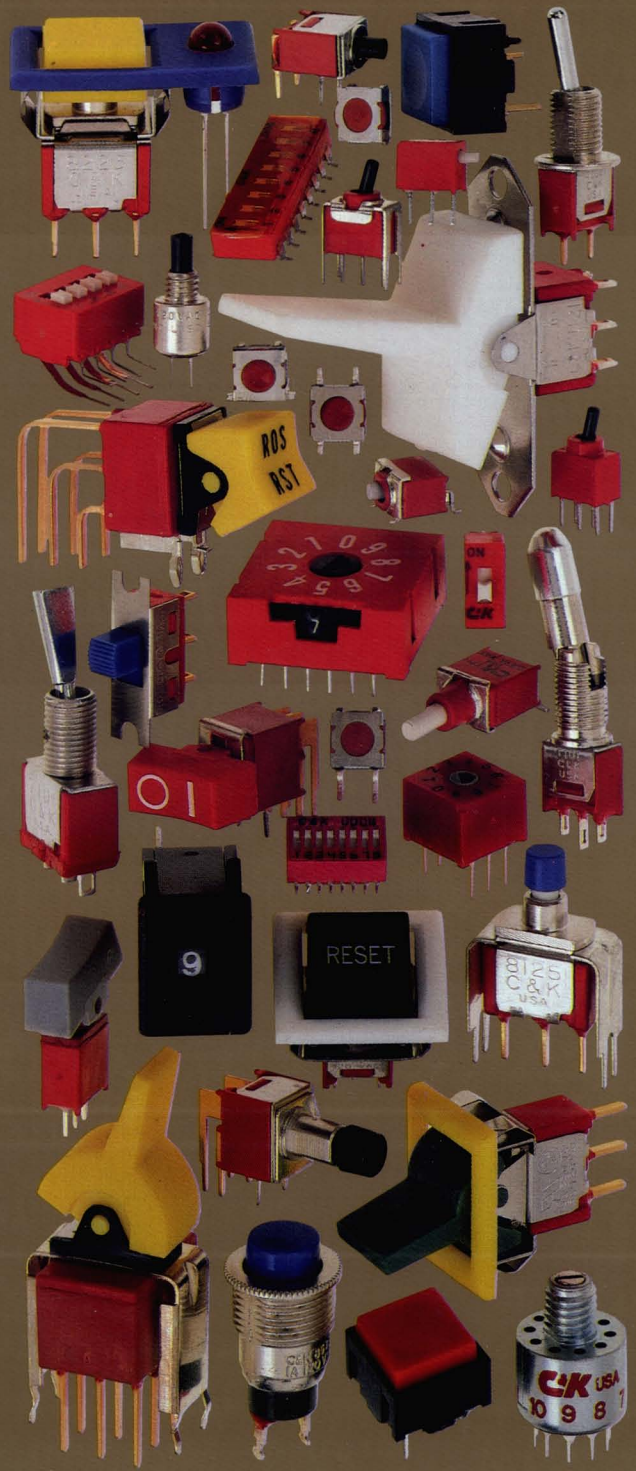




The Primary Source Worldwide...
SWITCHES — NEWTON DIVISION





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:

Telephone: 800-635-5936

Fax: 617-527-3062



The Primary Source Worldwide...

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

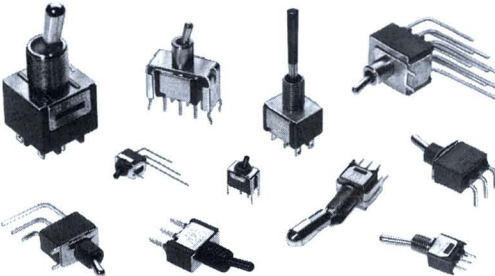
Philip R. Felton
Philip R. Felton
Director of Quality

Agency Approvals VIII
 LED Information; Sealed/Process Compatible Switch Information IX
 Unsealed Switches – Soldering & Cleaning; Contact Material & Application Recommendations; 3-Way Switches X



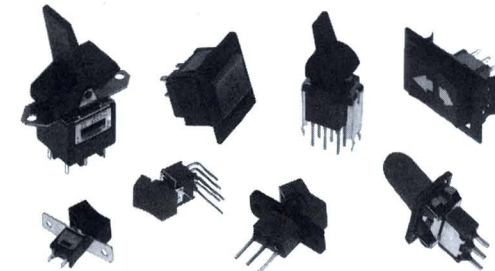
SECTION A – SURFACE MOUNT SWITCHES

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



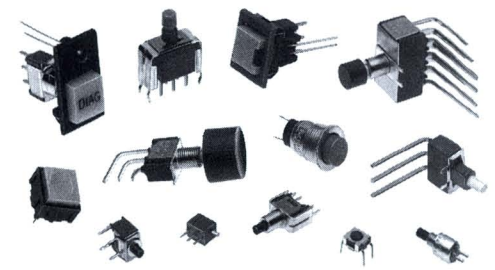
SECTION B – TOGGLE SWITCHES

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



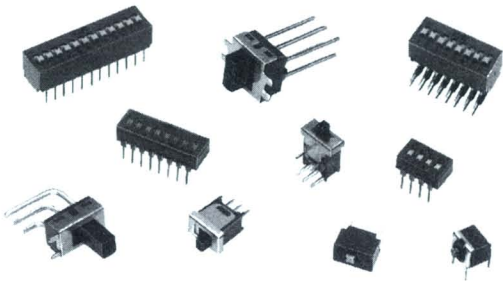
SECTION C – ROCKER AND LEVER HANDLE SWITCHES

