LOCATION NUMBERS**

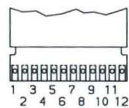


Fig. 1

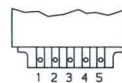


Fig. 2

See function codes, pages F-33 thru F-36, for signal locations.

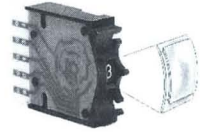
**COLOR/MARKING/STOPS** ■■■■ □□□□

- 0** (STD.) Matte black housing, Gloss black wheel with white characters; No stops.
- 1** Matte gray housing, Gloss black wheel with white characters; No stops.
- 9** Special color or markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-44 and consult factory. AVAILABLE COLORS: MARKING—White, Black. BODY—Black, Gray (matte finish). WHEEL—White, Black, Red, Orange, Yellow, Green, Blue, Brown, Gray (gloss finish).

Stop pins are available separately, see catalog section H.

## SEAL ■■■■■■□□

- 0** (Std.) Unsealed switching contacts.
- 1** Sealed switching contacts. Sealing is by means of an o-ring rotary seal and a cured-in-place elastomer gasket. Switching contact area is protected from moisture, oil, and airborne contaminants.
- 2** Dust lens. Protects the character face of the wheel from abrasion and dirt.
- 3** Sealed switching contacts and dust lens. (Options 1 and 2).
- 9** Sealing variations, section to section within assembly. Specify on CONFIGURATION FORM, page F-44 and consult factory. (Also specify with blank sections, where seal is not applicable).



DUST LENS

## ILLUMINATION ■■■■■■□

- NEW** **(NONE)** (STD.) No illumination
- 3** Red LED
  - 5** Yellow LED
  - 6** Green LED

**NOTE:** Illumination option not available with termination options with solder pins. Internal LED illuminates wheel character for low-light visibility.

### HOW TO ORDER

All available 3 SERIES THUMBWHEEL SWITCH options are listed on page F-32, and are described on pages F-33 thru F-43. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-44, for special instructions.

Endplates, blank sections, spacers, and assembly hardware are available separately, see catalog section H.

### SPECIFICATIONS

**CONTACT RATING:**  
 CARRY: 1 AMP continuous.  
 SWITCH: 100 mA max.

**OPERATING VOLTAGE:** 50 mV to 28 V DC or 120 V AC.

**ELECTRICAL LIFE:** 10<sup>5</sup> detent operations between any two adjacent positions @ 25°C.

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

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

**DIELECTRIC STRENGTH:** 500 V RMS min. @ sea level between common terminal and any output.

**OPERATING TEMPERATURE:** -10°C to 65°C.

### MATERIALS

**SWITCH BODY:** ABS plastic.  
**THUMBWHEEL:** ABS plastic.  
**ROTOR CONTACTS:** Precious metal on copper alloy.  
**STATOR CONTACTS:** Hard gold over nickel over 2 oz copper on epoxy fiberglass.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.





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## SECTION G

### MEMBRANE KEYPADS AND ROTARY SWITCHES

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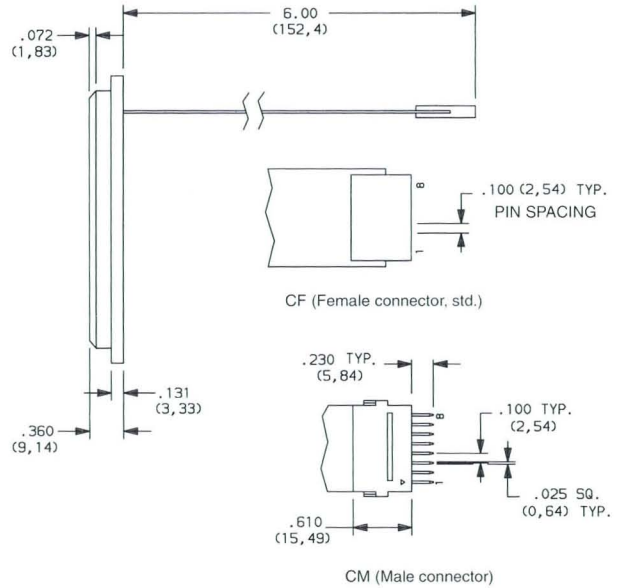
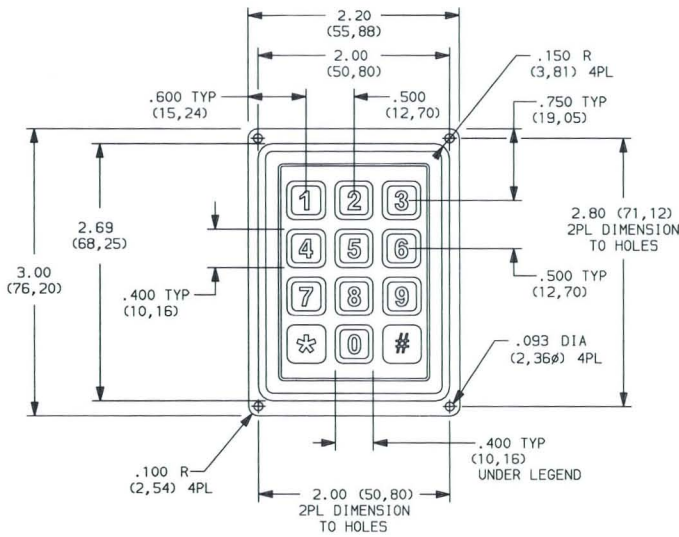
|             |                                 |                     |
|-------------|---------------------------------|---------------------|
| 4000 Series | ..... Membrane Keypads          | ..... G-2 thru G-3  |
| M Series    | ..... Half-Inch Rotary Switches | ..... G-4 thru G-10 |

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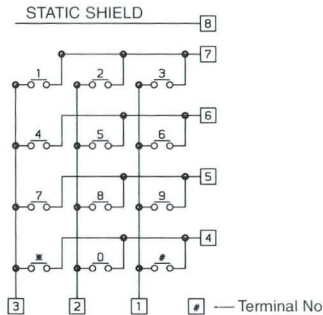


- LONG LIFE-UP TO FIVE MILLION CYCLES
- SEALED SWITCHES—SPLASHPROOF
- GRAPHIC OVERLAY RESISTS CHEMICALS
- CUSTOM DESIGN AND MANUFACTURING CAPABILITY
- BUILT-IN STATIC SHIELD—STANDARD
- 6 IN. FLEX TAIL WITH MALE OR FEMALE CONNECTOR
- DETENT AVAILABLE FOR TACTILE FEEDBACK

4A MODEL (3x4 ARRAY—12 KEYS)



SCHEMATIC

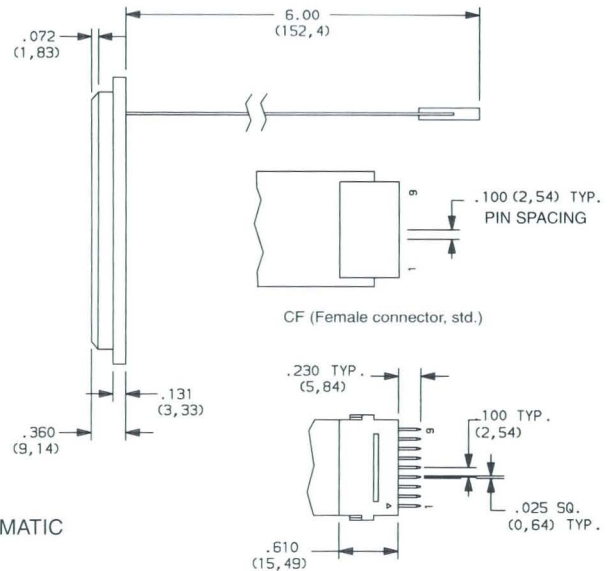
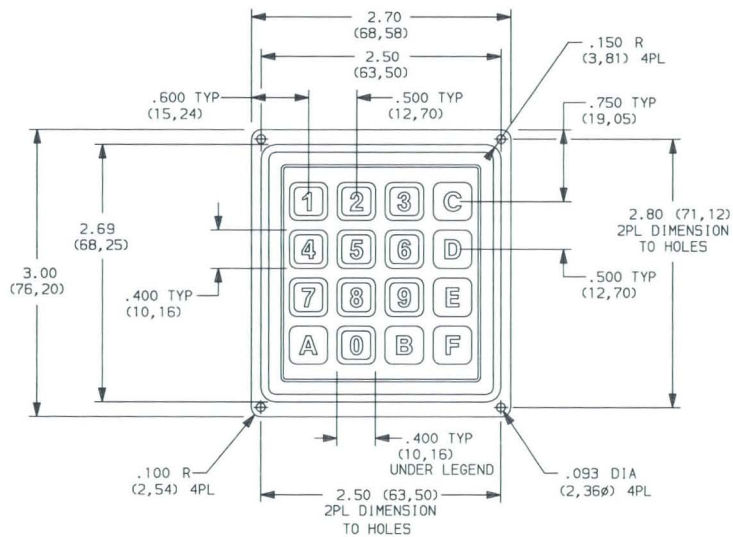


X-Y Matrix output circuit configuration with static shield. Switch function—SPST N.O. Momentary.

| MODEL NO.    | DETENT | CONNECTOR |
|--------------|--------|-----------|
| 4A01T322NCFQ | NO     | FEMALE    |
| 4A01T322NCMQ | NO     | MALE      |
| 4A01T322PCFQ | YES    | FEMALE    |
| 4A01T322PCMQ | YES    | MALE      |

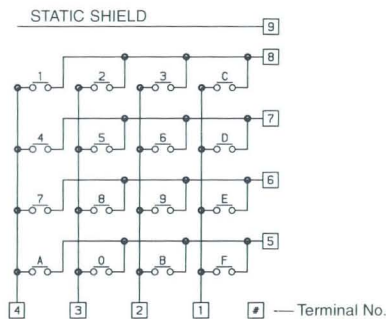
G

### 4B MODEL (4x4 ARRAY—16 KEYS)



### SCHEMATIC

| MODEL NO.    | DETENT | CONNECTOR |
|--------------|--------|-----------|
| 4B01H322NCFQ | NO     | FEMALE    |
| 4B01H322NCMQ | NO     | MALE      |
| 4B01H322PCFQ | YES    | FEMALE    |
| 4B01H322PCMQ | YES    | MALE      |



X-Y Matrix output circuit configuration with static shield. Switch function — SPST N.O. Momentary.

### HOW TO ORDER

Complete part numbers for 4000 SERIES MEMBRANE KEYPADS are shown above and on page G-2. Custom design and manufacturing capability, see inside front cover and consult factory.

### SPECIFICATIONS

- CONTACT RATING: 100 mA max. @ 30 V DC max., 0.5 W max.
- ELECTRICAL LIFE: 2,000,000 cycles (with detent); 5,000,000 cycles (without detent).
- CONTACT RESISTANCE: 50 ohms typ.
- INSULATION RESISTANCE:  $5 \times 10^6$  ohms min.
- DIELECTRIC STRENGTH: 250 V RMS min.
- CIRCUIT CAPACITANCE: 10 pf typ.
- CONTACT BOUNCE: Below 10 msec typ.
- ACTUATION FORCE: 7–11 oz. typ. (with detent); 3–5 oz. typ. (without detent).
- TRAVEL: .025–.030 typ. (with detent); .008–.010 typ. (without detent).
- STORAGE TEMPERATURE: -40°C to 80°C. (60°C max with detent).
- OPERATING TEMPERATURE: -30°C to 70°C. (60°C max with detent).

### MATERIALS

- OVERLAY WITH GRAPHICS: Polycarbonate/polyester, matte finish (embossed keys on models with detent). White characters on red keys with a black background. Numeric keys have a white border. Custom graphics available, consult factory.
- BASE: Rigid polyester (UL 94V-0), black, standard.
- CONTACTS & CIRCUITS: Silver conductive circuit on heat stabilized polyester membrane.
- CONNECTOR: Female connector with tin/lead plating, standard.

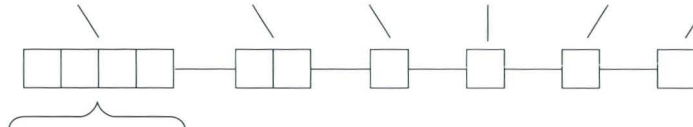
**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



UL® models available, see page G-6.

Easy Build-A-Switch:

Below is a complete listing of available options for M SERIES HALF-INCH ROTARY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page G-5; all available options are shown and described on pages G-6 thru G-9. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page G-9. Hardware and accessories are available separately, see catalog section H.

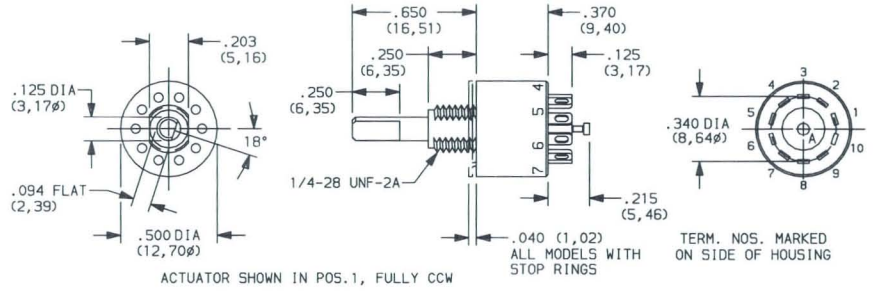


|      |      |    |   |   |   |   |
|------|------|----|---|---|---|---|
| MA00 | ME00 | L1 | N | C | G | D |
| MA02 | ME02 | L2 | S | Z | Q | F |
| MA03 | ME03 | L3 |   |   |   |   |
| MA04 | ME04 | S1 |   |   |   |   |
| MA05 | ME05 | S2 |   |   |   |   |
| MA06 | ME06 | S3 |   |   |   |   |
| MA07 | ME07 | S4 |   |   |   |   |
| MA08 | ME08 | S5 |   |   |   |   |
| MA09 | ME09 | S6 |   |   |   |   |
| MA10 | ME10 | S7 |   |   |   |   |
| MB00 | MF00 | S8 |   |   |   |   |
| MB02 | MF02 | S9 |   |   |   |   |
| MB03 | MF03 | SA |   |   |   |   |
| MB04 | MF04 | SB |   |   |   |   |
| MB05 | MF05 |    |   |   |   |   |
| MC00 | MG00 |    |   |   |   |   |
| MC02 | MG02 |    |   |   |   |   |
| MC03 | MG03 |    |   |   |   |   |
| MC04 | MG04 |    |   |   |   |   |
| MC05 | MG05 |    |   |   |   |   |
| MC06 | MG06 |    |   |   |   |   |
| MC07 | MG07 |    |   |   |   |   |
| MC08 | MG08 |    |   |   |   |   |
| MC09 | MG09 |    |   |   |   |   |
| MC10 | MG10 |    |   |   |   |   |
| MC11 | MG11 |    |   |   |   |   |
| MC12 | MG12 |    |   |   |   |   |
| MD00 | MH00 |    |   |   |   |   |
| MD02 | MH02 |    |   |   |   |   |
| MD03 | MH03 |    |   |   |   |   |
| MD04 | MH04 |    |   |   |   |   |
| MD05 | MH05 |    |   |   |   |   |
| MD06 | MH06 |    |   |   |   |   |

G

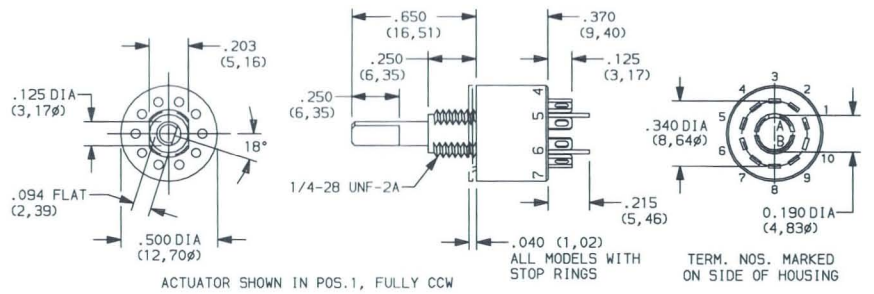


SWITCHES WITH STANDARD OPTIONS



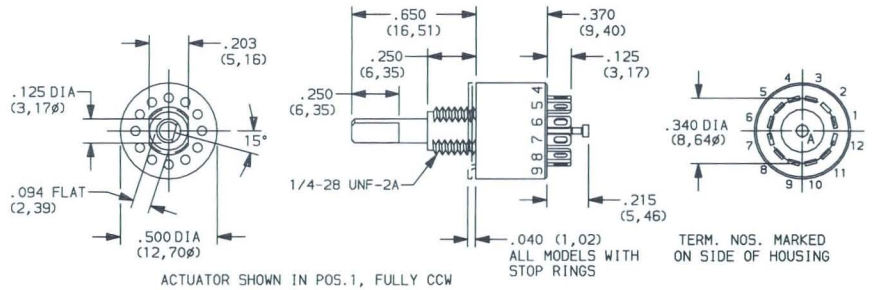
SP MODELS WITH 36° INDEXING

Part No. Shown: MA00L1NZQD



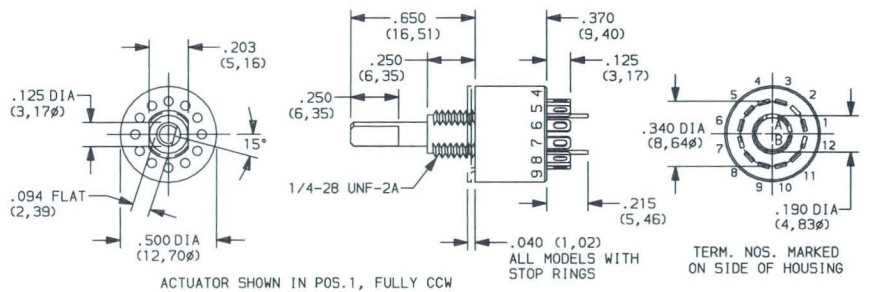
DP MODELS WITH 36° INDEXING

Part No. Shown: MB00L1NZQD



SP MODELS WITH 30° INDEXING

Part No. Shown: MC00L1NZQD



DP MODELS WITH 30° INDEXING

Part No. Shown: MD00L1NZQD



## SWITCH FUNCTION

| 36° INDEXING |                          |                           |             |           |
|--------------|--------------------------|---------------------------|-------------|-----------|
| NO. POLES    | MODEL NO. WITH STOP PINS | MODEL NO. WITH STOP RINGS | NO. POS.    | SCHEMATIC |
| SP           | MA00                     | ME00                      | 10-NO STOPS |           |
|              | MA02                     | ME02                      | 2           |           |
|              | MA03                     | ME03                      | 3           |           |
|              | MA04                     | ME04                      | 4           |           |
|              | MA05                     | ME05                      | 5           |           |
|              | MA06                     | ME06                      | 6           |           |
|              | MA07                     | ME07                      | 7           |           |
|              | MA08                     | ME08                      | 8           |           |
|              | MA09                     | ME09                      | 9           |           |
|              | MA10                     | ME10                      | 10          |           |
| DP           | MB00                     | MF00                      | 5-NO STOPS  |           |
|              | MB02                     | MF02                      | 2           |           |
|              | MB03                     | MF03                      | 3           |           |
|              | MB04                     | MF04                      | 4           |           |
|              | MB05                     | MF05                      | 5           |           |

| 30° INDEXING |                          |                           |             |           |
|--------------|--------------------------|---------------------------|-------------|-----------|
| NO. POLES    | MODEL NO. WITH STOP PINS | MODEL NO. WITH STOP RINGS | NO. POS.    | SCHEMATIC |
| SP           | MC00                     | MG00                      | 12-NO STOPS |           |
|              | MC02                     | MG02                      | 2           |           |
|              | MC03                     | MG03                      | 3           |           |
|              | MC04                     | MG04                      | 4           |           |
|              | MC05                     | MG05                      | 5           |           |
|              | MC06                     | MG06                      | 6           |           |
|              | MC07                     | MG07                      | 7           |           |
|              | MC08                     | MG08                      | 8           |           |
|              | MC09                     | MG09                      | 9           |           |
|              | MC10                     | MG10                      | 10          |           |
|              | MC11                     | MG11                      | 11          |           |
|              | MC12                     | MG12                      | 12          |           |
| DP           | MD00                     | MH00                      | 6-NO STOPS  |           |
|              | MD02                     | MH02                      | 2           |           |
|              | MD03                     | MH03                      | 3           |           |
|              | MD04                     | MH04                      | 4           |           |
|              | MD05                     | MH05                      | 5           |           |
|              | MD06                     | MH06                      | 6           |           |

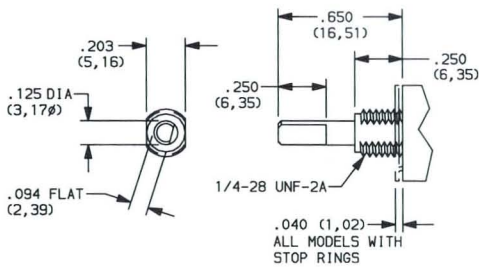
All models when ordered with S1-SB stainless steel actuator options. See AGENCY APPROVALS, page VIII.

Number of positions or stops preset at factory (Note: MX00 models have full 360° rotation with no stops. Stop pins or stop rings supplied for user-selectable stops, see above). All terminals present regardless of number of switch positions. Hardware is available separately, see catalog section H.

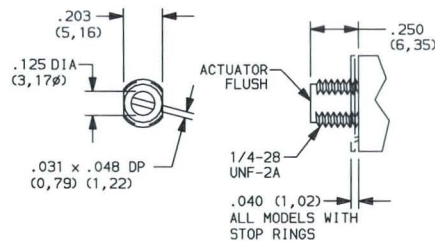
## ACTUATORS (ZINC ALLOY)

All actuators shown in pos. 1.

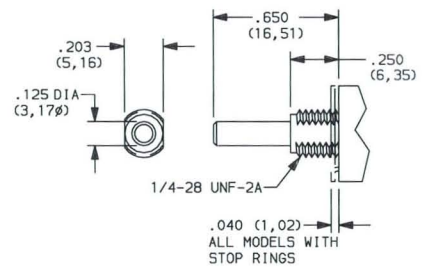
### L1 (STD.)



### L2



### L3





M Series

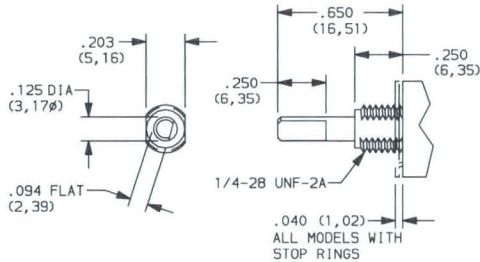
NEW STAINLESS STEEL ACTUATORS

Half-Inch Rotary Switches

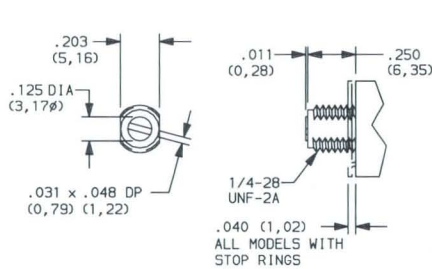
ACTUATORS (STAINLESS STEEL)

All actuators shown in pos. 1.

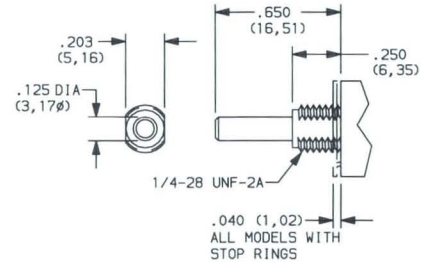
S1



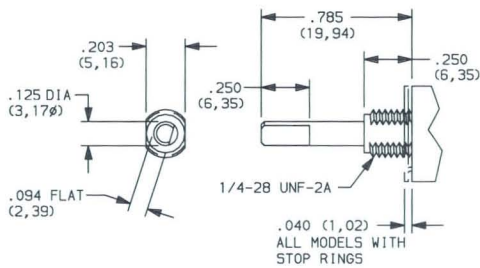
S2



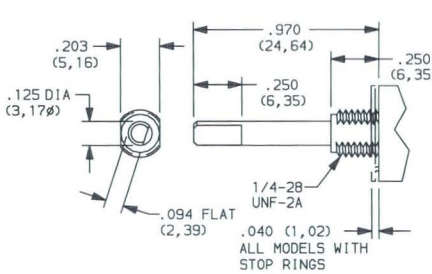
S3



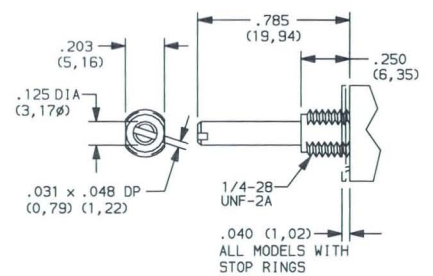
S4



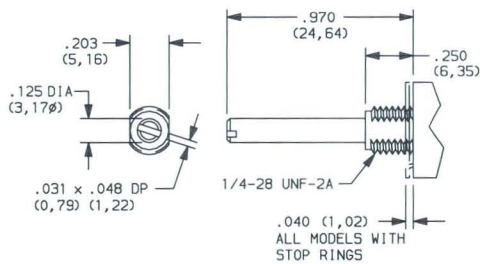
S5



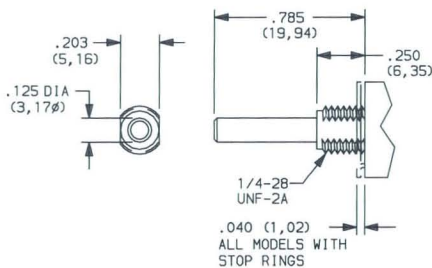
S6



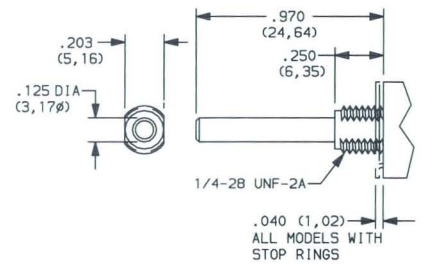
S7



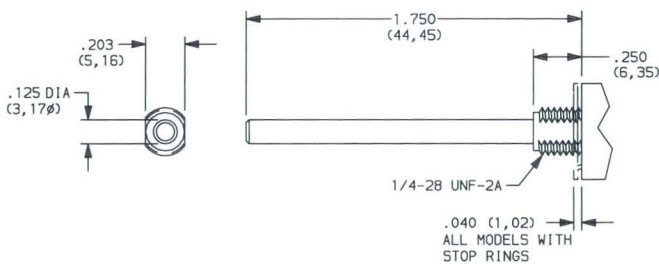
S8



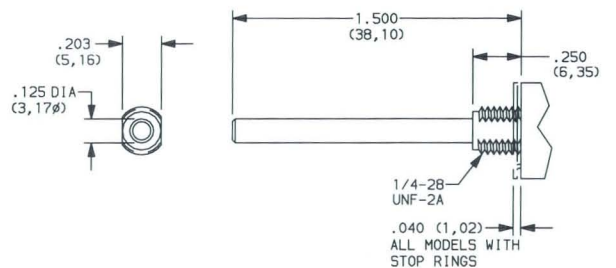
S9



SA



SB





## SHORTING/NON-SHORTING CONTACTS

**N** (STD.)

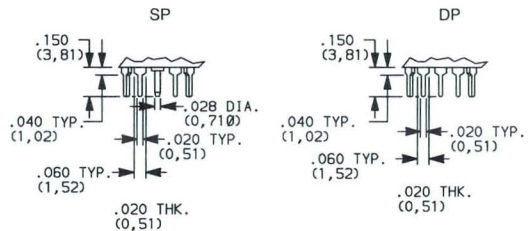
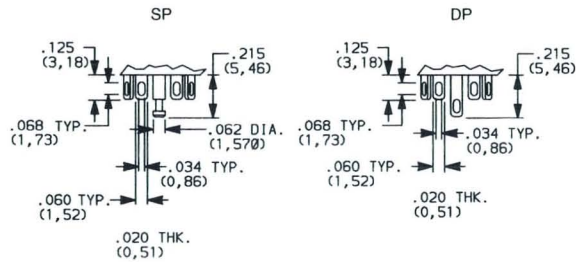
Non-Shorting contacts—break before make.

**S**

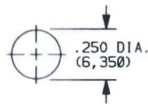
Shorting contacts—make before break.

## TERMINATIONS

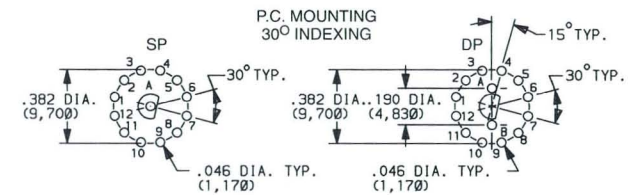
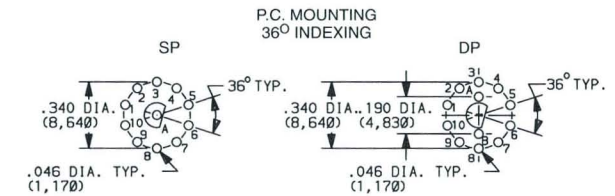
**Z** (STD.)



### PANEL MOUNTING



Hardware: All models — one mounting nut and lockwasher supplied standard.  
 MA00 thru MD00 models: two stop pins and adhesive mylar washer supplied.  
 ME00 thru MH00 models: two stop rings supplied.  
 Hardware is available separately, see catalog section H.



Q contact material standard. Terminal numbers marked on side of housing. Actuators and schematics shown in position 1. All terminals insert molded. All terminals present regardless of number of switch positions.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL     | TERMINAL PLATING | RATINGS                          |   |
|-------------|----------------------|------------------|----------------------------------|---|
| <b>Q</b>    | SILVER 1, 2          | SILVER 2         | POWER                            | CARRY: 6 AMPS CONTINUOUS. SWITCH: 250 mA @ 125 V AC OR 28 V DC.                                     |
| <b>G</b>    | GOLD OVER SILVER 3,4 | GOLD 4           | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR, CARRY: 6 AMPS CONTINUOUS. SWITCH: 250 mA @ 125 V AC OR 28 V DC. |

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

<sup>1</sup> MOVABLE CONTACTS: Non-shorting: Copper alloy, silver plated. Shorting: Zinc alloy, silver plated.

<sup>2</sup> STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.

<sup>3</sup> MOVABLE CONTACTS: Non-shorting: Copper alloy, with gold plate over nickel plate over silver plate. Shorting: Zinc alloy, with gold plate over nickel plate over silver plate.

<sup>4</sup> STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate over silver plate.

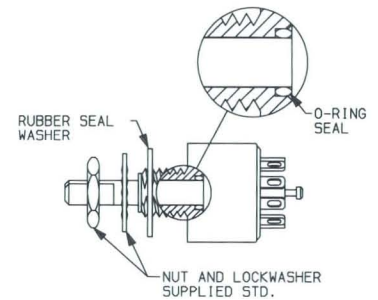
Q contact material standard with all terminations.

All models when ordered with S1-SB stainless steel actuator options. See page G-6 and VIII.



**SEAL** **D** (STD.)

No seal — std.

**F**SPLASHPROOF SHAFT  
AND PANEL SEAL**HOW TO ORDER**

All available M SERIES HALF-INCH ROTARY SWITCH options are listed on page G-4, and are described on pages G-5 thru G-9. Switches with standard options are shown on page G-5. When selecting options and building a part number, dashes, hyphens or spaces in the part number are not significant and are shown for clarity only. Hardware and accessories are available separately, see catalog section H.

 models available, see page G-6.

**SPECIFICATIONS**

**CONTACT RATING:**  
 CARRY: 6 AMPS continuous (Q contact material).  
 SWITCH: 250 mA max. @ 125 V AC or 28 V DC (Q contact material.). Non-shorting contacts std.

**ELECTRICAL LIFE:** 10,000 make-and-break cycles at 150 mA, 125 V AC or 28 V DC. One cycle=full 360° rotation CW, then CCW.

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

**INSULATION RESISTANCE:** 10<sup>10</sup> ohms min.

**DIELECTRIC STRENGTH:** 600 V RMS min. @ sea level.

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

**STOP STRENGTH:** 7.5 pound-inches min.

**OPERATING FORCE:** 4-7 ounce-inches typ. initial.

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

**MATERIALS**

**HOUSING AND BUSHING:** Zinc alloy, bright zinc plated, with clear chromate finish.

**ACTUATOR:** Zinc alloy, nickel plated or stainless steel.

**BASE:** Diallyl phthalate (DAP) or melamine phenolic, with insert molded terminals.

**ROTOR:** Glass filled polyester (UL 94V-0).

**MOVABLE CONTACTS:**  
 Non-shorting: Copper alloy, silver plated (Q contact mat'l).  
 Shorting: Zinc alloy, silver plated (Q contact mat'l).

**STATIONARY CONTACT & ALL TERMINALS:** Copper alloy, silver plated (Q contact mat'l). All terminals insert molded. All terminals present regardless of number of switch positions.

**CONTACT SPRING:** Music wire, phosphate coated.

**STOP PIN:** Stainless steel.

**STOP RING:** Brass.

**HARDWARE:** Nut—Brass, nickel plated. Lockwasher—Steel, nickel plated.

**NOTE:** Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

## SETTING STOPS—WITH STOP PINS

### MA00, MB00, MC00, & MD00 MODELS ONLY:

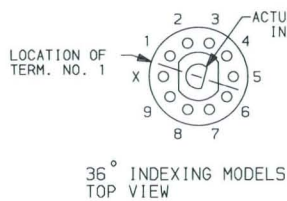
The number of switch positions or stops is adjustable by means of stop pins provided with each switch. Switches are normally shipped with stop pins and hardware in bulk, not installed. Without stop pins, switches have full 360° rotation and no stops. Note that all two pole models begin to repeat when actuated 180° or more.

To set stops, refer to figures 1 & 2. Orient switch so that terminal no. 1 is as shown. Turn actuator to position 1, using flats on bushing and terminal no. 1 as reference. Install CCW stop pin in hole designated 'X'. Install second stop pin in hole number corresponding to the number of positions desired. Note that two pole models will begin to repeat when actuated 180° or more. To retain stop pins, use adhesive mylar washer included; see figure 3.

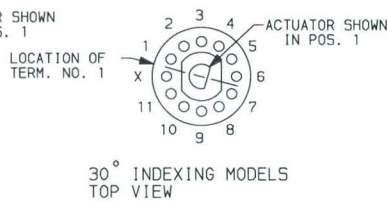
All models except MX00 models have number of switch positions or stops pre-set at factory and are not adjustable.

### HARDWARE:

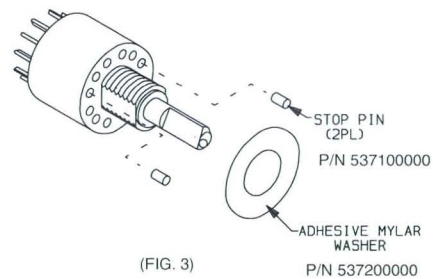
Two stop pins, mounting nut, and lockwasher supplied standard.



(FIG. 1)



(FIG. 2)



(FIG. 3)

## SETTING STOPS—WITH STOP RINGS

### ME00, MF00, MG00, & MH00 MODELS ONLY:

The number of switch positions or stops is adjustable by means of stop rings provided with each switch. These models are normally shipped with stop rings and hardware in bulk, not installed. Without stop rings, switches have full 360° rotation and no stops. Note that all two pole models begin to repeat when actuated 180° or more.

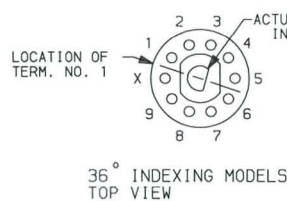
To set stops refer to figures 4 & 5. Orient switch so that terminal no. 1 is as shown. Turn actuator to pos. 1 using flats on bushing and terminal no. 1 as reference. See figure 6 and install inner stop ring with short tab in hole designated 'X'. Install outer stop ring with long tab in hole number corresponding to the number of positions desired. Note that all two pole models begin to repeat when actuated 180° or more. Use mounting nut and lockwasher to retain stop rings.

### ALL MEXX, MFXX, MGXX, & MHXX models (except MX00 models):

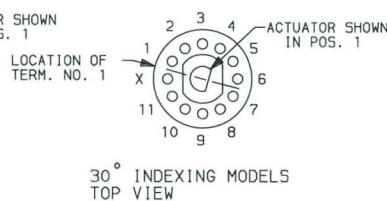
Number of switch positions or stops are preset at factory, but are user adjustable.

### HARDWARE:

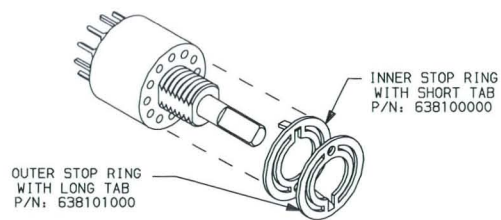
Two stop rings, mounting nut and lockwasher supplied standard.