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



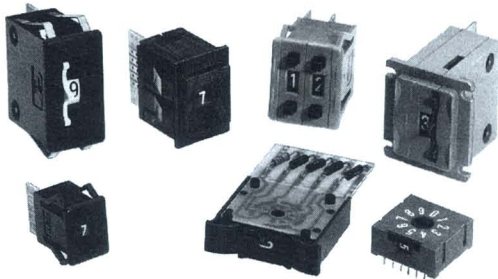
SECTION D – PUSHBUTTON SWITCHES

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 Pulse Momentary Pushbutton Switches D-70 thru D-73



SECTION E – DIP AND SLIDE SWITCHES

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



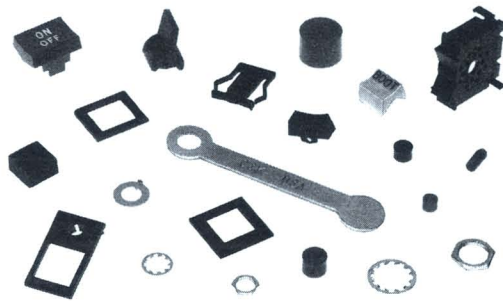
SECTION F – CODED SWITCHES

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



SECTION G – MEMBRANE KEYPADS AND ROTARY SWITCHES

4000 Series	Membrane Keypads	G-2 thru G-3
M Series	Half - Inch Rotary Switches	G-4 thru G-10



SECTION H – HARDWARE AND ACCESSORIES

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

Distributors – United States	XI thru XVIII
Distributors – Canada	XIX
Distributors – International	XX thru XXII
Other C&K Products	XXIII thru XXIV, See Also Insert & Reply Cards Inside Back Cover

A

B

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E

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G

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INDEX BY SWITCH SERIES

SERIES	SWITCH TYPE	SECTION PAGES	SERIES	SWITCH TYPE	SECTION PAGES
BD	Washable DIP Switches	E-4 thru E-6	M	Half-Inch Rotary Switches	G-4 thru G-10
BP	Side Actuated DIP Switches	E-7 thru E-8	S2	Subminiature Thumbwheel Switches	F-15 thru F-20
E	Sealed Toggle Switches	B-18 thru B-29	SF/SR	Thumbwheel Switches	F-21 thru F-31
	Sealed Anti-Static Rocker & Lever Handle Switches	C-12 thru C-26	T	Tiny Toggle Switches	B-12 thru B-17
E010	Sealed Momentary Pushbutton Switches	D-17 thru D-22		Tiny Rocker Switches	C-7 thru C-11
E020	Sealed Snap-Acting Momentary Pushbutton Switches	D-23 thru D-30	TP	Tiny Pushbutton Switches	D-10 thru D-16
EP	Sealed Surface Mount Tiny Pushbutton Switches	A-16 thru A-17	TS	Tiny Slide Switches	E-11 thru E-13
	Sealed Tiny Pushbutton Switches	D-4 thru D-9	UD	Sealed Ultra-Miniature Surface Mount DIP Switches	A-2
ET	Sealed Surface Mount Tiny Toggle Switches	A-14 thru A-15	1000	Miniature Slide Switches	E-14 thru E-20
	Sealed Tiny Toggle Switches	B-6 thru B-11	3	Thumbwheel Switches	F-32 thru F-44
	Sealed Tiny Rocker Switches	C-2 thru C-6	3M	Minithumbwheel Switches	F-2 thru F-4
GP	Sealed Ultra-Miniature Surface Mount Pushbutton Switches	A-8 thru A-10	3P	Miniature Pushwheel Switches	F-10 thru F-14
	Sealed Ultra-Miniature Pushbutton Switches	D-2 thru D-3	3U	Tiny Pushwheel Switches	F-5 thru F-9
GS	Ultra-Miniature Surface Mount Slide Switches	A-11 thru A-13	4000	Membrane Keypads	G-2 thru G-3
	Ultra-Miniature Slide Switches	E-9 thru E-10	5000 & L	Illuminated Rocker Switches	C-49 thru C-53
GT	Sealed Ultra-Miniature Surface Mount Toggle Switches	A-5 thru A-7	7000 & U	Toggle Switches	B-30 thru B-46
	Sealed Ultra-Miniature Toggle Switches	B-2 thru B-5		Rocker & Lever Handle Switches	C-27 thru C-48
KA	Sealed Half-Inch Dome Pushbutton Switches	D-65 thru D-66	8020 & U	Snap-Acting Momentary Pushbutton Switches	D-31 thru D-46
KP	Piezo Pulse Momentary Pushbutton Switches	D-70 thru D-73	8060	Alternate Action & Momentary Pushbutton Switches	D-47 thru D-56
KS	Pushbutton Key Switches	D-67 thru D-69	8500	Subminiature Pushbutton Switches	D-59 thru D-62
KT	Sealed Surface Mount Miniature Key Switches	A-18 thru A-20	8600	Microminiature Pushbutton Switches	D-57 thru D-58
	Sealed Miniature Key Switches	D-63 thru D-64	9000	Power Toggle Switches	B-47 thru B-52
LD	Sealed Low Profile Surface Mount DIP Switches	A-3 thru A-4		Power Rocker & Lever Handle Switches	C-54 thru C-60
	Sealed Low Profile DIP Switches	E-2 thru E-3			