(FIG. 4)



(FIG. 5)



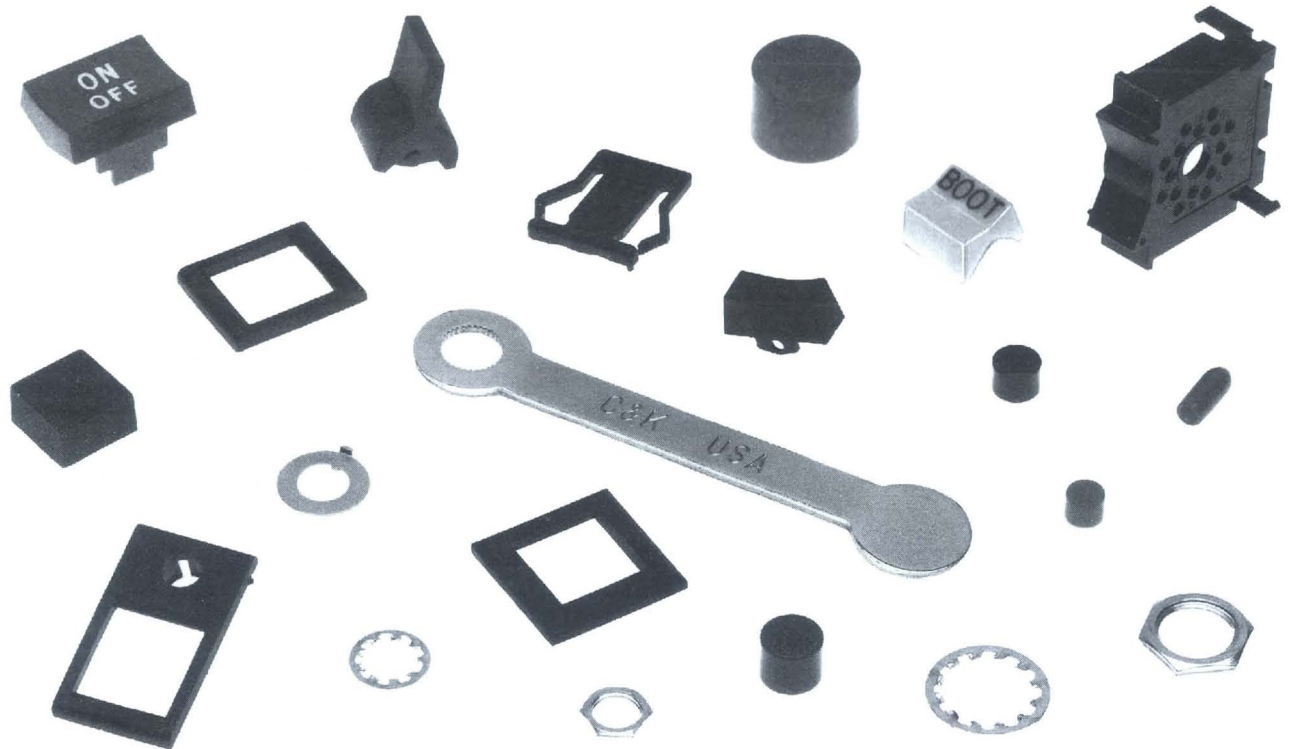
(FIG. 6)

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## SECTION H

### HARDWARE AND ACCESSORIES

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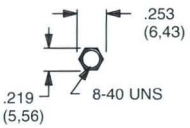
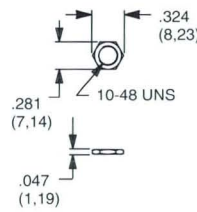
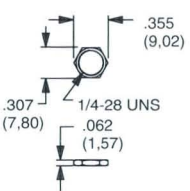
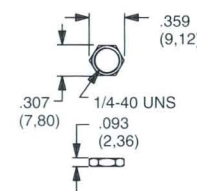
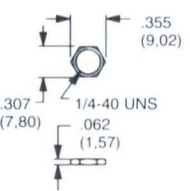
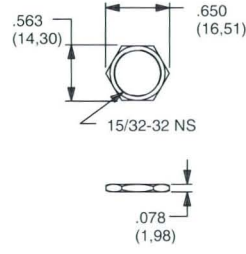
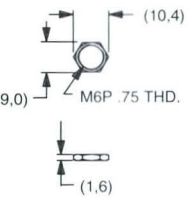


|   |                |
|---|----------------|
| Hardware—Panel Mounted Switches .....                             | H-2 thru H-6   |
| Actuators—Rocker and Lever Handle Switches .....                  | H-6 thru H-8   |
| Frames—Rocker, Lever Handle, Pushbutton Switches .....            | H-9 thru H-10  |
| Caps—Pushbutton Switches .....                                    | H-11 thru H-12 |
| Endplates, Spacers, Blank Sections, Hardware—Coded Switches ..... | H-13 thru H-18 |
| Miscellaneous .....   | H-18           |

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H

## HEX NUTS

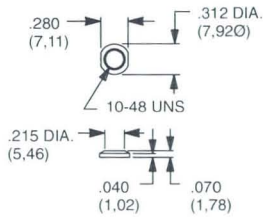
|  |  |
|--|--|
| <p>8-40 THD.</p>  <p><b>PART NO.</b><br/> <b>775200201</b> NICKEL PLATED<br/> <b>775200264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           8600</p>                                   | <p>10-48 THD.</p>  <p><b>PART NO.</b><br/> <b>464900201</b> NICKEL PLATED<br/> <b>464900264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           T, TP</p>  |
| <p>1/4-28 THD.</p>  <p><b>PART NO.</b><br/> <b>477100201</b> NICKEL PLATED</p> <p><b>FOR SERIES</b><br/>           M</p>  | <p>1/4-40 THD.</p>  <p><b>PART NO.</b><br/> <b>540400201</b> NICKEL PLATED<br/> <b>540400264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           E, E010</p>   |
| <p>1/4-40 THD.</p>  <p><b>PART NO.</b><br/> <b>700201201</b> NICKEL PLATED<br/> <b>700201264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           7000, 8020, 8060, 8500, 9000, T, TP</p> | <p>15-32 THD.</p>  <p><b>PART NO.</b><br/> <b>707100201</b> NICKEL PLATED<br/> <b>707100215</b> SATIN CHROME<br/> <b>707100264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           7000, 8500, 9000</p> |
| <p>METRIC</p>  <p><b>PART NO.</b><br/> <b>791600201</b> NICKEL PLATED<br/> <b>791600264</b> BLACK</p> <p><b>FOR SERIES</b><br/>           7000, 8020, 8060</p>                        |  |

### MATERIAL

Brass, nickel plated std. Other finishes, consult factory

## DRESS NUTS

10-48 THD.



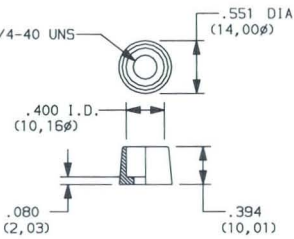
PART NO.

**465701201** NICKEL PLATED  
**465701264** BLACK

FOR SERIES

T, TP

1/4-40 THD.



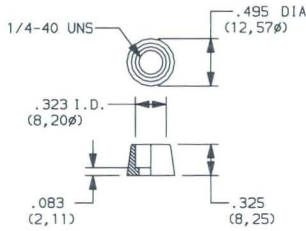
PART NO.

**580700201** NICKEL PLATED

FOR SERIES

8020, 8060, 8500, TP

1/4-40 THD.



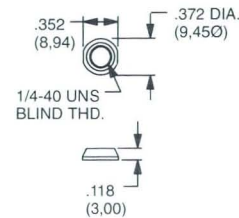
PART NO.

**702501201** NICKEL PLATED  
**702501264** BLACK

FOR SERIES

8020, 8060, E010, TP

1/4-40 THD. - BLIND



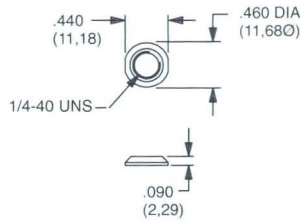
PART NO.

**709901201** NICKEL PLATED  
**709901215** SATIN CHROME  
**709901264** BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



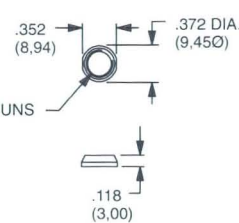
PART NO.

**776001201** NICKEL PLATED  
**776002231** BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



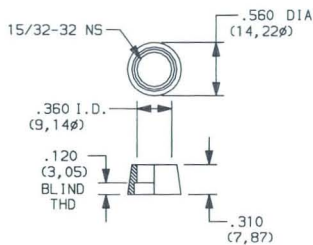
PART NO.

**780701201** NICKEL PLATED  
**780701215** SATIN CHROME  
**780701264** BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

15/32 THD. - BLIND



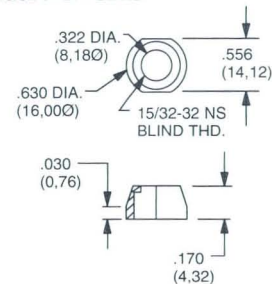
PART NO.

**498800201** NICKEL PLATED

FOR SERIES

8500

15/32 THD. - BLIND



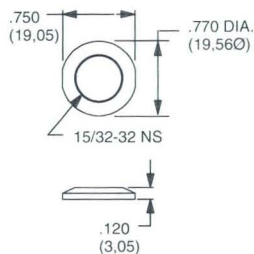
PART NO.

**605300201** NICKEL PLATED

FOR SERIES

7000 (T2P ACTUATOR OPTION ONLY)

15/32 THD.



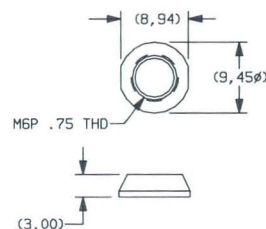
PART NO.

**895101201** NICKEL PLATED  
**895101264** BLACK

FOR SERIES

7000, 8500, 9000

METRIC



PART NO.

**709903201** NICKEL PLATED  
**709903264** BLACK

FOR SERIES

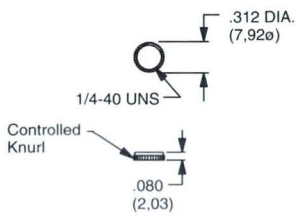
7000, 8020, 8060

### MATERIAL

Brass, nickel plated std. Other finishes, consult factory

## KNURLED NUTS

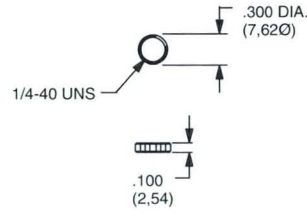
1/4-40 THD. - BLIND



PART NO.  
**778000201** NICKEL PLATED  
**778000264** BLACK

FOR SERIES  
 7000, 8020, 8060, 8500, 9000, T, TP

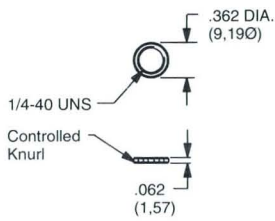
1/4-40 THD.



PART NO.  
**778600201** NICKEL PLATED  
**778600224** BLACK

FOR SERIES  
 7000, 8020, 8060, 8500, 9000, E, E010, T, TP

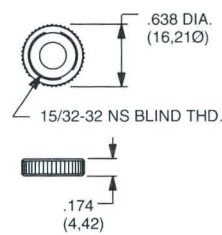
1/4-40 THD. - (FITS GULMITE #12 SOCKET)



PART NO.  
**796901201** NICKEL PLATED  
**796901264** BLACK

FOR SERIES  
 7000, 8020, 8060, 8500, 9000, T, TP

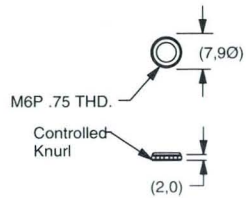
15/32 THD. - BLIND



PART NO.  
**471300201** NICKEL PLATED  
**471300264** BLACK

FOR SERIES  
 7000, 8500, 9000

METRIC



PART NO.  
**483200201** NICKEL PLATED

FOR SERIES  
 7000, 8020, 8060

### MATERIAL

Brass, nickel plated std. Other finishes, consult factory

## WRENCHES



PART NO.  
**465300201**

FITS NUT PART NUMBERS  
 4649XXXXX, 4657XXXXX

PART NO.  
**481500201**

FITS NUT PART NUMBERS  
 7780XXXXX, 4832XXXXX

PART NO.  
**778500201**

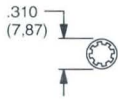
FITS NUT PART NUMBERS  
 7002XXXXX, 7099XXXXX  
 7807XXXXX, 7916XXXXX

PART NO.  
**894200201**

FITS NUT PART NUMBERS  
 7969XXXXX

## LOCKWASHERS

FITS 10-48 BUSHING

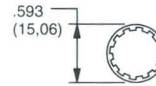


.018 THK.  
(0,46)

PART NO.

**465200202** NICKEL PLATED

FITS 15/32 BUSHING

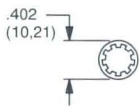


.021 THK.  
(0,53)

PART NO.

**700302202** NICKEL PLATED  
**700302264** BLACK

FITS 1/4-40 BUSHING



.018 THK.  
(0,46)

PART NO.

**700303202** NICKEL PLATED  
**700303264** BLACK

### MATERIAL

Steel, nickel plated std. Other finishes, consult factory.

## LOCKING RINGS

FITS 10-48 BUSHING



.029  
(0,74)

PART NO.

**465000201** NICKEL PLATED - FLAT



.065  
(1,65)

PART NO.

**465101201** NICKEL PLATED - KEYWAY

FITS 1/4-40 BUSHING



.029  
(0,74)

PART NO.

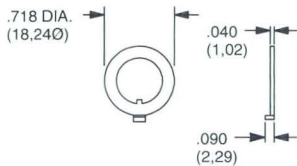
**700701201** NICKEL PLATED - KEYWAY  
**700701264** BLACK - KEYWAY

.065  
(1,65)

PART NO.

**753700201** NICKEL PLATED - SMALL KEYWAY  
**753700264** BLACK - SMALL KEYWAY

FITS 15/32 BUSHING



.040  
(1,02)

PART NO.

**707200201** NICKEL PLATED - KEYWAY  
**707200264** BLACK - KEYWAY

.090  
(2,29)



.029  
(0,74)

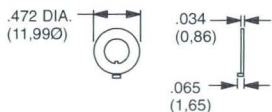
**753700201** NICKEL PLATED - SMALL KEYWAY  
**753700264** BLACK - SMALL KEYWAY

.082  
(2,08)

PART NO.

**757200201** NICKEL PLATED - FLAT  
**757200264** BLACK - FLAT

FITS METRIC BUSHING

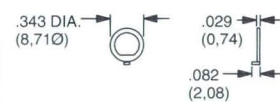


.034  
(0,86)

PART NO.

**791800201** NICKEL PLATED - KEYWAY  
**791800264** BLACK - KEYWAY

.065  
(1,65)



.029  
(0,74)

PART NO.

**757300201** NICKEL PLATED - SMALL FLAT  
**757300264** BLACK - SMALL FLAT

.082  
(2,08)

### MATERIAL

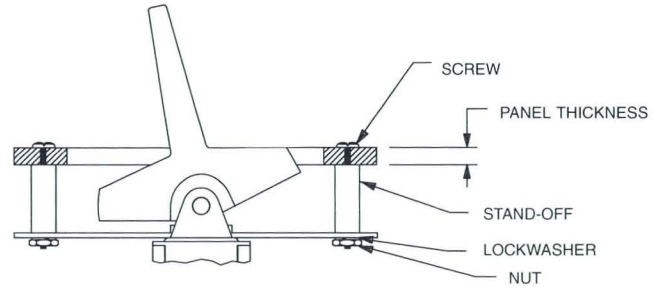
Brass, nickel plated std. Other finishes, consult factory.



# Hardware and Accessories

## ROCKER AND LEVER HANDLE SWITCH—PANEL MOUNTING HARDWARE

Panel mounting hardware for rocker and lever handle switches is available separately. Mounting hardware consists of two screws, two nuts, two standoffs and two lockwashers per switch, and is available for panel thicknesses of 1/16, 3/32 and 1/8 in. See part nos. below.



FOR J1, J2, J54, J64, J94 ACTUATORS – 7000 & E SERIES  
FOR J1, J6 ACTUATORS – T SERIES

FOR J1, J2, J3, J50, J60, J90 ACTUATORS – 9000 SERIES  
FOR J3 ACTUATORS – 7000 SERIES

| PART NO.         | PANEL THK.      | STANDOFF LENGTH |
|------------------|-----------------|-----------------|
| <b>761101000</b> | 1/16 IN. (1,59) | .295 (7,49)     |
| <b>761102000</b> | 3/32 IN. (2,38) | .264 (6,71)     |
| <b>761103000</b> | 1/8 IN. (3,18)  | .233 (5,92)     |

| PART NO.         | PANEL THK.      | STANDOFF LENGTH |
|------------------|-----------------|-----------------|
| <b>770601000</b> | 1/16 IN. (1,59) | .295 (7,49)     |
| <b>770602000</b> | 3/32 IN. (2,38) | .264 (6,71)     |
| <b>770603000</b> | 1/8 IN. (3,18)  | .233 (5,92)     |

FOR J4, J5 ACTUATORS – 7000 & 9000 SERIES

FOR J10 ACTUATOR – 7000 & 9000 SERIES

| PART NO.         | PANEL THK.      | STANDOFF LENGTH |
|------------------|-----------------|-----------------|
| <b>775001000</b> | 1/16 IN. (1,59) | .375 (9,53)     |
| <b>775002000</b> | 3/32 IN. (2,38) | .344 (8,74)     |
| <b>775003000</b> | 1/8 IN. (3,18)  | .312 (7,92)     |

| PART NO.         | PANEL THK.      | STANDOFF LENGTH |
|------------------|-----------------|-----------------|
| <b>770701000</b> | 1/16 IN. (1,59) | .295 (7,49)     |
| <b>770702000</b> | 3/32 IN. (2,38) | .264 (6,71)     |
| <b>770703000</b> | 1/8 IN. (3,18)  | .233 (5,92)     |

### MATERIAL

Screws, nuts lockwashers: Stainless steel. Standoffs: Nylon, std. Aluminum available, consult factory

## ROCKER AND LEVER HANDLE ACTUATORS

J1



PART NO.

- 538501000** WHITE
- 538502263** BLACK
- 538503000** RED
- 538504000** ORANGE
- 538505000** YELLOW
- 538506000** GREEN
- 538507000** BLUE
- 538508000** BROWN
- 538509000** GRAY

FOR SERIES

ET

Material: Nylon. Finish: Matte.

J1



PART NO.