SWITCH TYPE	SERIES	SECTION PAGES	SWITCH TYPE	SERIES	SECTION PAGES
Anti-Static Switches	E	C-12 thru C-26	Sealed Switches (cont.)	ET	A-14 thru A-15 B-6 thru B-11 C-2 thru C-6
Coded Switches	S2	F-15 thru F-20		GP	A-8 thru A-10 D-2 thru D-3
	SF/SR	F-21 thru F-31		GS	A-11 thru A-13 E-9 thru E-10
	3	F-32 thru F-44		GT	A-5 thru A-7 B-2 thru B-5
	3M	F-2 thru F-4		KA	D-65 thru D-66
	3P	F-10 thru F-14		KT	A-18 thru A-20 D-63 thru D-64
	3U	F-5 thru F-9		LD	A-3 thru A-4 E-2 thru E-3
DIP Switches	BD	E-4 thru E-6		UD	A-2
	BP	E-7 thru E-8			
	LD	A-3 thru A-4 E-2 thru E-3			
	UD	A-2			
Illuminated Switches	5000 & L	C-49 thru C-53		Slide Switches	GS
Lever Handle Switches	E	C-12 thru C-26	TS	E-7 thru E-8	
	7000 & U	C-27 thru C-48	1000	E-14 thru E-20	
	9000	C-54 thru C-60	Surface Mount Switches	EP	A-16 thru A-17
Power Switches	9000	B-47 thru B-52 C-54 thru C-60	ET	A-14 thru A-15	
Pushbutton Switches	E010	D-17 thru D-22	GP	A-8 thru A-10	
	E020	D-23 thru D-30	GS	A-11 thru A-13	
	EP	A-16 thru A-17 D-4 thru D-9	GT	A-5 thru A-7	
	GP	A-8 thru A-10 D-2 thru D-3	KT	A-18 thru A-20	
	KA	D-65 thru D-66	LD	A-3 thru A-4	
	KP	D-70 thru D-73	UD	A-2	
	KS	D-67 thru D-69	Thumbwheel Switches	S2	F-15 thru F-20
	KT	A-18 thru A-20 D-63 thru D-64	SF/SR	F-21 thru F-31	
	TP	D-10 thru D-16	3	F-32 thru F-44	
	8020 & U	D-31 thru D-46	3M	F-2 thru F-4	
	8060	D-47 thru D-56	Tiny Switches	EP	A-16 thru A-17 D-4 thru D-9
	8500	D-59 thru D-62	ET	A-14 thru A-15 B-6 thru B-11 C-2 thru C-6	
	8600	D-57 thru D-58	T	B-12 thru B-17 C-7 thru C-11	
Pushwheel Switches	3P	F-10 thru F-14	TP	D-10 thru D-16	
	3U	F-5 thru F-9	TS	E-11 thru E-13	
Rocker Switches	E	C-12 thru C-26	Toggle Switches	E	B-18 thru B-29
	ET	C-2 thru C-6	ET	A-14 thru A-15 B-6 thru B-11	
	T	C-7 thru C-11	GT	A-5 thru A-7 B-2 thru B-5	
	5000 & L	C-49 thru C-53	T	B-12 thru B-17	
	7000 & U	C-27 thru C-48	7000 & U	B-30 thru B-46	
	9000	C-54 thru C-60	9000	B-47 thru B-52	
Rotary Switches	M	G-2 thru G-6	Ultra-Miniature Switches	GP	A-8 thru A-10 D-2 thru D-3
Sealed Switches	E	B-18 thru B-29 C-12 thru C-26	GS	A-11 thru A-13 E-9 thru E-10	
	E010	D-17 thru D-22	GT	A-5 thru A-7 B-2 thru B-5	
	E020	D-23 thru D-30	UD	A-2	
	EP	A-16 thru A-17 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:

- UL** FILE NO.: E42363. Recognized under the component program of Underwriters Laboratories Inc.
- CSA** FILE NOS.: LR29210 (Newton, MA—USA)
LR49546 (Clayton, NC—USA)
LR47724 (England)
LR47725 (Hong Kong)
- VDE** FILE NO.: 8869-4401
- SEV** FILE NO.: 81.1162.01
- SEMKO** 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.

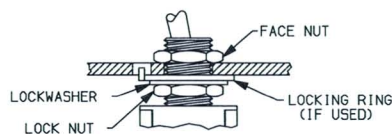
At C&K, we are continuously upgrading our agency certifications, and adding new models and options. Consult the factory with your needs if the approval that you require does not appear.

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					

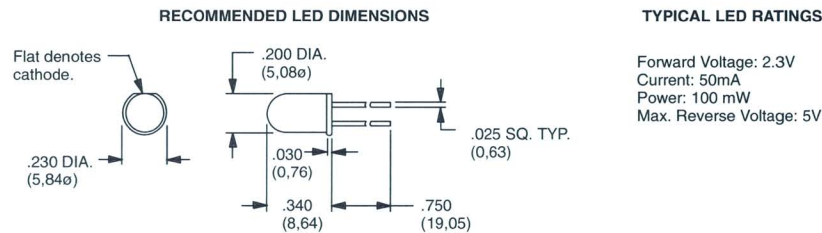
Process information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

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.

<u>Surface Mount Models</u>	<u>Page</u>	<u>Thru-Hole Models</u>	<u>Page</u>
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.

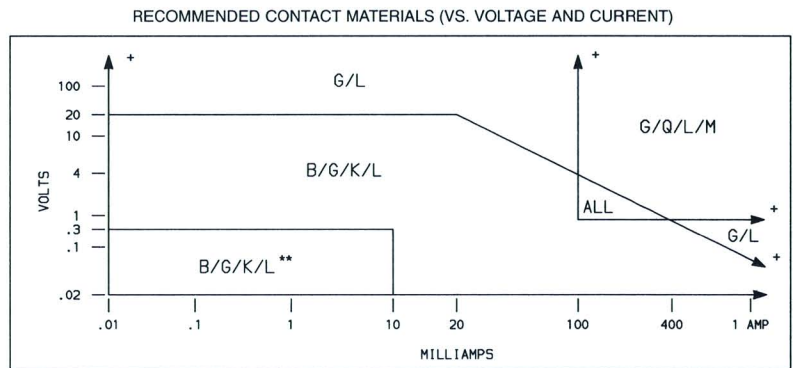
CONTACT MATERIAL & APPLICATION RECOMMENDATIONS

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



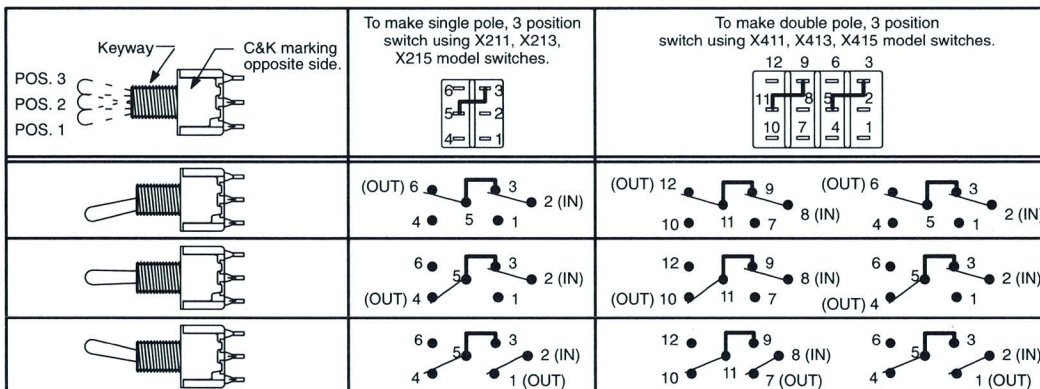
* To maximum switch rating.

** 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.



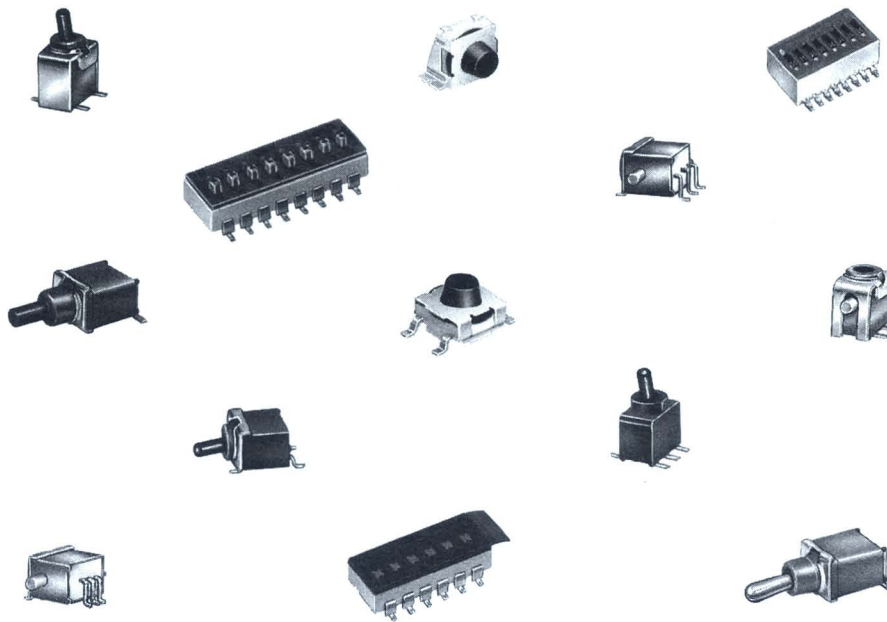
These switch series have one or more models that may be wired to achieve SP3T or DP3T functions:

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.