- 468001000** WHITE
- 468002263** BLACK
- 468003000** RED
- 468004000** ORANGE
- 468005000** YELLOW
- 468006000** GREEN
- 468007000** BLUE
- 468008000** BROWN
- 468009000** GRAY

FOR SERIES

T

Material: Nylon. Finish: Matte.



## ROCKER AND LEVER HANDLE ACTUATORS

Special colors, custom markings available, consult factory.

J1, J11, J15, J16



PART NO.

- 760201000** WHITE
- 760202263** BLACK
- 760203000** RED
- 760204000** ORANGE
- 760205000** YELLOW
- 760206000** GREEN
- 760207000** BLUE
- 760208000** BROWN
- 760209000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J2, J21, J25, J26



PART NO.

- 760501000** WHITE
- 760502263** BLACK
- 760503000** RED
- 760504000** ORANGE
- 760505000** YELLOW
- 760506000** GREEN
- 760507000** BLUE
- 760508000** BROWN
- 760509000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J3, J37



PART NO.

- 766601000** WHITE
- 766602263** BLACK
- 766603000** RED
- 766604000** ORANGE
- 766605000** YELLOW
- 766606000** GREEN
- 766607000** BLUE
- 766608000** BROWN
- 766609000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J4, J47



PART NO.

- 773301000** WHITE
- 773302263** BLACK
- 773303000** RED
- 773304000** ORANGE
- 773305000** YELLOW
- 773306000** GREEN
- 773307000** BLUE
- 773308000** BROWN
- 773309000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J5, J57



PART NO.

- 791201000** WHITE
- 791202263** BLACK
- 791203000** RED
- 791204000** ORANGE
- 791205000** YELLOW
- 791206000** GREEN
- 791207000** BLUE
- 791208000** BROWN
- 791209000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J6



PART NO.

- 538401000** WHITE
- 538402263** BLACK
- 538403000** RED
- 538404000** ORANGE
- 538405000** YELLOW
- 538406000** GREEN
- 538407000** BLUE
- 538408000** BROWN
- 538409000** GRAY

FOR SERIES

ET

Material: Nylon. Finish: Matte.

J6



PART NO.

- 468101000** WHITE
- 468102263** BLACK
- 468103000** RED
- 468104000** ORANGE
- 468105000** YELLOW
- 468106000** GREEN
- 468107000** BLUE
- 468108000** BROWN
- 468109000** GRAY

FOR SERIES

T

Material: Nylon. Finish: Matte.

J10, J19



PART NO.

- 769501000** WHITE
- 769502263** BLACK
- 769503000** RED
- 769504000** ORANGE
- 769505000** YELLOW
- 769506000** GREEN
- 769507000** BLUE
- 769508000** BROWN
- 769509000** GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

## ROCKER AND LEVER HANDLE ACTUATORS

Special colors, custom markings available, consult factory.

J50, J51, J52, J53, J54



PART NO.

- 628301000** WHITE
- 628302263** BLACK
- 628303000** RED
- 628304000** ORANGE
- 628305000** YELLOW
- 628306000** GREEN
- 628307000** BLUE
- 628308000** BROWN
- 628309000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J60, J61, J62, J63, J64



PART NO.

- 613801000** WHITE
- 613802263** BLACK
- 613803000** RED
- 613804000** ORANGE
- 613805000** YELLOW
- 613806000** GREEN
- 613807000** BLUE
- 613808000** BROWN
- 613809000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J90, J91, J92, J93, J94



PART NO.

- 598001000** WHITE
- 598002263** BLACK
- 598003000** RED
- 598004000** ORANGE
- 598005000** YELLOW
- 598006000** GREEN
- 598007000** BLUE
- 598008000** BROWN
- 598009000** GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

5000 SERIES ROCKER



PART NO.

- 792201000** WHITE
- 792203000** RED
- 792204000** ORANGE
- 792205000** YELLOW
- 792206000** GREEN

Material: Translucent polycarbonate. Finish: Gloss.

5600 SERIES LENS



PART NO.

- 795201000** WHITE
- 795203000** RED
- 795204000** ORANGE
- 795205000** YELLOW
- 795206000** GREEN

Material: Translucent polycarbonate. Finish: Gloss.

L41



PART NO.

- 481001000** WHITE
- 481002263** BLACK
- 481003000** RED
- 481004000** ORANGE
- 481005000** YELLOW
- 481006000** GREEN
- 481007000** BLUE
- 481008000** BROWN
- 481009000** GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

L42



PART NO.

- 481101000** WHITE
- 481102263** BLACK
- 481103000** RED
- 481104000** ORANGE
- 481105000** YELLOW
- 481106000** GREEN
- 481107000** BLUE
- 481108000** BROWN
- 481109000** GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

L43



PART NO.

- 481201000** WHITE
- 481202263** BLACK
- 481203000** RED
- 481204000** ORANGE
- 481205000** YELLOW
- 481206000** GREEN
- 481207000** BLUE
- 481208000** BROWN
- 481209000** GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

## FRAMES

Special colors, custom markings available, consult factory.

FOR J11, J21 ACTUATORS



|                  |               |
|------------------|---------------|
| <u>PART NO.</u>  |               |
| <b>764500223</b> | BRIGHT CHROME |
| <b>764500252</b> | SATIN CHROME  |
| <b>764500746</b> | BLACK ENAMEL  |
| <b>764500747</b> | WHITE ENAMEL  |

FOR SERIES  
7000

Material: Spring Steel.

FOR J16, J26 ACTUATORS



|                  |        |
|------------------|--------|
| <u>PART NO.</u>  |        |
| <b>459101000</b> | WHITE  |
| <b>459102000</b> | BLACK  |
| <b>459103000</b> | RED    |
| <b>459104000</b> | ORANGE |
| <b>459105000</b> | YELLOW |
| <b>459106000</b> | GREEN  |
| <b>459107000</b> | BLUE   |
| <b>459108000</b> | BROWN  |
| <b>459109000</b> | GRAY   |

FOR SERIES  
7000

Material: Nylon. Finish: Matte.

FOR J19 ACTUATOR



|                  |               |
|------------------|---------------|
| <u>PART NO.</u>  |               |
| <b>781000223</b> | BRIGHT CHROME |
| <b>781000252</b> | SATIN CHROME  |
| <b>781000746</b> | BLACK ENAMEL  |
| <b>781000747</b> | WHITE ENAMEL  |

FOR SERIES  
7000, 9000

Material: Spring Steel.

FOR J37, J47, J57 ACTUATORS



|                  |               |
|------------------|---------------|
| <u>PART NO.</u>  |               |
| <b>445400223</b> | BRIGHT CHROME |
| <b>445400252</b> | SATIN CHROME  |
| <b>445400746</b> | BLACK ENAMEL  |
| <b>445400747</b> | WHITE ENAMEL  |

FOR SERIES  
7000, 9000

Material: Spring Steel.

FOR J51, J61, J81, J83, J85, J86, J91 ACTUATORS



|                  |        |
|------------------|--------|
| <u>PART NO.</u>  |        |
| <b>615601000</b> | WHITE  |
| <b>615602263</b> | BLACK  |
| <b>615603000</b> | RED    |
| <b>615604000</b> | ORANGE |
| <b>615605000</b> | YELLOW |
| <b>615606000</b> | GREEN  |
| <b>615607000</b> | BLUE   |
| <b>615608000</b> | BROWN  |
| <b>615609000</b> | GRAY   |

FOR SERIES  
7000

Material: Nylon. Finish: Matte.

FOR J52, J62, J82, J84, J92 ACTUATORS

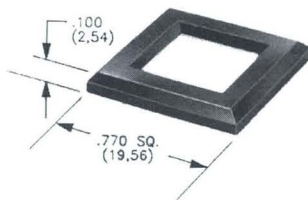


|                  |        |
|------------------|--------|
| <u>PART NO.</u>  |        |
| <b>613301000</b> | WHITE  |
| <b>613302263</b> | BLACK  |
| <b>613303000</b> | RED    |
| <b>613304000</b> | ORANGE |
| <b>613305000</b> | YELLOW |
| <b>613306000</b> | GREEN  |
| <b>613307000</b> | BLUE   |
| <b>613308000</b> | BROWN  |
| <b>613309000</b> | GRAY   |

FOR SERIES  
7000

Material: Nylon. Finish: Matte.

SQUARE FRAME

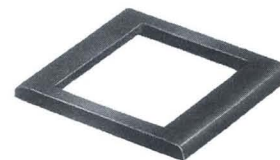


|  |                     |                     |        |
|--|---------------------|---------------------|--------|
|  | <u>MATTE FINISH</u> | <u>GLOSS FINISH</u> |        |
|  | <u>PART NO.</u>     | <u>PART NO.</u>     |        |
|  | <b>486701000</b>    | <b>486801000</b>    | WHITE  |
|  | <b>486702000</b>    | <b>486802000</b>    | BLACK  |
|  | <b>486703000</b>    | <b>486803000</b>    | RED    |
|  | <b>486704000</b>    | <b>486804000</b>    | ORANGE |
|  | <b>486705000</b>    | <b>486805000</b>    | YELLOW |
|  | <b>486706000</b>    | <b>486806000</b>    | GREEN  |
|  | <b>486707000</b>    | <b>486807000</b>    | BLUE   |
|  | <b>486708000</b>    | <b>486808000</b>    | BROWN  |
|  | <b>486709000</b>    | <b>486809000</b>    | GRAY   |

FITS  
FOR J50, J60, J80, J83, J90 ACTUATORS

Material: Nylon. Finish: Matte or Gloss.

5000 & 5600 SERIES FRAME



|  |                  |        |
|--|------------------|--------|
|  | <u>PART NO.</u>  |        |
|  | <b>788801000</b> | WHITE  |
|  | <b>788802000</b> | BLACK  |
|  | <b>788803000</b> | RED    |
|  | <b>788804000</b> | ORANGE |
|  | <b>788805000</b> | YELLOW |
|  | <b>788806000</b> | GREEN  |
|  | <b>788807000</b> | BLUE   |
|  | <b>788808000</b> | BROWN  |
|  | <b>788809000</b> | GRAY   |

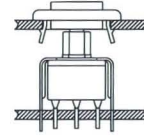
Material: Nylon. Finish: Matte.

## SEPARATE SNAP-IN FRAMES

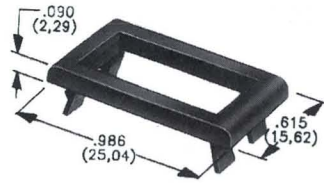
Special colors, custom markings available, consult factory.

### SEPARATE SNAP-IN FRAMES

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



#### FOR J1, J2 ACTUATORS

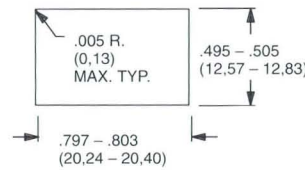


|  | .047 (1,19) PANEL THK. | .062 (1,57) PANEL THK. | .090 (2,29) PANEL THK. | .125 (3,18) PANEL THK. |        |
|--|------------------------|------------------------|------------------------|------------------------|--------|
|  | PART NO.               | PART NO.               | PART NO.               | PART NO.               | COLOR  |
|  | 452901000              | 452701000              | 452801000              | 452601000              | WHITE  |
|  | 452902263              | 452702263              | 452802263              | 452602263              | BLACK  |
|  | 452903000              | 452703000              | 452803000              | 452603000              | RED    |
|  | 452904000              | 452704000              | 452804000              | 452604000              | ORANGE |
|  | 452905000              | 452705000              | 452805000              | 452605000              | YELLOW |
|  | 452906000              | 452706000              | 452806000              | 452606000              | GREEN  |
|  | 452907000              | 452707000              | 452807000              | 452607000              | BLUE   |
|  | 452908000              | 452708000              | 452808000              | 452608000              | BROWN  |
|  | 452909000              | 452709000              | 452809000              | 452609000              | GRAY   |

#### FOR SERIES

7000, E

#### PANEL MOUNTING



#### FOR J50, J60, J80, J90 ACTUATORS

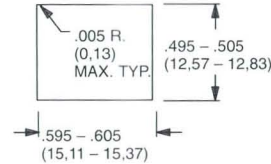


|  | .047 (1,19) PANEL THK. | .062 (1,57) PANEL THK. | .090 (2,29) PANEL THK. | .125 (3,18) PANEL THK. |        |
|--|------------------------|------------------------|------------------------|------------------------|--------|
|  | PART NO.               | PART NO.               | PART NO.               | PART NO.               | COLOR  |
|  | 432501000              | 432601000              | 432701000              | 432801000              | WHITE  |
|  | 432502263              | 432602263              | 432702263              | 432802263              | BLACK  |
|  | 432503000              | 432603000              | 432703000              | 432803000              | RED    |
|  | 432504000              | 432604000              | 432704000              | 432804000              | ORANGE |
|  | 432505000              | 432605000              | 432705000              | 432805000              | YELLOW |
|  | 432506000              | 432606000              | 432706000              | 432806000              | GREEN  |
|  | 432507000              | 432607000              | 432707000              | 432807000              | BLUE   |
|  | 432508000              | 432608000              | 432708000              | 432808000              | BROWN  |
|  | 432509000              | 432609000              | 432709000              | 432809000              | GRAY   |

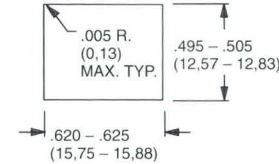
#### FOR SERIES

7000, E, 8020, 8060, 8500, E010, E020, TP

#### PANEL MOUNTING - 4325, 4326



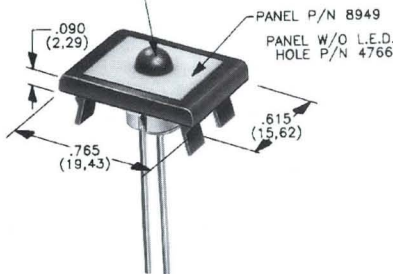
#### PANEL MOUNTING - 4327, 4328



PANEL INSERTS (WILL FIT SEPARATE SNAP-IN FRAMES FOR J50, J60, J90 ACTUATORS)

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

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



PANEL INSERT WITH HOLE FOR LED

BLANK PANEL INSERT WITHOUT HOLE FOR LED

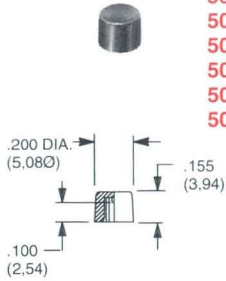
| PART NO.  | PART NO.  | COLOR  |
|-----------|-----------|--------|
| 894901000 | 476601000 | WHITE  |
| 894902000 | 476602000 | BLACK  |
| 894903000 | 476603000 | RED    |
| 894904000 | 476604000 | ORANGE |
| 894905000 | 476605000 | YELLOW |
| 894906000 | 476606000 | GREEN  |
| 894907000 | 476607000 | BLUE   |
| 894908000 | 476608000 | BROWN  |
| 894909000 | 476609000 | GRAY   |

## PUSHBUTTON CAPS

Special colors, custom marking available, consult factory. Material: Nylon. Finish: Round caps—gloss, Square caps—matte or gloss.

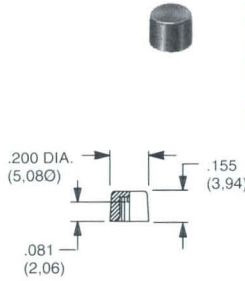
FOR .100 DIA. PLUNGERS

| PART NO.         |        |
|------------------|--------|
| <b>508101000</b> | WHITE  |
| <b>508102000</b> | BLACK  |
| <b>508103000</b> | RED    |
| <b>508104000</b> | ORANGE |
| <b>508105000</b> | YELLOW |
| <b>508106000</b> | GREEN  |
| <b>508107000</b> | BLUE   |
| <b>508108000</b> | BROWN  |
| <b>508109000</b> | GRAY   |



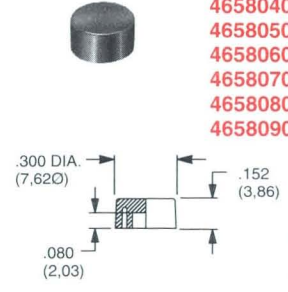
FOR SERIES  
EP, TP

| PART NO.         |        |
|------------------|--------|
| <b>538701000</b> | WHITE  |
| <b>538702000</b> | BLACK  |
| <b>538703000</b> | RED    |
| <b>538704000</b> | ORANGE |
| <b>538705000</b> | YELLOW |
| <b>538706000</b> | GREEN  |
| <b>538707000</b> | BLUE   |
| <b>538708000</b> | BROWN  |
| <b>538709000</b> | GRAY   |



FOR SERIES  
TP (RECOMMENDED FOR  
S9 PLUNGER OPTION)

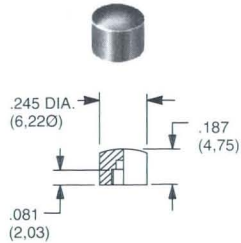
| PART NO.         |        |
|------------------|--------|
| <b>465801000</b> | WHITE  |
| <b>465802000</b> | BLACK  |
| <b>465803000</b> | RED    |
| <b>465804000</b> | ORANGE |
| <b>465805000</b> | YELLOW |
| <b>465806000</b> | GREEN  |
| <b>465807000</b> | BLUE   |
| <b>465808000</b> | BROWN  |
| <b>465809000</b> | GRAY   |



FOR SERIES  
EP, TP

FOR .106 DIA. PLUNGERS

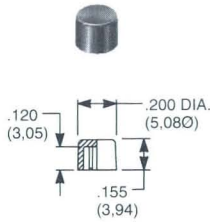
| PART NO.         |        |
|------------------|--------|
| <b>785101000</b> | WHITE  |
| <b>785102000</b> | BLACK  |
| <b>785103000</b> | RED    |
| <b>785104000</b> | ORANGE |
| <b>785105000</b> | YELLOW |
| <b>785106000</b> | GREEN  |
| <b>785107000</b> | BLUE   |
| <b>785108000</b> | BROWN  |
| <b>785109000</b> | GRAY   |



FOR SERIES  
8600

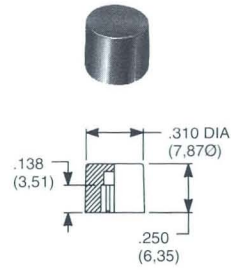
FOR .122 DIA. PLUNGERS

| PART NO.         |        |
|------------------|--------|
| <b>708901000</b> | WHITE  |
| <b>708902000</b> | BLACK  |
| <b>708903000</b> | RED    |
| <b>708904000</b> | ORANGE |
| <b>708905000</b> | YELLOW |
| <b>708906000</b> | GREEN  |
| <b>708907000</b> | BLUE   |
| <b>708908000</b> | BROWN  |
| <b>708909000</b> | GRAY   |