SECTION A

SURFACE MOUNTED SWITCHES



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



*Process sealed—withstands soldering and cleaning processes.

A



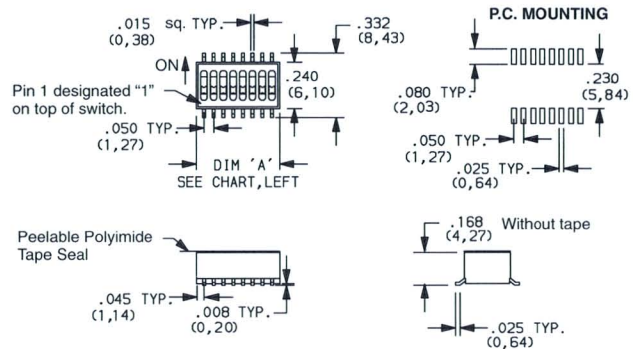
NOTE: Reflective aluminum tape seal omitted for clarity.

- **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'
UD02H0SK	2	.140 (3,56)
UD04H0SK	4	.240 (6,10)
UD06H0SK	6	.340 (8,64)
UD08H0SK	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: 10⁹ 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.

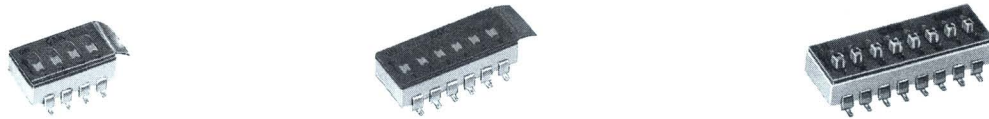
TAPE SEAL: Polyimide, with reflective aluminum.

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.

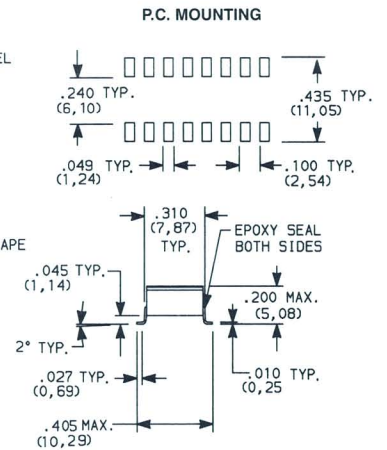
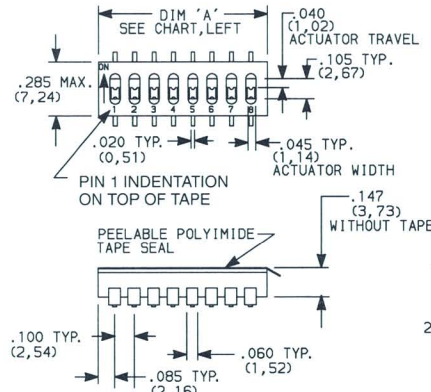
- **LOW PROFILE DESIGN—SPST—4, 5, 6, 7, 8, 10 POSITIONS**
- **BIFURCATED GOLD PLATED CONTACTS—NO LUBRICANTS REQUIRED**
- **PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—REMOVABLE REFLECTIVE POLYIMIDE TOP TAPE SEAL STD.**
- **RECESSED SLIDE ACTUATORS AND POSITIVE 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'
LD04H0SK	4	.470 (11,94)
LD05H0SK	5	.570 (14,48)
LD06H0SK	6	.670 (17,02)
LD07H0SK	7	.770 (19,56)
LD08H0SK	8	.870 (22,10)
LD10H0SK	10	1.070 (27,18)

Schematic

SPST



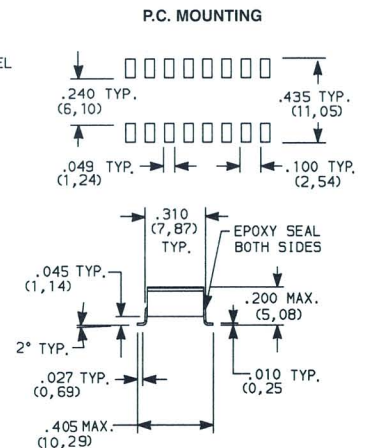
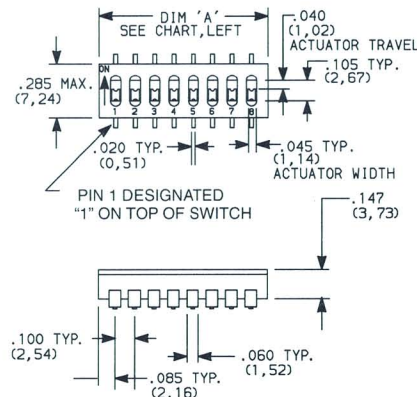
Part No. Shown: LD08H0SK

UNSEALED—NO TAPE

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

Schematic

SPST



Part No. Shown: LD08H0SKD



*Process sealed—withstands soldering and cleaning processes.