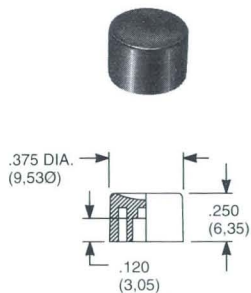
FOR SERIES  
8020, 8060, E010, E020, TP

| PART NO.         |        |
|------------------|--------|
| <b>801801000</b> | WHITE  |
| <b>801802000</b> | BLACK  |
| <b>801803000</b> | RED    |
| <b>801804000</b> | ORANGE |
| <b>801805000</b> | YELLOW |
| <b>801806000</b> | GREEN  |
| <b>801807000</b> | BLUE   |
| <b>801808000</b> | BROWN  |
| <b>801809000</b> | GRAY   |



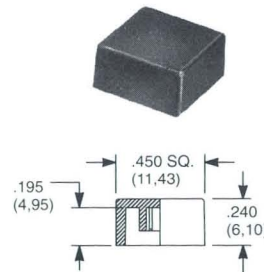
FOR SERIES  
8020, 8060, E010, E020, TP

| PART NO.         |        |
|------------------|--------|
| <b>752701000</b> | WHITE  |
| <b>752702000</b> | BLACK  |
| <b>752703000</b> | RED    |
| <b>752704000</b> | ORANGE |
| <b>752705000</b> | YELLOW |
| <b>752706000</b> | GREEN  |
| <b>752707000</b> | BLUE   |
| <b>752708000</b> | BROWN  |
| <b>752709000</b> | GRAY   |



FOR SERIES  
8020, 8060, E010, E020, TP

| MATTE            |        | GLOSS            |        |
|------------------|--------|------------------|--------|
| PART NO.         |        | PART NO.         |        |
| <b>798201000</b> | WHITE  | <b>484601000</b> | WHITE  |
| <b>798202000</b> | BLACK  | <b>484602000</b> | BLACK  |
| <b>798203000</b> | RED    | <b>484603000</b> | RED    |
| <b>798204000</b> | ORANGE | <b>484604000</b> | ORANGE |
| <b>798205000</b> | YELLOW | <b>484605000</b> | YELLOW |
| <b>798206000</b> | GREEN  | <b>484606000</b> | GREEN  |
| <b>798207000</b> | BLUE   | <b>484607000</b> | BLUE   |
| <b>798208000</b> | BROWN  | <b>484608000</b> | BROWN  |
| <b>798209000</b> | GRAY   | <b>484609000</b> | GRAY   |

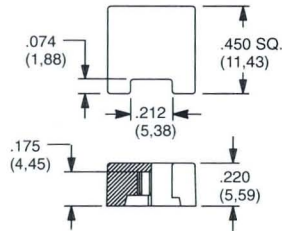


FOR SERIES  
8020, 8060, E010, E020, TP

## PUSHBUTTON CAPS

Special colors, custom marking available, consult factory. Material: Nylon. Finish: Round caps—gloss, Square caps—matte. Square caps w/LED cutout—matte or gloss.

FOR .122 DIA. PLUNGERS



MATTE

GLOSS

PART NO.

PART NO.

- 459701000
- 459702000
- 459703000
- 459704000
- 459705000
- 459706000
- 459707000
- 459708000
- 459709000

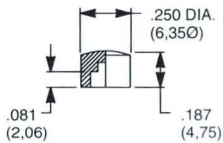
- 476801000
- 476802000
- 476803000
- 476804000
- 476805000
- 476806000
- 476807000
- 476808000
- 476809000

- WHITE
- BLACK
- RED
- ORANGE
- YELLOW
- GREEN
- BLUE
- BROWN
- GRAY

FOR SERIES

8020, 8060

FOR .157 DIA. PLUNGERS



PART NO.

- 479601000
- 479602000
- 479603000
- 479604000
- 479605000
- 479606000
- 479607000
- 479608000
- 479609000

FOR SERIES

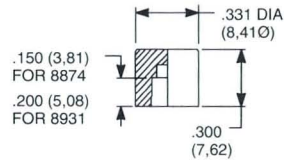
8500 (NOT AVAIL. WITH 85X1 MODELS)

PART NO.

- 448901000
- 448902000
- 448903000
- 448904000
- 448905000
- 448906000
- 448907000
- 448908000
- 448909000

FOR SERIES

8500



PART NO.

PART NO.

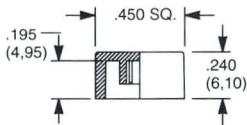
- 887401000
- 887402000
- 887403000
- 887404000
- 887405000
- 887406000
- 887407000
- 887408000
- 887409000

FOR SERIES

8500 (T OPTION W/ 85X2 AND 85X4 MODELS)

FOR SERIES

8500 (T OPTION W/ 85X2 AND 85X4 MODELS & T1 OPTION W/ ALL MODELS)

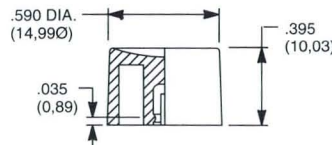
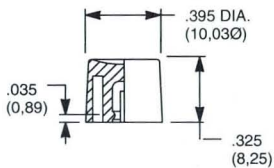


PART NO.

- 894101000
- 894102000
- 894103000
- 894104000
- 894105000
- 894106000
- 894107000
- 894108000
- 894109000

FOR SERIES

8020, 8060, E010, E020



PART NO.

- 894001000
- 894002263
- 894003000
- 894004000
- 894005000
- 894006000
- 894007000
- 894008000
- 894009000

FOR SERIES

8020, 8060, E010, E020

## END PLATES FOR CODED SWITCHES

### 3U SERIES



LEFT  
(W/HOLE)



RIGHT  
(W/PIN)

PART NO.

**627502000** LEFT — BLACK  
**627509000** LEFT — GRAY

**627602000** RIGHT — BLACK  
**627609000** RIGHT — GRAY

One left and right piece required for complete assembly.

### 3P SERIES



LEFT  
(W/HOLE)



RIGHT  
(W/PIN)

PART NO.

**623502000** LEFT — BLACK  
**623509000** LEFT — GRAY

**623602000** RIGHT — BLACK  
**623609000** RIGHT — GRAY

One left and right piece required for complete assembly.

### S2 SERIES



REAR MOUNT — STYLE S  
WITH .157 (4MM) FLANGE

PART NO.

**211702000** BLACK

Two required for complete assembly.



REAR MOUNT — STYLE R  
WITH .315 (8MM) FLANGE

PART NO.

**211802000** BLACK

Two required for complete assembly.



REAR MOUNT — STYLE T  
WITH NO FLANGE

PART NO.

**212002000** BLACK

Two required for complete assembly.



FRONT MOUNT — STYLE F

PART NO.

**211902000** BLACK

Two required for complete assembly.

### SF/SR SERIES



LEFT



RIGHT

FRONT MOUNT — STYLE SF

PART NO.

**234702000** LEFT — BLACK  
**234602000** RIGHT — BLACK

One left and right piece required for complete assembly.



LEFT



RIGHT

REAR MOUNT — STYLE SR

PART NO.

**211302000** LEFT — BLACK  
**211309000** LEFT — GRAY

**211402000** RIGHT — BLACK  
**211409000** RIGHT — GRAY

One left and right piece required for complete assembly.

## END PLATES FOR CODED SWITCHES

3 SERIES



FRONT MOUNT — STYLE 0

PART NO.

**413402000** BLACK  
**413409000** GRAY

Two required for complete assembly.



REAR MOUNT — STYLE 1

PART NO.

**400402000** BLACK  
**400409000** GRAY

Two required for complete assembly.



REAR MOUNT — STYLE 2

PART NO.

**473202000** BLACK  
**473209000** GRAY

Two required for complete assembly.



FRONT MOUNT — STYLE 3

PART NO.

**655702000** BLACK  
**655709000** GRAY

Two required for complete assembly.

### HARDWARE FOR FIELD ASSEMBLY — 3 SERIES ONLY

SCREWS FOR FIELD ASSEMBLY OF THUMBWHEEL SWITCHES  
(2 screws needed per assembly + 403500000 nuts.)

| SCREW PART NUMBER<br>(0-80 UNF THD. SIZE) | NUMBER OF SECTIONS IN ASSEMBLY |                     |                     |                     |                     |
|---|--------------------------------|---------------------|---------------------|---------------------|---------------------|
|   | FRONT MOUNTING                 |                     |                     | REAR MOUNTING       |                     |
|   | MTG. STYLE — 00, 30            | MTG. STYLE — 03, 33 | MTG. STYLE — 04, 34 | MTG. STYLE — 10, 20 | MTG. STYLE — 14, 24 |
| <b>412706000</b>                          | 1 - 2                          | 1                   | 1                   | 1 - 2               | 1                   |
| <b>412701000</b>                          | 3 - 4                          | 2 - 3               | 2                   | 3                   | 2                   |
| <b>412702000</b>                          | 5 - 7                          | 4 - 5               | 3 - 4               | 4 - 6               | 3 - 4               |
| <b>412703000</b>                          | 8 - 10                         | 6 - 8               | 5 - 6               | 7 - 9               | 5 - 6               |
| <b>412704000</b>                          | 11 - 13                        | 9 - 10              | 7 - 8               | 10 - 12             | 7 - 8               |
| <b>412705000</b>                          | 14 - 16                        | 11 - 13             | 9 - 10              | 13 - 15             | 9 - 10              |

See 3 Series mounting styles, pages F-37 thru F-40.



NUT

PART NO.

**403500000**

2 nuts required per assembly and screws.



NUT DRIVER  
(for 403500000 nut)

PART NO.

**406100652**

Not required for assembly. Not supplied with sample pieces.



## SPACERS FOR CODED SWITCHES

### 3U SERIES

**AVAILABLE  
SOON**

.100 THK.  
(Makes section pitch .400.)

PART NO.

**663902000** BLACK  
**663909000** GRAY

### 3P SERIES



.100 THK.  
(Makes section pitch .400.)

PART NO.

**663602000** BLACK  
**663609000** GRAY

### SF/SR SERIES



FRONT MOUNT—FITS STYLE SF  
.150 THK.

PART NO.

**212502000** BLACK



REAR MOUNT—FITS STYLE SR  
.150 THK.

PART NO.

**212202000** BLACK

### 3 SERIES



FRONT MOUNT—FITS STYLE 0 & 3  
.185 THK.  
(makes section pitch .500)

PART NO.

**410602000** BLACK  
**410609000** GRAY



FRONT MOUNT—FITS STYLE 0 & 3  
.078 (10mm) THK.  
(makes section pitch 10mm)

PART NO.

**410802000** BLACK  
**410809000** GRAY



REAR MOUNT—FITS STYLE 1  
.150 THK.  
(makes section pitch .500)

PART NO.

**410702000** BLACK  
**410709000** GRAY



REAR MOUNT—FITS STYLE 2  
.150 THK.  
(makes section pitch .500)

PART NO.

**473602000** BLACK  
**473609000** GRAY

## BLANK (INACTIVE) SECTIONS FOR CODED SWITCHES

### 3U SERIES



BLANK SECTION  
.300 THK.

PART NO.

**664002000** BLACK  
**664009000** GRAY

### 3P SERIES



BLANK SECTION  
.300 THK.

PART NO.

**663702000** BLACK  
**663709000** GRAY

### S2 SERIES



BLANK SECTION  
.315 THK.

PART NO.

**212702000** PLAIN — BLACK  
**229002000** W/RIB — BLACK

2127

2290  
W/RIB

### SF/SR SERIES



FRONT MOUNT — STYLE SF  
.312 THK.

PART NO.

**212602000** W/RIB — BLACK  
**234802000** W/RIB & SPRINGS — BLACK

2126  
W/RIB

2348  
W/RIB &  
SPRINGS



FRONT MOUNT — STYLE SF  
.312 THK.

PART NO.

**212402000** PLAIN — BLACK



REAR MOUNT — STYLE SR  
.312 THK.

PART NO.

**212102000** PLAIN — BLACK  
**212302000** W/RIB — BLACK

2121

2123  
W/RIB

## BLANK (INACTIVE) SECTIONS FOR CODED SWITCHES

### 3 SERIES



4136  
W/RIB  
  
4005  
W/RIB &  
W/OUT  
SPRINGS



4135  
PLAIN  
  
4007  
PLAIN &  
W/OUT  
SPRINGS

FRONT MOUNT — STYLE 0 & 3  
.315 THK.

PART NO.

**413602000** W/RIB — BLACK  
**413609000** W/RIB — GRAY

**400502000** W/RIB & W/OUT SPRINGS — BLACK  
**400509000** W/RIB & W/OUT SPRINGS — GRAY

FRONT MOUNT — STYLE 0 & 3  
.315 THK.

PART NO.

**413502000** PLAIN — BLACK  
**413509000** PLAIN — GRAY

**400702000** PLAIN & W/OUT SPRINGS — BLACK  
**400709000** PLAIN & W/OUT SPRINGS — GRAY



4006  
W/RIB



4008  
PLAIN

REAR MOUNT — STYLE 1  
.350 THK.

PART NO.

**400602000** W/RIB — BLACK  
**400809000** W/RIB — GRAY

**400802000** PLAIN — BLACK  
**400809000** PLAIN — GRAY



4734  
W/RIB



4733  
PLAIN

REAR MOUNT — STYLE 2  
.350 THK.

PART NO.

**473402000** W/RIB — BLACK  
**473409000** W/RIB — GRAY

**473302000** PLAIN — BLACK  
**473309000** PLAIN — GRAY

## MISCELLANEOUS COMPONENTS

### STOP PINS



PART NO.

- 3 SERIES ..... **40290000**
- 3P SERIES ..... **65780000**
- M SERIES ..... **53710000**
- SF/SR & S2 SERIES ... **58730000**

### CONNECTOR—3 SERIES

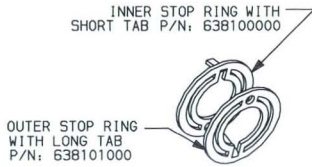


PART NO.

**40460000**

Fits 0, 1, 4, 5 terminations only.

### STOP RINGS—M SERIES



PART NO.

- 63810000** INNER—WITH SHORT TAB
- 638101000** OUTER—WITH LONG TAB

One each required for setting stops.

### CONNECTOR—3P SERIES



PART NO.

**63000000**

Fits 0, 1 terminations only.

### WASHERS—M SERIES



PART NO.

- 58680000** RUBBER PANEL SEAL
- 537202000** ADHESIVE MYLAR  
RETAINS STOP PINS

### CONNECTOR FOR Z3 TERMINATIONS



PART NO.

**53010000**

### LED SUPPORT—KS SERIES



PART NO.

**54030000**

### SPLASH RESISTANT COVER—LD SERIES



PART NO.

**67850000** 8 POSITION

Fits 8 position models with flush actuators only.

### TOGGLE CAPS

PART NO.

- 706201000** WHITE
- 706202000** BLACK
- 706203000** RED
- 706204000** ORANGE
- 706205000** YELLOW
- 706206000** GREEN
- 706207000** BLUE
- 706208000** BROWN
- 706209000** GRAY



VINYL FOR SERIES  
7000, 9000, E, T

PART NO.

- 896801000** WHITE
- 896802000** BLACK
- 896803000** RED
- 896804000** ORANGE
- 896805000** YELLOW
- 896806000** GREEN
- 896807000** BLUE
- 896808000** BROWN
- 896809000** GRAY



POLYETHYLENE FOR SERIES  
7000, 9000, E

PART NO.

- 763701000** WHITE
- 763702000** BLACK
- 763703000** RED
- 763704000** ORANGE
- 763705000** YELLOW
- 763706000** GREEN
- 763707000** BLUE
- 763708000** BROWN
- 763709000** GRAY



VINYL FOR SERIES  
7000

## ALABAMA

|                      |            |                |
|----------------------|------------|----------------|
| Allied Elect.        | Huntsville | (205) 721-3500 |
| Allied Elect.        | Mobile     | (205) 476-1875 |
| Component Dist. Inc. | Huntsville | (205) 883-7501 |
| Hamilton Hallmark    | Huntsville | (205) 837-8700 |
| Hammond Elect.       | Huntsville | (205) 830-4764 |
| Newark Elect.        | Birmingham | (205) 979-7003 |
| Newark Elect.        | Huntsville | (205) 837-9091 |
| Newark Elect.        | Mobile     | (205) 471-6500 |
| Newark Elect.        | Montgomery | (205) 270-8074 |
| Reptron Elect.       | Huntsville | (205) 722-9500 |
| RS Elect.            | Huntsville | (205) 721-9999 |
| Sager Elect. Supply  | Huntsville | (800) 448-3845 |

## ARKANSAS

|               |             |                |
|---------------|-------------|----------------|
| Newark Elect. | Little Rock | (501) 225-8130 |
|---------------|-------------|----------------|

## ARIZONA

|                       |         |                |
|-----------------------|---------|----------------|
| Allied Elect.         | Phoenix | (602) 437-9080 |
| Bell Industries       | Tempe   | (602) 966-3600 |
| Beswitched            | Phoenix | (602) 275-4805 |
| Cal-Switch            | Phoenix | (602) 230-8212 |
| Control Design Supply | Tempe   | (602) 829-7981 |
| Hamilton Hallmark     | Phoenix | (602) 437-1200 |
| LCOMP, Inc.           | Tempe   | (602) 730-1633 |
| Master Distributors   | Phoenix | (602) 267-1111 |
| Newark Elect.         | Phoenix | (602) 864-9905 |
| Newark Elect.         | Tempe   | (602) 966-6340 |
| Newark Elect.         | Tucson  | (602) 881-9001 |
| Richey/Cypress        | Tempe   | (602) 966-2256 |
| Sterling Elect.       | Phoenix | (602) 437-5565 |

## CALIFORNIA

|               |                  |                |
|---------------|------------------|----------------|
| Allied Elect. | Chatsworth       | (818) 882-6981 |
| Allied Elect. | Fremont          | (510) 505-0220 |
| Allied Elect. | Irvine           | (714) 727-3010 |
| Allied Elect. | Rocklin          | (916) 279-2550 |
| Allied Elect. | San Diego        | (619) 279-2550 |
| Allied Elect. | S. San Francisco | (415) 952-9599 |
| Allied Elect. | Torrance         | (310) 373-8828 |