UNSEALED—NO TAPE—EXTENDED ACTUATORS

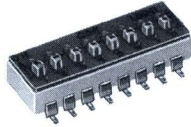
A

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)

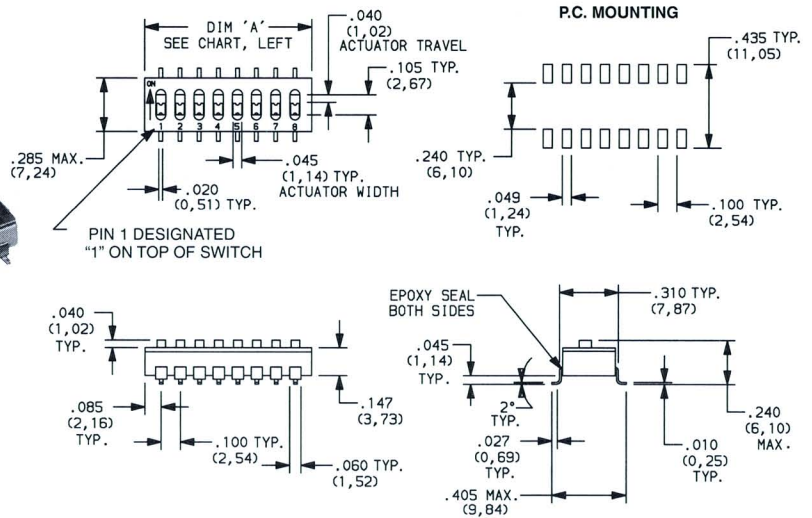
Schematic



SPST



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: 10⁹ 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.



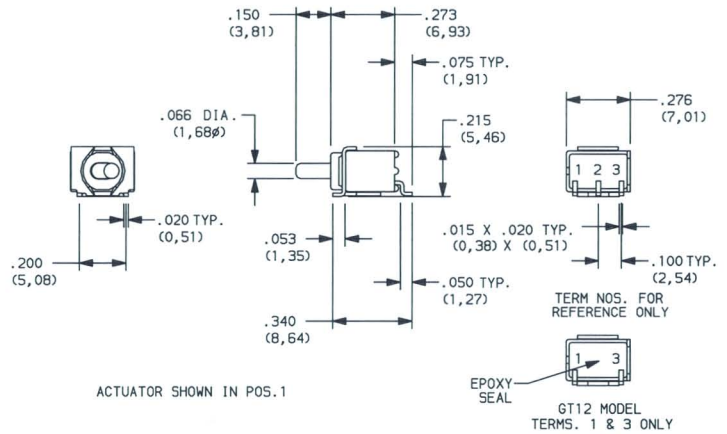
- THREE SURFACE MOUNT TERMINAL STYLES— .100 IN. TERMINAL SPACING
- PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS 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
GT11MSAKE	ON	NONE	ON
GT13MSAKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT			
GT12MSAKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST			