## CALIFORNIA (Cont.)

|                         |                  |                |
|-------------------------|------------------|----------------|
| Bell Industries         | Agoura Hills     | (818) 879-9492 |
| Bell Industries         | Cypress          | (714) 895-7801 |
| Bell Industries         | Rocklin          | (916) 652-0418 |
| Bell Industries         | San Diego        | (619) 268-1277 |
| Bell Industries         | Sunnyvale        | (408) 734-8570 |
| Cal-Switch              | Cupertino        | (408) 279-8848 |
| Cal-Switch              | Gardena          | (310) 538-9830 |
| Cal-Switch              | San Diego        | (619) 231-6740 |
| Capstone Elect.         | Irvine           | (714) 587-0638 |
| Capstone Elect.         | San Jose         | (408) 453-9804 |
| Hamilton Hallmark       | Costa Mesa       | (714) 641-4100 |
| Hamilton Hallmark       | Rocklin          | (916) 624-9781 |
| Hamilton Hallmark       | Sunnyvale        | (408) 743-3300 |
| Hamilton Hallmark       | San Diego        | (619) 571-7540 |
| Hamilton Hallmark       | Woodland Hills   | (818) 594-0404 |
| Integrated Elect. Corp. | Sacramento       | (916) 363-6030 |
| Master Distributors     | Oakland          | (510) 835-1500 |
| Master Distributors     | Santa Monica     | (310) 452-1229 |
| Neumann Elect.          | San Diego        | (619) 695-3005 |
| Newark Elect.           | Arcadia          | (818) 445-1420 |
| Newark Elect.           | Citrus Heights   | (916) 721-1633 |
| Newark Elect.           | Dublin           | (510) 833-9449 |
| Newark Elect.           | Foster City      | (415) 572-8300 |
| Newark Elect.           | Lancaster        | (805) 940-1545 |
| Newark Elect.           | Long Beach       | (310) 427-7408 |
| Newark Elect.           | Los Gatos        | (408) 358-2949 |
| Newark Elect.           | Orange           | (714) 634-8224 |
| Newark Elect.           | Riverside        | (909) 784-1101 |
| Newark Elect.           | San Diego        | (619) 453-8211 |
| Newark Elect.           | San Diego        | (619) 569-8877 |
| Newark Elect.           | San Mateo        | (415) 571-5300 |
| Newark Elect.           | San Ramon        | (510) 743-0250 |
| Newark Elect.           | Santa Fe Springs | (310) 929-9722 |
| Newark Elect.           | Tustin           | (714) 838-8511 |
| Newark Elect.           | Ventura          | (805) 644-2265 |
| Newark Elect.           | West Hills       | (818) 888-3718 |
| PSC Elect.              | Sunnyvale        | (408) 737-1333 |

## CALIFORNIA (Cont.)

|                    |                  |                |
|--------------------|------------------|----------------|
| Richey/Cypress     | Garden Grove     | (714) 898-8288 |
| Richey/Cypress     | San Diego        | (619) 271-4511 |
| Richey/Cypress     | San Jose         | (408) 956-8010 |
| Richey/Cypress     | Sun Valley       | (818) 768-0403 |
| Sterling Elect.    | San Diego        | (619) 560-8097 |
| Sterling Elect.    | San Jose         | (408) 435-5566 |
| Sterling Elect.    | Tustin           | (714) 259-0900 |
| Sterling Elect.    | Westlake Village | (818) 865-2333 |
| Steven Engineering | S. San Francisco | (415) 588-9200 |
| Wes-Garde Comp.    | Van Nuys         | (818) 786-3724 |

## COLORADO

|                         |                  |                |
|-------------------------|------------------|----------------|
| Allied Elect.           | Englewood        | (303) 790-1664 |
| Bell Industries         | Denver           | (303) 691-9270 |
| Capstone Elect.         | Aurora           | (303) 375-1300 |
| Component Dist., Inc.   | Littleton        | (303) 770-6214 |
| Denver Beta Wintronics  | Arvada           | (303) 431-7161 |
| Hamilton Hallmark       | Colorado Springs | (719) 637-0055 |
| Hamilton Hallmark       | Englewood        | (303) 790-1662 |
| Integrated Elect. Corp. | Denver           | (303) 292-5537 |
| Kimball Elect.          | Denver           | (303) 893-1413 |
| Newark Elect.           | Colorado Springs | (719) 592-9494 |
| Newark Elect.           | Denver           | (303) 757-3351 |
| Newark Elect.           | Denver           | (303) 373-4540 |
| Richey/Cypress          | Englewood        | (303) 792-5829 |
| Sterling Elect.         | Englewood        | (303) 792-3939 |

## CONNECTICUT

|                     |             |                |
|---------------------|-------------|----------------|
| Allied Elect.       | Cheshire    | (203) 272-7730 |
| Bell Industries     | Meriden     | (203) 639-6000 |
| Hamilton Hallmark   | Cheshire    | (203) 271-2844 |
| Newark Elect.       | Bloomfield  | (203) 243-1731 |
| Newark Elect.       | Meriden     | (203) 630-2239 |
| Newark Elect.       | Windsor     | (203) 683-8860 |
| Park Distributors   | Bridgeport  | (203) 366-7200 |
| Sager Elect. Supply | Wallingford | (203) 265-4600 |
| Sterling Elect.     | Wallingford | (203) 265-9535 |
| Wes-Garde Comp.     | Hartford    | (203) 527-7705 |

## FLORIDA

|                      |                   |                |
|----------------------|-------------------|----------------|
| Allied Elect.        | Casselberry       | (407) 831-3331 |
| Allied Elect.        | Jacksonville      | (904) 739-5920 |
| Allied Elect.        | Largo             | (813) 541-4660 |
| Allied Elect.        | Miami Lakes       | (305) 558-2511 |
| Allied Elect.        | Pompano Beach     | (305) 978-3008 |
| Bell Industries      | Altamonte Springs | (407) 339-0078 |
| Electronic Equipment | Maitland          | (407) 539-0888 |
| Electronic Equipment | Miami             | (305) 526-6000 |
| Electronic Equipment | Tampa             | (813) 988-0810 |
| Hamilton Hallmark    | Ft. Lauderdale    | (305) 484-5482 |
| Hamilton Hallmark    | Largo             | (813) 541-7440 |
| Hamilton Hallmark    | Winter Park       | (407) 657-3300 |
| Hammond Elect.       | Ft. Lauderdale    | (305) 973-7103 |
| Hammond Elect.       | Orlando           | (407) 849-6060 |
| Newark Elect.        | Jacksonville      | (904) 399-5041 |
| Newark Elect.        | Melbourne         | (407) 727-3205 |
| Newark Elect.        | Miami             | (305) 593-2686 |
| Newark Elect.        | Ocala             | (904) 867-1114 |
| Newark Elect.        | Orlando           | (407) 896-8350 |
| Newark Elect.        | Plantation        | (305) 424-4400 |
| Newark Elect.        | Tampa             | (813) 287-1578 |
| Peerless Radio       | Pompano Beach     | (305) 973-4141 |
| Reptron Elect.       | Ft. Lauderdale    | (305) 735-1112 |
| Reptron Elect.       | Tampa             | (813) 854-2351 |
| Sager Elect. Supply  | Orlando           | (407) 354-1130 |
| Wes-Garde Comp.      | Lakeland          | (813) 644-7564 |

## GEORGIA

|                     |          |                |
|---------------------|----------|----------------|
| Allied Elect.       | Atlanta  | (404) 612-9360 |
| Hamilton Hallmark   | Duluth   | (404) 623-4400 |
| Hammond Elect.      | Norcross | (404) 449-1996 |
| Newark Elect.       | Atlanta  | (404) 448-8500 |
| Newark Elect.       | Macon    | (912) 743-2446 |
| Newark Elect.       | Norcross | (404) 448-1300 |
| Peerless Radio      | Atlanta  | (404) 612-9090 |
| Reptron Elect.      | Norcross | (404) 446-1300 |
| RS Elect.           | Norcross | (404) 242-0520 |
| Sager Elect. Supply | Norcross | (404) 446-0085 |



## HAWAII

Newark Elect. Honolulu (808) 839-0035

## IDAHO

A-I Elect. Coeur D'Alene (208) 765-3280  
 Kimball Elect. Boise (208) 342-3559  
 Kimball Elect. Pocatello (208) 232-2201  
 Newark Elect. Boise (208) 342-4311  
 Radar Electric Boise (208) 336-2227

## ILLINOIS

Advent Elect. Rosemont (708) 297-6200  
 Allied Elect. Libertyville (708) 918-0250  
 Allied Elect. Oak Forest (708) 535-0038  
 Allied Elect. Wood Dale (708) 860-0007  
 Bell Industries Elk Grove Village (708) 640-1910  
 Capstone Elect. Itasca (708) 250-0300  
 Classic Comp. Northbrook (708) 272-9650  
 Electronic Dist. Inc. Wauconda (708) 487-3347  
 Hamilton Hallmark Bensonville (708) 860-7780  
 Hawk Elect. Wheeling (708) 459-4030  
 Klaus Radio Champagne (217) 356-1896  
 Klaus Radio La Salle (815) 223-7400  
 Klaus Radio Peoria (309) 691-4840  
 Klaus Radio Quincy (217) 223-7560  
 LCOMP, Inc. Addison (708) 628-1400  
 LECTRO Comp. Carol Stream (708) 690-0520  
 Newark Elect. Addison (708) 495-7740  
 Newark Elect. Arlington Heights (708) 956-9270  
 Newark Elect. Peoria (309) 693-3771  
 Newark Elect. Rockford (815) 229-0225  
 Newark Elect. Schaumburg (708) 310-8980  
 Newark Elect. Springfield (217) 787-9972  
 Newark Elect. Willowbrook (708) 654-8250  
 Newark Elect. Willowbrook (708) 789-4780  
 Reptron Elect. Schaumburg (708) 882-1700  
 Sterling Elect. Schaumburg (708) 303-9900  
 Wes-Garde Comp. Carol Stream (708) 653-1460

## INDIANA

Advent Elect. Indianapolis (317) 872-4910  
 Allied Elect. Indianapolis (317) 875-0448  
 Altex Elect. Carmel (317) 848-1323  
 Bell Industries Ft. Wayne (219) 422-4300  
 Bell Industries Indianapolis (317) 875-8200  
 Custom Service Elect. Indianapolis (317) 879-9119  
 Hamilton Hallmark Indianapolis (317) 872-8875  
 Newark Elect. Bloomington (812) 330-0342  
 Newark Elect. Evansville (812) 423-2552  
 Newark Elect. Ft. Wayne (219) 484-0766  
 Newark Elect. Highland (219) 838-8902  
 Newark Elect. Indianapolis (317) 844-0047  
 Newark Elect. Indianapolis (317) 259-0085  
 Newark Elect. Merrillville (219) 738-2787  
 RS Elect. Indianapolis (317) 253-9065

## IOWA

Advent Elect. Cedar Rapids (319) 363-0221  
 Allied Elect. W. Des Moines (515) 223-6488  
 Dee Elect. Cedar Rapids (319) 365-7551  
 Newark Elect. Bettendorf (319) 359-3711  
 Newark Elect. Cedar Rapids (319) 393-3800  
 Newark Elect. West Des Moines (515) 222-0700

## KANSAS

Allied Elect. Lenexa (913) 599-6227  
 Hamilton Hallmark Lenexa (913) 888-4747  
 Newark Elect. Overland Park (913) 677-0727  
 Newark Elect. Wichita (316) 267-8755  
 RS Elect. Overland Park (913) 362-1923  
 Sterling Elect. Lenexa (913) 492-5406  
 Wes-Garde Comp. Overland Park (913) 262-2718

## KENTUCKY

Allied Elect. Louisville (502) 452-2293  
 Newark Elect. Lexington (606) 266-6446  
 Newark Elect. Louisville (502) 423-0280

## LOUISIANA

|               |          |                |
|---------------|----------|----------------|
| Allied Elect. | Metairie | (504) 885-1195 |
| MG Elect.     | Harahan  | (504) 733-0070 |
| Newark Elect. | Metairie | (504) 838-9771 |

## MARYLAND

|                     |            |                |
|---------------------|------------|----------------|
| Allied Elect.       | Columbia   | (301) 381-1560 |
| Bell Industries     | Columbia   | (410) 290-5100 |
| D.K. Elect.         | Columbia   | (301) 621-5775 |
| Hamilton Hallmark   | Columbia   | (410) 988-9800 |
| Newark Elect.       | Beltsville | (301) 604-1700 |
| Newark Elect.       | Hanover    | (410) 712-6922 |
| Peerless Radio      | Columbia   | (410) 997-1717 |
| Reptron Elect.      | Columbia   | (410) 290-5113 |
| Resco/Baltimore     | Baltimore  | (410) 931-8200 |
| Resco/Washington    | Beltsville | (301) 937-9100 |
| Sager Elect. Supply | Columbia   | (410) 995-4900 |
| Sterling Elect.     | Columbia   | (410) 290-3800 |

## MASSACHUSETTS

|                     |                  |                |
|---------------------|------------------|----------------|
| Allied Elect.       | Billerica        | (508) 667-7921 |
| Allied Elect.       | Norwood          | (617) 255-0361 |
| Bell Industries     | Andover          | (508) 474-8880 |
| Capstone Elect.     | Wilmington       | (508) 657-5874 |
| Gerber Elect.       | Norwood          | (617) 769-6000 |
| Hamilton Hallmark   | Peabody          | (508) 532-9808 |
| Heilind Elect.      | Wilmington       | (508) 657-4870 |
| Newark Elect.       | Methuen          | (508) 683-0913 |
| Newark Elect.       | Waltham          | (617) 622-5760 |
| Newark Elect.       | West Springfield | (413) 785-5851 |
| Newark Elect.       | Woburn           | (617) 932-9040 |
| Newark Elect.       | Worcester        | (508) 757-4515 |
| Sager Elect. Supply | Hingham          | (617) 749-6700 |
| Sterling Elect.     | Woburn           | (617) 938-6200 |

## MICHIGAN

|               |                  |                |
|---------------|------------------|----------------|
| Advent Elect. | Farmington Hills | (313) 477-1650 |
| Allied Elect. | Grand Rapids     | (616) 949-8200 |
| Allied Elect. | Plymouth         | (313) 416-9300 |

## MICHIGAN (Cont.)

|                   |                  |                |
|-------------------|------------------|----------------|
| Hamilton Hallmark | Novi             | (313) 347-4271 |
| Hamilton Hallmark | Plymouth         | (313) 416-5800 |
| Newark Elect.     | Farmington Hills | (313) 737-5150 |
| Newark Elect.     | Grand Rapids     | (616) 455-9190 |
| Newark Elect.     | Oak Park         | (313) 967-0600 |
| Newark Elect.     | Saginaw          | (517) 799-0480 |
| Newark Elect.     | Traverse City    | (616) 929-2313 |
| Newark Elect.     | Troy             | (313) 680-9110 |
| Reptron Elect.    | Livonia          | (313) 525-2700 |
| RS Elect.         | Flint            | (313) 742-5000 |
| RS Elect.         | Grand Rapids     | (616) 241-3483 |
| RS Elect.         | Livonia          | (313) 525-1155 |
| Spemco            | St. Clair Shores | (313) 771-2700 |

## MINNESOTA

|                   |                   |                |
|-------------------|-------------------|----------------|
| Allied Elect.     | Bloomington       | (612) 881-0838 |
| Digi-Key          | Thief River Falls | (218) 681-6674 |
| Gopher Elect.     | St. Paul          | (612) 490-4900 |
| Hamilton Hallmark | Bloomington       | (612) 881-2600 |
| Newark Elect.     | Crystal           | (612) 535-4280 |
| Newark Elect.     | Duluth            | (218) 727-4776 |
| Newark Elect.     | Minneapolis       | (612) 331-6350 |
| Newark Elect.     | St. Paul          | (612) 631-2683 |
| Reptron Elect.    | Minnetonka        | (612) 938-0000 |
| Richey/Cypress    | Eden Prairie      | (612) 934-2104 |
| Sterling Elect.   | Minneapolis       | (612) 831-2666 |

## MISSOURI

|                   |                  |                |
|-------------------|------------------|----------------|
| Allied Elect.     | Earth City       | (314) 291-7031 |
| Hamilton Hallmark | Earth City       | (314) 291-5350 |
| LCOMP, Inc.       | Kansas City      | (816) 241-0111 |
| LCOMP, Inc.       | Maryland Heights | (314) 291-6200 |
| Newark Elect.     | Crestwood        | (314) 821-7466 |
| Newark Elect.     | Maryland Heights | (314) 298-2505 |
| Newark Elect.     | Springfield      | (417) 869-7070 |
| RS Elect.         | Maryland Heights | (314) 997-7709 |
| Wes-Garde Comp.   | St. Louis        | (314) 567-7776 |



## MISSISSIPPI

Newark Elect. Ridgeland (601) 956-3834  
Newark Elect. Tupelo (601) 840-0305

## MONTANA

Newark Elect. Helena (406) 443-6192

## NEBRASKA

Allied Elect. Omaha (402) 697-0038  
Newark Elect. Omaha (402) 592-2423  
Scott Elect. Lincoln (402) 466-8221  
Scott Elect. Omaha (402) 734-6750

## NEVADA

Newark Elect. Las Vegas (702) 597-0330  
Newark Elect. Reno (702) 322-6090

## NEW HAMPSHIRE

Allied Elect. Nashua (603) 883-3006  
Astrum Elect. Atkinson (603) 898-3399  
Brevan Elect. Merrimack (603) 429-1900  
Newark Elect. Manchester (603) 645-6749  
Newark Elect. Nashua (603) 888-5790  
Sager Elect. Supply Salem (603) 898-1348  
Wes-Garde Comp. Nashua (603) 880-1971

## NEW JERSEY

Allied Elect. Edison (908) 572-9600  
Allied Elect. Moorestown (609) 234-7769  
Allied Elect. Parsippany (201) 428-3350  
Bell Industries Fairfield (201) 227-6060  
Capstone Elect. Marlton (609) 596-7500  
E.A.C. Teterboro (201) 288-4477  
Hamilton Hallmark Cherry Hill (609) 424-0110  
Hamilton Hallmark Parsippany (201) 515-5300  
Marlac Elect. Moorestown (609) 234-4200  
Newark Elect. Bordentown (609) 298-4450  
Newark Elect. Clark (908) 381-1343

## NEW JERSEY (Cont.)

Newark Elect. East Brunswick (908) 937-6600  
Newark Elect. Fairfield (201) 882-0300  
Newark Elect. Pennsauken (609) 663-9490  
Newark Elect. Union (908) 851-2290  
Relay Specialties Oakland (201) 337-1000  
Sterling Elect. Edison (908) 417-1000  
Sterling Elect. Mt. Laurel (609) 273-6420  
Wes-Garde Comp. Mt. Laurel (609) 778-8190

## NEW MEXICO

Bell Industries Albuquerque (505) 292-2700  
Betatron Elect. Albuquerque (505) 821-1122  
Newark Elect. Albuquerque (505) 828-1878  
Sterling Elect. Albuquerque (505) 884-1900

## NEW YORK

Advacom, Inc. PennYan (315) 536-2221  
Allied Elect. Fairport (716) 425-3850  
Allied Elect. Lagrangeville (914) 452-1470  
Allied Elect. Mineola (516) 248-2360  
Allied Elect. Syracuse (315) 463-2955  
Hamilton Hallmark Hauppauge (516) 434-7470  
Hamilton Hallmark Rochester (716) 475-9130  
Hamilton Hallmark Ronkonkoma (516) 737-0600  
Logicomp Elect. Mamaroneck (914) 698-9332  
Newark Elect. Binghamton (607) 771-8795  
Newark Elect. Cheektowaga (716) 862-9700  
Newark Elect. Commack (516) 499-1216  
Newark Elect. Latham (518) 783-0983  
Newark Elect. Pittsford (716) 381-4244  
Newark Elect. Syracuse (315) 437-6611  
Newark Elect. Wappingers Falls (914) 298-2810  
Peerless Radio Lynbrook (516) 593-2121  
Rome Elect. Rome (315) 337-5400  
Sager Elect. Supply Hauppauge (516) 348-1300  
Simcona Elect. Rochester (716) 328-3230  
Summit Distributors Buffalo (716) 887-2800  
Summit Elect. Rochester (716) 334-8110  
Switches Unlimited Woodside (718) 478-5000



# United States Distributors

## **NORTH CAROLINA**

|                     |            |                |
|---------------------|------------|----------------|
| Allied Elect.       | Raleigh    | (919) 876-5845 |
| Capstone Elect.     | Raleigh    | (919) 954-0600 |
| Hamilton Hallmark   | Raleigh    | (919) 872-0712 |
| Hammond Elect.      | Greensboro | (919) 275-6391 |
| Newark Elect.       | Charlotte  | (704) 535-5650 |
| Newark Elect.       | Greensboro | (919) 292-7240 |
| Newark Elect.       | Greensboro | (919) 294-2142 |
| Newark Elect.       | Raleigh    | (919) 781-7677 |
| Newark Elect.       | Wilmington | (919) 791-9393 |
| Reptron Elect.      | Raleigh    | (919) 870-5189 |
| Sager Elect. Supply | Raleigh    | (919) 850-9550 |
| Sterling Elect.     | Raleigh    | (919) 790-8734 |

## **OHIO**

|                     |             |                |
|---------------------|-------------|----------------|
| Advacom, Inc.       | Middleburg  | (216) 826-3300 |
| Aesco               | Akron       | (216) 762-8818 |
| Aesco               | Columbus    | (614) 882-6762 |
| Allied Elect.       | Beachwood   | (216) 831-4900 |
| Allied Elect.       | Cincinnati  | (513) 771-6990 |
| Allied Elect.       | Worthington | (614) 785-1270 |
| Bell Industries     | Dayton      | (513) 435-5922 |
| Bell Industries     | Solon       | (216) 498-2002 |
| Hamilton Hallmark   | Dayton      | (513) 439-6735 |
| Hamilton Hallmark   | Solon       | (216) 498-1100 |
| Hamilton Hallmark   | Worthington | (614) 888-3313 |
| Newark Elect.       | Akron       | (216) 374-9987 |
| Newark Elect.       | Cincinnati  | (513) 772-8181 |
| Newark Elect.       | Cleveland   | (216) 391-9330 |
| Newark Elect.       | Columbus    | (614) 431-0809 |
| Newark Elect.       | Dayton      | (513) 294-8980 |
| Newark Elect.       | Toledo      | (419) 866-0404 |
| Newark Elect.       | Youngstown  | (216) 793-6134 |
| Reptron Elect.      | Solon       | (216) 349-1415 |
| Sager Elect. Supply | Akron       | (216) 864-2111 |
| Sager Elect. Supply | Dayton      | (513) 298-5555 |
| Sterling Elect.     | Solon       | (216) 248-1122 |
| Thompson Electric   | Columbus    | (614) 228-6191 |
| Wes-Garde Comp.     | Westerville | (614) 885-0319 |

## **OKLAHOMA**

|                     |               |                |
|---------------------|---------------|----------------|
| Allied Elect.       | Tulsa         | (918) 664-0844 |
| Altair              | Tulsa         | (918) 252-5781 |
| Electro Enterprises | Oklahoma City | (405) 427-6591 |
| Hamilton Hallmark   | Tulsa         | (918) 254-6110 |
| Newark Elect.       | Oklahoma City | (405) 843-3301 |
| Newark Elect.       | Tulsa         | (918) 252-5070 |
| Sterling Elect.     | Tulsa         | (918) 663-2410 |

## **OREGON**

|                        |             |                |
|------------------------|-------------|----------------|
| Allied Elect.          | Portland    | (503) 252-0335 |
| Almac/Arrow Elect.     | Beaverton   | (503) 629-8090 |
| Bell Industries        | Beaverton   | (503) 644-3444 |
| Hamilton Hallmark      | Beaverton   | (503) 526-6200 |
| Integrated Elect. Corp | Beaverton   | (503) 641-1690 |
| Moore Elect. Inc.      | Tualatin    | (503) 692-5333 |
| Newark Elect.          | Portland    | (503) 257-0741 |
| Newark Elect.          | Portland    | (503) 297-1984 |
| Radar Electric         | Portland    | (503) 232-3404 |
| Wes-Garde Comp.        | Wilsonville | (503) 682-1333 |

## **PUERTO RICO**

|                   |             |                |
|-------------------|-------------|----------------|
| Hamilton Hallmark | Rio Piedras | (809) 764-1199 |
|-------------------|-------------|----------------|

## **PENNSYLVANIA**

|                   |                  |                |
|-------------------|------------------|----------------|
| Advacom, Inc.     | Export           | (412) 325-7551 |
| Advacom, Inc.     | McKean           | (814) 476-7774 |
| Aim Elect.        | Levittown        | (215) 946-3900 |
| Allied Elect.     | Camp Hill        | (717) 975-3570 |
| Allied Elect.     | Pittsburgh       | (412) 367-4124 |
| Bell Industries   | Treose           | (215) 953-2800 |
| C.M.D.            | North Versailles | (412) 678-6020 |
| Cumberland Elect. | Harrisburg       | (717) 232-9715 |
| Cumberland Elect. | Lancaster        | (717) 393-8416 |
| Cumberland Elect. | York             | (717) 845-8791 |
| E.C.I.            | York             | (717) 846-5334 |
| Newark Elect.     | Allentown        | (215) 434-7171 |
| Newark Elect.     | Cornwell Heights | (215) 245-7300 |

## PENNSYLVANIA (Cont.)

|                     |                 |                |
|---------------------|-----------------|----------------|
| Newark Elect.       | Ft. Washington  | (215) 265-0933 |
| Newark Elect.       | Pittsburgh      | (412) 343-9090 |
| Newark Elect.       | Pittsburgh      | (412) 788-4790 |
| Reptron Elect.      | Montgomeryville | (215) 855-0925 |
| Sager Elect. Supply | Mars            | (412) 772-2233 |
| Sager Elect. Supply | Philadelphia    | (215) 464-4336 |
| Shap Elect.         | Philadelphia    | (215) 969-3300 |

## RHODE ISLAND

|                      |           |                |
|----------------------|-----------|----------------|
| Major-Edwards Elect. | Pawtucket | (401) 725-7400 |
|----------------------|-----------|----------------|

## SOUTH CAROLINA

|               |               |                |
|---------------|---------------|----------------|
| Allied Elect. | Greenville    | (803) 288-8835 |
| Newark Elect. | Columbia      | (803) 798-0198 |
| Newark Elect. | Greenville    | (803) 288-9610 |
| Newark Elect. | N. Charleston | (803) 764-3091 |

## SOUTH DAKOTA

|               |             |                |
|---------------|-------------|----------------|
| Newark Elect. | Sioux Falls | (605) 333-0435 |
|---------------|-------------|----------------|

## TENNESSEE

|               |             |                |
|---------------|-------------|----------------|
| Allied Elect. | Memphis     | (901) 367-2895 |
| Newark Elect. | Brentwood   | (615) 371-1341 |
| Newark Elect. | Chattanooga | (615) 899-0056 |
| Newark Elect. | Knoxville   | (615) 588-6493 |
| Newark Elect. | Memphis     | (901) 365-8060 |
| Traver Elect. | Knoxville   | (615) 531-2255 |

## TEXAS

|               |            |                |
|---------------|------------|----------------|
| Allied Elect. | Austin     | (512) 219-7171 |
| Allied Elect. | Dallas     | (214) 553-4370 |
| Allied Elect. | El Paso    | (915) 779-6294 |
| Allied Elect. | Ft. Worth  | (817) 595-3500 |
| Allied Elect. | Houston    | (713) 455-3933 |
| Allied Elect. | Humble     | (713) 446-8005 |
| Altair        | Austin     | (512) 837-4970 |
| Altair        | Houston    | (713) 462-3029 |
| Altair        | Richardson | (214) 231-5166 |

## TEXAS (Cont.)

|                         |                |                |
|-------------------------|----------------|----------------|
| Bell Industries         | Richardson     | (214) 690-0482 |
| Capstone Elect.         | Carrollton     | (214) 380-9049 |
| Cal-Switch              | Austin         | (512) 424-9285 |
| Cal-Switch              | Dallas         | (214) 234-6227 |
| Douglas Elect.          | Corpus Christi | (512) 883-5103 |
| Hamilton Hallmark       | Austin         | (512) 258-8848 |
| Hamilton Hallmark       | Dallas         | (214) 553-4300 |
| Hamilton Hallmark       | Houston        | (713) 781-6100 |
| Ideal Industrial Elect. | El Paso        | (915) 779-6647 |
| Newark Elect.           | Arlington      | (817) 561-0292 |
| Newark Elect.           | Austin         | (512) 338-0287 |
| Newark Elect.           | Corpus Christi | (512) 857-5621 |
| Newark Elect.           | El Paso        | (915) 778-5322 |
| Newark Elect.           | Garland        | (214) 494-5911 |
| Newark Elect.           | Houston        | (713) 270-4800 |
| Newark Elect.           | Richardson     | (214) 235-1998 |
| Newark Elect.           | San Antonio    | (210) 734-7960 |
| Richey/Cypress          | Irvine         | (214) 255-0065 |
| Southwest Elect.        | Richardson     | (214) 234-3050 |
| Southwest Elect.        | Stafford       | (713) 240-4000 |
| Sterling Elect.         | Austin         | (512) 836-1341 |
| Sterling Elect.         | Carrollton     | (214) 243-1600 |
| Sterling Elect.         | Houston        | (713) 627-9800 |
| Wes-Garde Comp.         | Dallas         | (214) 357-1768 |

## UTAH

|                         |                  |                |
|-------------------------|------------------|----------------|
| Allied Elect.           | Salt Lake City   | (801) 261-5244 |
| Bell Industries         | Midvale          | (801) 561-9691 |
| Hamilton Hallmark       | Salt Lake City   | (801) 266-2022 |
| Integrated Elect. Corp. | West Valley City | (801) 977-9750 |
| Kimball Elect.          | Salt Lake City   | (801) 328-2075 |
| Newark Elect.           | Salt Lake City   | (801) 261-5660 |
| RA-ELCO                 | Salt Lake City   | (801) 487-7749 |
| Standard Supply         | Salt Lake City   | (801) 486-3371 |
| Sterling Elect.         | Salt Lake City   | (801) 972-5444 |



## United States Distributors

### **VIRGINIA**

|                  |                |                |
|------------------|----------------|----------------|
| Allied Elect.    | Springfield    | (703) 644-9515 |
| Allied Elect.    | Virginia Beach | (804) 363-8662 |
| Mextronics Corp. | Roanoke        | (703) 342-4444 |
| Newark Elect.    | Arlington      | (703) 968-0080 |
| Newark Elect.    | Herndon        | (703) 707-9010 |
| Newark Elect.    | Richmond       | (804) 282-5671 |
| Newark Elect.    | Roanoke        | (703) 772-6281 |
| Newark Elect.    | Virginia Beach | (804) 499-0719 |
| Sterling Elect.  | Richmond       | (804) 323-5510 |

### **VERMONT**

|               |               |                |
|---------------|---------------|----------------|
| Hooker Elect. | Colchester    | (802) 864-0885 |
| Newark Elect. | S. Burlington | (802) 860-1856 |

### **WASHINGTON**

|                         |          |                |
|-------------------------|----------|----------------|
| Allied Elect.           | Everett  | (206) 353-7313 |
| Allied Elect.           | Tacoma   | (206) 572-7745 |
| Almac/Arrow Elect.      | Bellevue | (206) 643-9992 |
| Bell Industries         | Redmond  | (206) 881-2140 |
| Hamilton Hallmark       | Redmond  | (206) 881-6697 |
| Integrated Elect. Corp. | Bellevue | (206) 455-2727 |
| Moore Elect., Inc.      | Kent     | (206) 251-8090 |
| Newark Elect.           | Bellevue | (206) 641-9809 |
| Newark Elect.           | Bellevue | (206) 641-4676 |
| Newark Elect.           | Spokane  | (509) 327-1935 |
| Radar Electric          | Richland | (509) 943-8336 |
| Radar Electric          | Seattle  | (206) 282-2511 |
| Radar Electric          | Spokane  | (509) 747-3053 |
| Richey/Cypress          | Seattle  | (206) 575-1910 |

### **WEST VIRGINIA**

|               |               |                |
|---------------|---------------|----------------|
| Newark Elect. | S. Charleston | (304) 744-9022 |
|---------------|---------------|----------------|

### **WISCONSIN**

|                      |            |                |
|----------------------|------------|----------------|
| Allied Elect.        | New Berlin | (414) 796-1280 |
| Bell Industries      | Waukesha   | (414) 547-8879 |
| Classic Comp.        | New Berlin | (414) 786-5300 |
| Hamilton Hallmark    | New Berlin | (414) 797-7844 |
| Hawk Elect.          | Waukesha   | (414) 547-4457 |
| Indust. Elect. Of WI | Milwaukee  | (414) 276-1212 |
| Newark Elect.        | Brookfield | (414) 783-6566 |
| Newark Elect.        | Green Bay  | (414) 494-1400 |
| Newark Elect.        | Madison    | (608) 221-4738 |
| Newark Elect.        | Wauwatosa  | (414) 453-9100 |
| Taylor Electric      | Mequon     | (414) 241-4321 |

### **WYOMING**

|                      |          |                |
|----------------------|----------|----------------|
| Houge Radio & Supply | Cheyenne | (307) 632-6474 |
|----------------------|----------|----------------|



## ALBERTA

|               |          |                |
|---------------|----------|----------------|
| Future Elect. | Calgary  | (403) 250-5550 |
| Future Elect. | Edmonton | (403) 438-2848 |
| Zentronics    | Calgary  | (403) 291-1988 |
| Zentronics    | Edmonton | (403) 482-3038 |

## BRITISH COLUMBIA

|                      |                 |                |
|----------------------|-----------------|----------------|
| Future Elect.        | Vancouver       | (604) 294-1166 |
| Hamilton Hallmark    | Burnaby         | (604) 420-4101 |
| Intek Elect.         | Burnaby         | (614) 294-8100 |
| Newark Elect.        | New Westminster | (604) 520-5721 |
| Pacific Coast Elect. | Victoria        | (604) 385-5111 |
| Queale Elect. Ltd.   | Victoria        | (604) 388-6111 |
| Zentronics           | Richmond        | (604) 273-5575 |

## MANITOBA

|               |          |                |
|---------------|----------|----------------|
| Future Elect. | Winnipeg | (204) 786-7711 |
| Zentronics    | Winnipeg | (204) 989-1957 |

## ONTARIO

|                        |             |                |
|------------------------|-------------|----------------|
| Capstone Elect.        | Mississauga | (416) 670-2010 |
| Carsten Elect. Ltd.    | Markham     | (416) 477-7705 |
| Electronic Wholesalers | Ottawa      | (613) 746-4413 |
| Future Elect.          | Mississauga | (416) 612-9200 |
| Future Elect.          | Ottawa      | (613) 820-8313 |

## ONTARIO (Cont.)

|                   |             |                |
|-------------------|-------------|----------------|
| Hamilton Hallmark | Mississauga | (416) 564-6060 |
| Hamilton Hallmark | Nepean      | (613) 226-1700 |
| Newark Elect.     | London      | (519) 685-4280 |
| Newark Elect.     | Mississauga | (416) 670-2888 |
| Newark Elect.     | Mississauga | (416) 670-4185 |
| Nova Elect. Dist. | Concord     | (416) 669-9060 |
| Zentronics        | Mississauga | (416) 507-4400 |
| Zentronics        | Nepean      | (613) 226-8840 |

## QUEBEC

|                        |                   |                |
|------------------------|-------------------|----------------|
| Carsten Elect. Ltd.    | St. Laurent       | (514) 334-8321 |
| Electronic Wholesalers | Montreal          | (514) 769-8861 |
| Electronic Wholesalers | Ste. Foy          | (418) 657-5020 |
| Ferrotechnics          | Pointe Claire     | (514) 333-7288 |
| Future Elect.          | Pointe Claire     | (514) 694-7710 |
| Future Elect.          | Quebec City       | (418) 877-6666 |
| Hamilton Hallmark      | Ville St. Laurent | (514) 335-1000 |
| Newark Elect.          | Laval             | (514) 681-6476 |
| Newark Elect.          | Mount Royal       | (514) 738-4488 |
| Zentronics             | Ville St. Laurent | (514) 737-9700 |
| Zentronics             | Ste. Foy          | (418) 654-1077 |



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Fax: (1)3042010

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Parramatta, NSW 2150  
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Fax: (02)6339137

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A-1160 Wien  
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Fax: (0222)457743

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Ninoofsesteenweg 155  
1750 Schepdaal  
Telephone: (02)5692934  
Fax: (02)5697018

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Brooklin, Sao Paulo SP  
Telephone: (11)5360355  
Fax: (11)2402650

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**Kaifa Trading Co. Ltd.**  
2202 H. K. Worsted Mills Ind. Bldg.  
31-39 Wo Tong Tsui St.  
Kwai Chung, New Territories  
Telephone: 4851933  
Fax: 4804723

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Vibeholmsvej 16  
DK-2605 Brondby  
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Fax: (43)432322

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Wurlitzergasse, 10/3  
A-1160, Wien (Austria)  
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Fax: (0222)4652438

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P.O.Box 58/Tammisalontie  
400830 Helsinki  
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Fax: (0)788256

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75013 Paris  
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Fax: (1)45821012

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Fax: (089)75908142

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Athens 11743  
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Fax: (1)9017024



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Fax: (3)7959068

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### **Accutrol Systems Private Ltd.**