SPST and SPDT



ACTUATOR SHOWN IN POS. 1

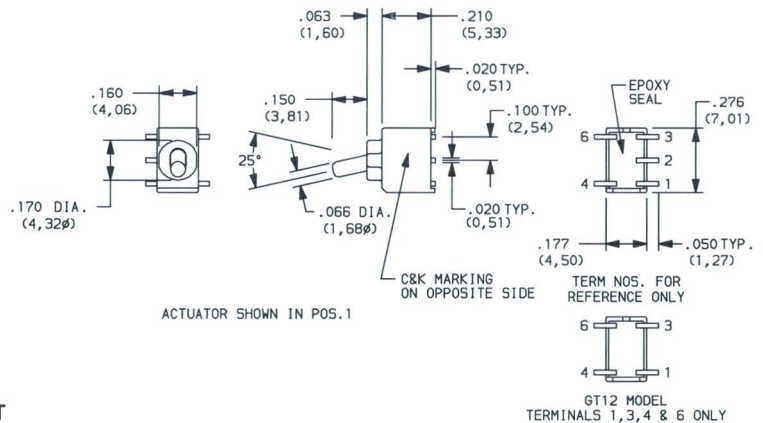
TERM NOS. FOR REFERENCE ONLY
EPOXY SEAL
GT12 MODEL TERMS. 1 & 3 ONLY

SP MODELS WITH SC SURFACE MOUNT TERMINALS

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

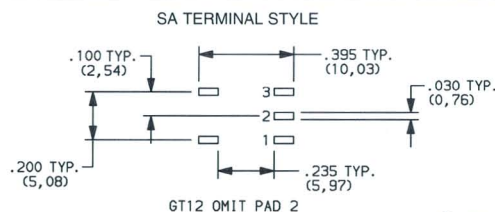


SPST and SPDT

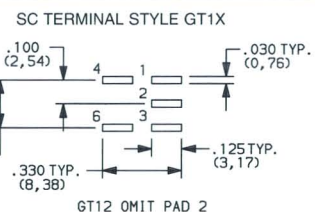


ACTUATOR SHOWN IN POS. 1

TERM NOS. FOR REFERENCE ONLY
EPOXY SEAL
GT12 MODEL TERMINALS 1, 3, 4 & 6 ONLY



P.C. MOUNTING



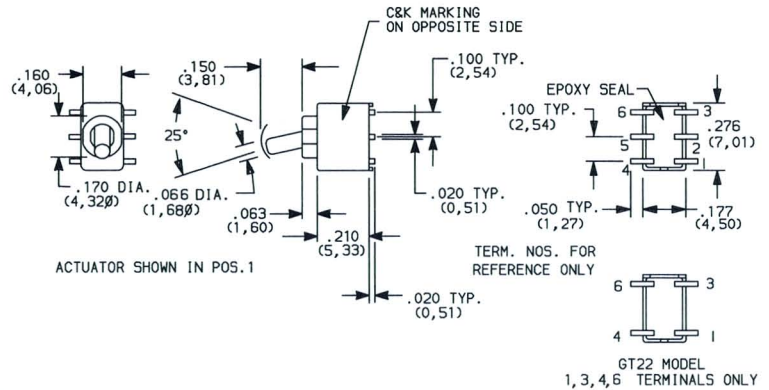
Suggested mounting patterns, see CAUTION page A-7.

*Process sealed—withstands soldering and cleaning processes.

A

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

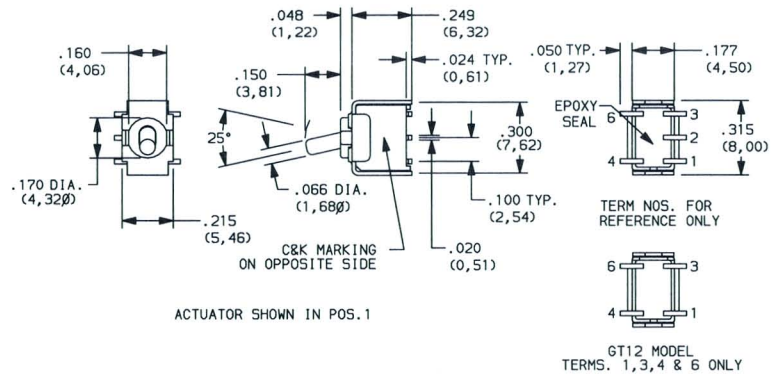
DP MODELS WITH SC SURFACE MOUNT TERMINALS



DPST and DPDT

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

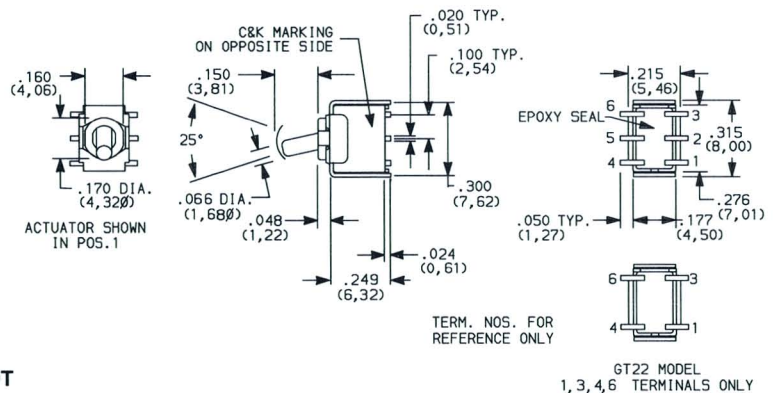
SP MODELS WITH SV SURFACE MOUNT TERMINALS



SPST and SPDT

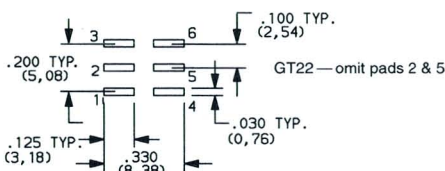
PART NO.	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
GT21MSVKE	ON	NONE	ON
GT23MSVKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic			
DPDT			
GT22MSVKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic			
DPST			

DP MODELS WITH SV SURFACE MOUNT TERMINALS



DPST and DPDT

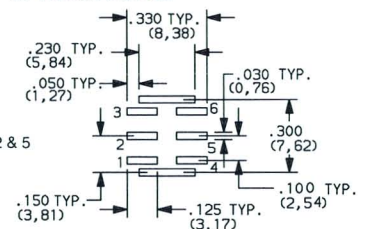
SC TERMINAL STYLE GT2X



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.

A

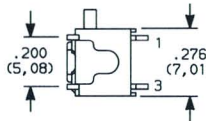
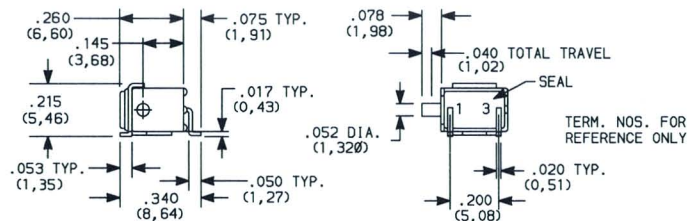


- FIVE SURFACE MOUNT TERMINAL STYLES—.050 AND .100 IN. TERMINAL SPACING
- PROCESS COMPATIBLE—WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES—HIGH TEMPERATURE MATERIALS (UL 94V-0)
- SEALED CONSTRUCTION—INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL
- TIN-LEAD ALLOY COATS ALL SIDES OF 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
GP11MSAKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic		
SPST		
GP12MSAKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic		
SPDT		