Nirmal, 15th Floor, Nariman Pt.  
Bombay 400 021

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Fax: (22)202-9403

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### **Futura Electronics Ltd.**

68 Church Street  
Skerries, Co. Dublin

Telephone: (1)8490680

Fax: (1)8491549

## **ISRAEL**

### **Telsys Ltd./Electronic Engineering**

Atidim Industrial Park  
Dvora Hanevia St., Neve Sharet  
Tel-Aviv 61431

Telephone: (3)492001

Fax: (3)497407

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Via Fratelli Di Dio, 18  
20063 Cernusco S/N  
Milano

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Fax: (02)92107135

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### **Midoriya Electric Co. Ltd.**

2-7-19, Kyobashi  
Chou-Ku, Tokyo 104

Telephone: (3)3561-5763

Fax: (3)3561-5794

## **KOREA**

### **Duckwoo International Co., Ltd.**

Duckwoo Bldg. 69-4, Moonjung-Dong  
Songpa-Gu, Seoul (POB 103, Seoul)

Telephone: (02)449-9231~7

Fax: (02)449-9238

## **MALAYSIA (WEST)**

### **DCP (M) SDN BHD**

6th Floor, Wisma Denko  
41, Aboo Sittee Lane, 10400 Penang

Telephone: (4)281860

Fax: (4)281420

## **NETHERLANDS**

### **Elproma Electronica BV**

Nijendal 42 / Postbus 170  
3970 AD Driebergen

Telephone: (03438)18724

Fax: (03438)12286

## **NEW ZEALAND**

### **Active Components (N.Z.) Ltd.**

6 Silverfield, Glenfield, Auckland  
P.O. Box 100-544, NSMC, Auckland

Telephone: (9)4443669

Fax: (9)4440193

## **NORWAY**

### **Freber Norge A/S**

Betzy Kjelsbergsv. 263  
Boks 3583, 3007 Drammen

Telephone: 32825350

Fax: 32824760

## **PHILIPPINES**

### **Alexan Commercial**

812 Elcano Street  
Binondo, Manila

Telephone: (2)402223

Fax: (2)405952



## **POLAND**

### **Elproma Elektronika Sp. z.o.o.**

ul. Mariensztat 8

00-302 Warsaw

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Fax: (2)6351182

## **PORTUGAL**

### **Ditram Componentes E Electronica, Lda.**

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1000 Lisboa (Lisbon)

Telephone: (1)7934834

Fax: (1)7934984

## **SINGAPORE**

### **Dynamar Computer Products Pte. Ltd.**

109, Defu Lane 10

Singapore 1953

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Fax: 2813308

## **SOUTH AFRICA**

### **Suntronika (Pty.) Ltd.**

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Braamfontein, Johannesburg

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Fax: (011)4034050

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### **Unitronics, S.A.**

Plaza Espana, 18 - Planta 9

28008 Madrid

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Fax: (1)5484228

Barcelona (office)

Telephone: (3)4052800

Fax: (3)4053936

Las Arenas (Vizcaya) (office)

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Fax: (4)4644224

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### **Freber Elektronik AB**

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S-135 70 Stockholm

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### **Sibalco, W. Siegrist & Co., AG**

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Fax: (061)2611664

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### **Formosa Elite Corp.**

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Fax: (02)3613619

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### **Dynamar Computer Products Co. Ltd. (Thailand)**

2991/19 Visuthanee, 1/F, Ladprao Rd.

SOI 101-103, Klongchan, Bangkok, Bangkok 10220

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Fax: 23760133

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### **Bupat Co. Ltd.**

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Fax: (4)4180484

Istanbul (office)

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Fax: (01)3462460

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### **Roxburgh Electronics Ltd.**

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Scunthorpe, South Humberside DN15 8QJ

Telephone: (0724)281770

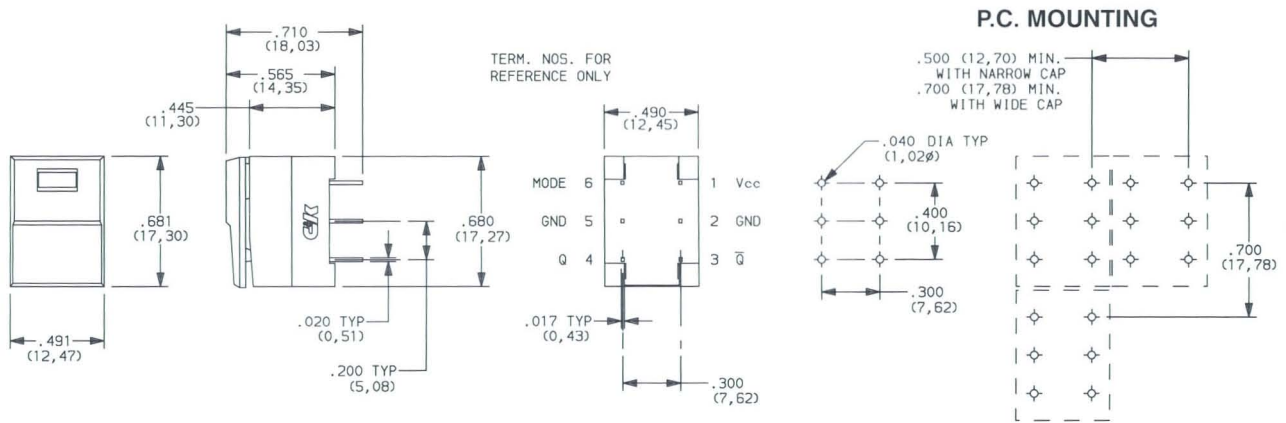
Fax: (0724)281650



## SS SERIES SOLID STATE PUSHBUTTON SWITCHES



- CUSTOM I.C. BUILT-IN—INTERFACE SWITCH DIRECTLY TO USER LOGIC
- BOUNCE-FREE OUTPUT—PROVIDES 'CLEANING' FUNCTION
- USERS SELECTABLE OPERATION—SPDT MOMENTARY OR ALTERNATE ACTION
- INTEGRAL L.E.D. DISPLAY FOR INDICATION OF STATE
- TWO L.E.D. STYLES, TWO CAP STYLES WITH EIGHT AVAILABLE COLORS
- DIP PATTERN COMPATIBLE



### DESCRIPTION

The custom integrated circuit provides all of the "cleaning" functions necessary to interface the switch directly to user logic. The mechanical switching assembly, a single pole double throw contact spring, is connected to the input of a conventional R-S flip-flop to provide positive debounce. The low input current requirement and large voltage compliance of the flip-flop allow a low-force long life switch design.

Depending upon the status of the mode pin, the signal out of the debounce circuitry is directed to a divide-by-two flip-flop (for alternate action operation) or directly to the output drivers (for momentary operation). Positive output of the circuit is provided by the use of current-mirror circuitry, achieving the closest possible tracking of the supply over a large output range and minimum standby current requirements. Sufficient current sink capability is maintained via large area device to drive a minimum of 10 TTL style loads. The I.C. also supplies regulated current to an integral L.E.D. display.

Power up circuitry insures that the status of the switch is determined at the time of system turn-on. The 'Q' output is in the 'OFF' (low level) state. The opposite logic condition exists at the 'Q̄' output, due to internal inversion and duplication of the power output stage. The two outputs are loaded independently, and are capable of driving full loads simultaneously. Short circuits to either the supply or ground are permitted for indefinite periods at the outputs without interference to normal operation since the output pins are totally buffered from the switching input section. In fact, operation at normal logic levels is possible from one output even when the other output is shorted. A linked short at the ground terminals reduces the complication of board layout for mounting of multiple switch units.

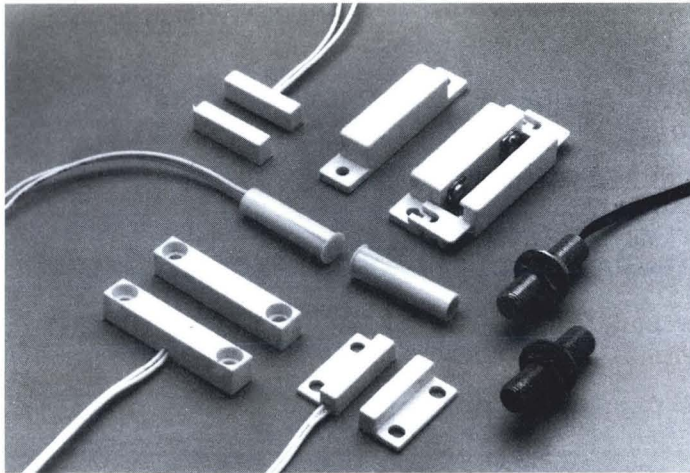
### SPECIFICATIONS

- SWITCHING FUNCTION: SPDT, Momentary or alternate action, user choice with jumper in external circuit.
- OPERATING TEMPERATURE: 0°C to 70°C.
- OPERATING FORCE: 150 grams typ; consult factory for complete specifications and ratings.

### MATERIALS

- CASE: Glass filled nylon.
- CAP: Polycarbonate—ABS blend (UL 940-0), matte finish, 8 colors available, black standard.
- TERMINALS: Solder clad, insert molded.

## PS SERIES MAGNETIC PROXIMITY SENSORS



- FEATURING HIGH TECHNOLOGY REED SWITCHES WITH ALNICO 5 MAGNETS
- RUGGED IMPACT RESISTANT HOUSING
- TESTED TO MILITARY STANDARDS FOR SHOCK AND VIBRATION
- LOW LEVEL LIFE EXPECTANCY OF 100 MILLION OPERATIONS
- SPEEDY INSTALLATION
- CUSTOM OPTIONS INCLUDE WIRE LENGTH AND COLOR, CONSULT FACTORY

## DESCRIPTION

MAGNETIC PROXIMITY SENSORS operate when a magnetic field approaches two opposing magnetic reed blades. Within this actuation distance, the magnetic field will overcome the spring tension of the overlapping blades and bring the contacts together. When the magnetic field is removed, the reeds separate by their own spring tension.

PS SERIES MAGNETIC PROXIMITY SENSORS feature reed switches with bifurcated dry reed contacts and a vacuum deposited ruthenium coating on the contact surfaces. Bifurcation substantially reduces the incidence and duration of contact bounce on closure and minimizes contact noise. Ruthenium contact surfaces exhibit exceptional wear characteristics, stable contact resistance throughout life, and no cold-weld tendency. The contacts of

the reed switches are sealed within a glass capsule using a high energy CO<sub>2</sub> laser to assure seal integrity. The supplied Alnico 5 magnets have excellent stability and resist magnetism loss due to aging and temperature.

Typical applications include counting, limit sensing, size or level indication, and path interruption indication. Typical examples are automotive seat belt and air bag inflation sensing, industrial paper roll sizing, and door open indicator.

## SPECIFICATIONS

**ELECTRICAL CIRCUIT:** SPST normally open switch contacts.  
Contacts are held closed when magnet is within actuation range.

**CONTACT RATING:** Switching—20 VDC max., 0.5 A max., 10 VA max. Carrying—1.5 A max.

**CONTACT RESISTANCE:** 0.20 ohms.

**DIELECTRIC STRENGTH:** 350 VDC min.

**MAGNETS:** Alnico 5.

**OPERATING FREQUENCY:** 500 Hz.

**VIBRATION:** 30 G max. at 10-2000 Hz, no false opening or closure of contacts > 20 milliseconds, per MIL-STD-202F, Method 204C, Condition D, and Method 310, Condition E.

**SHOCK:** 100 G max. at 11 millisecond impact duration, no false opening or closure of contacts > 20 milliseconds, per MIL-STD-202F, Method 213B, Condition C, and Method 310, Condition E.

**TRANSIENT:** 5000 V with 8 A peak, 2 x 200 microsecond pulse.  
No contact welding with switch contacts closed.

**OPERATING TEMPERATURE:** -40°F to 140°F (-40°C to 60°C).

## MATERIALS

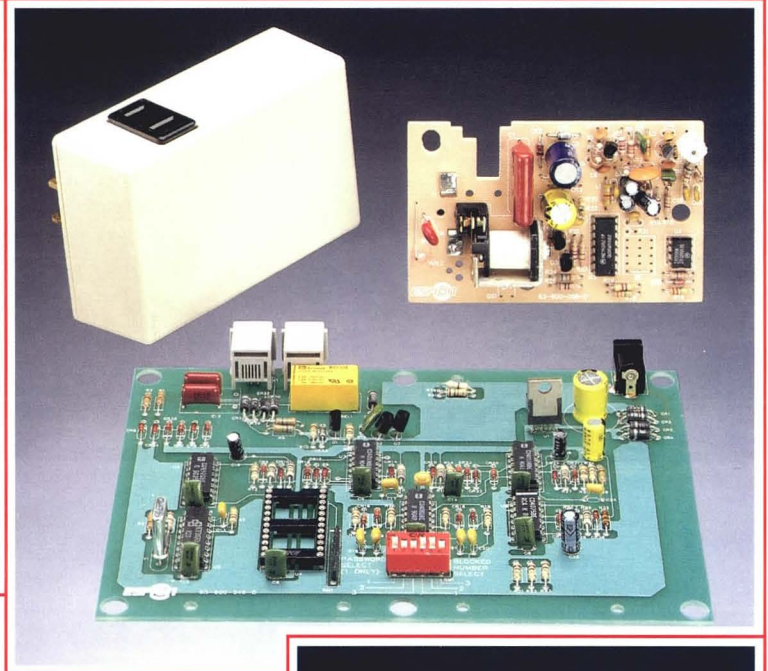
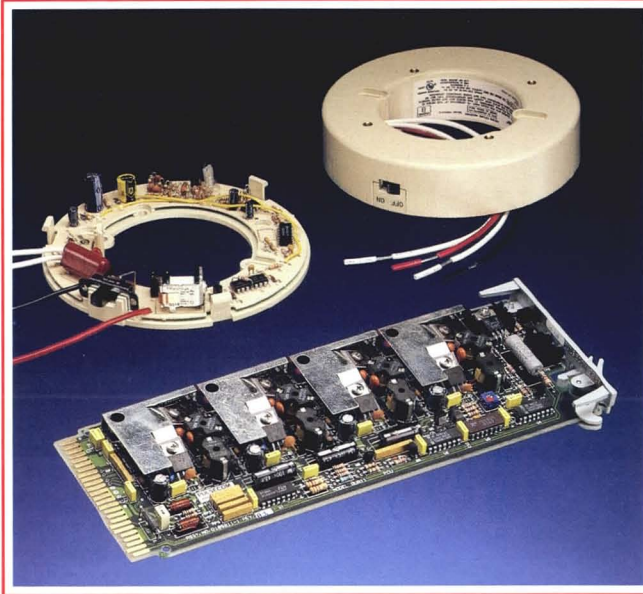
**REED SWITCH:** Sputtered ruthenium contacts, bifurcated. Laser sealed glass capsule with dry nitrogen atmosphere.

**WIRE LEADS:** UL 1007, 22 AWG, 12" length standard.

**HOUSING:** All models except PS15-ABS (UL 94V-0), brown standard. PS15 model—Brass, zinc chromate plated.

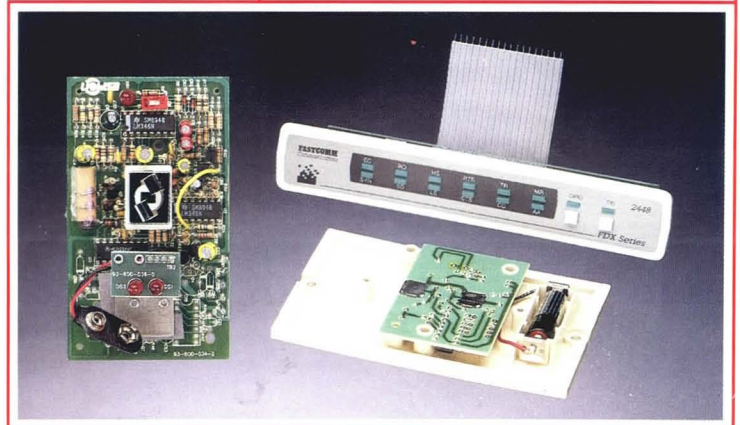


# Custom Manufacturing



Espion, Inc. is a wholly owned and operated subsidiary of C&K Components, Inc. specializing in complete turn-key manufacturing services. Our modern manufacturing facilities utilize extensive process control and inventory control methods capable of providing you with consistent high quality products and the fastest delivery.

- Complete electronic and mechanical design services
- Extensive CAD / CAM / CAE services
- Printed circuit board design
- Manual and semi-automatic thru-hole & SMT printed circuit board assembly and soldering
- Worldwide component procurement
- Compliance with many Mil Std procedures
- Thorough In-Process inspection
- In-circuit, Burn-in and Environmental Testing



For more information on our contract manufacturing services, return the attached card in the back of this book, or call:  
Telephone: 617-527-7700 Fax: 617-332-2379



## Clayton / Unimax Division

C&K Clayton / Unimax Division manufactures and sells a complete line of switchlocks, slide, rotary, rocker, pushbutton, Unimax precision snap-acting and metal cased switches. The ultra-modern facility in Clayton, North Carolina features extensive automation and flexible cellular manufacturing methods capable of producing the highest quality products and the fastest delivery. An aggressive program of new product development and market expansion is supported by an international network of sales representatives and distributors offering a full range of solutions to your switching requirements.

Our value-added capabilities enable us to meet your application specific requirements with the addition of harnesses, wire leads, and custom markings and colors.



- Low, medium and high security switchlocks
- One, two, three and four pole illuminated pushbuttons
- Slide switches with ratings from low level to 15 Amps
- Rotary switches with 30°, 36°, 45°, 60° & 90° indexing
- Power rockers with ratings to 16 Amps @ 125 V AC-1/2 HP



## Clayton / Unimax Division



C&K offers the industry's widest selection of Unimax precision, general purpose, miniature and subminiature snap-action and metal cased switches.

- Ratings from low level to 30 Amps @ 480 V AC
- Various terminations, actuators and operating forces
- Military specified models available
- Splashproof versions of precision & heavy duty series
- UL, CSA, VDE and BEAB



In addition, C&K Clayton / Unimax is the exclusive U.S. distributor for RAFI GmbH, regarded as one of the premiere manufacturers of industrial and commercial-grade switch controls and switch control components in Europe. The RAFI product line expands C&K's product offerings to include commercial and industrial-grade pushbutton, switchlock, rotary selector and toggle switches, as well as indicator lamps, interlock / gang switches and specialty control components.

For a complete listing of C&K Clayton / Unimax products, return the attached card in the back of this book, or call:  
Telephone: 800-334-7729 Fax: 919-553-4758



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**SALES/CUSTOMER SERVICE DIRECT: (800) 635-5936**

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