MOM.=MOMENTARY



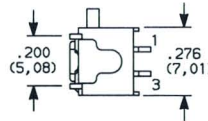
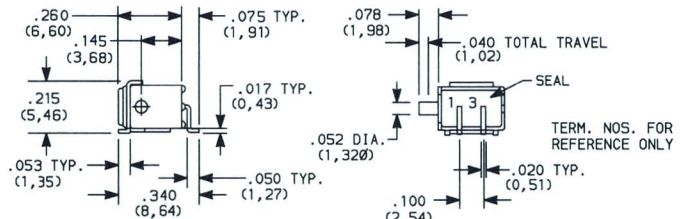
SPST and SPDT

GP12 MODEL TERMINALS 1, 2, & 3

SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

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

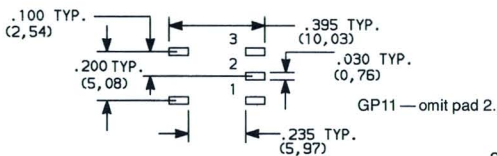
MOM.=MOMENTARY



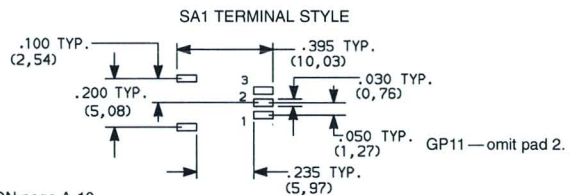
SPST and SPDT

GP12 MODEL TERMINALS 1, 2, & 3

SA TERMINAL STYLE



P.C. MOUNTING



Suggested mounting patterns, see CAUTION page A-10.



*Process sealed—withstands soldering and cleaning processes.

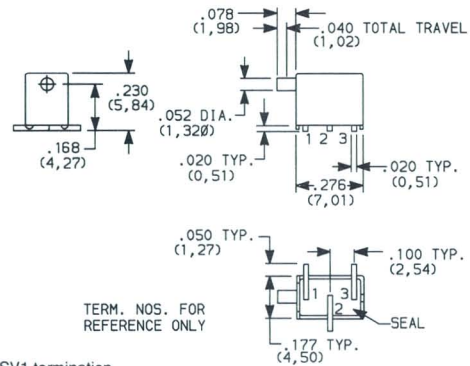
SP MODEL WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GP12MSCKE	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.

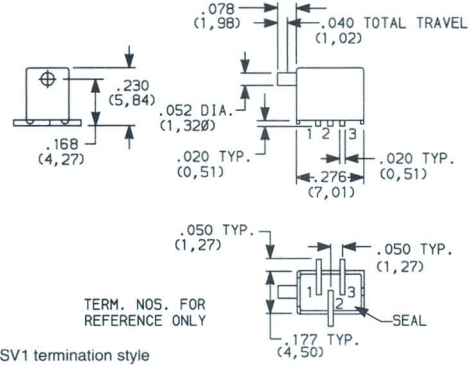
SP MODEL WITH SC1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GP12MSC1KE	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.

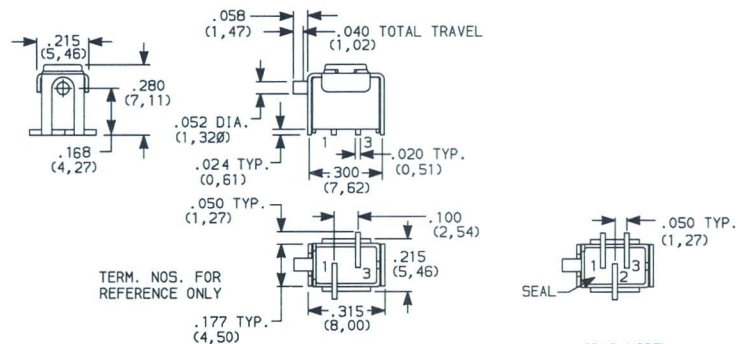
SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

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

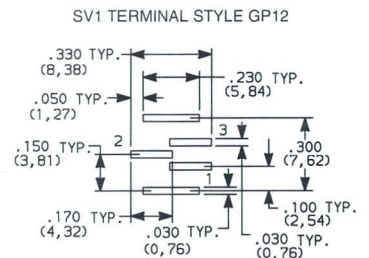
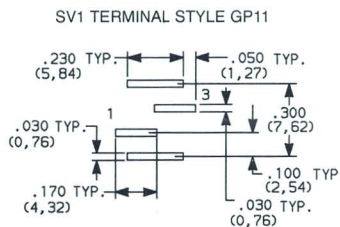
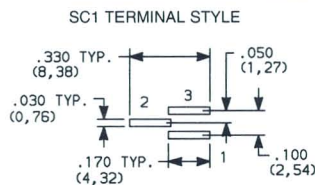
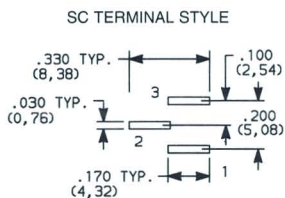
MOM.=MOMENTARY



SPST and SPDT



P.C. MOUNTING



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°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 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.

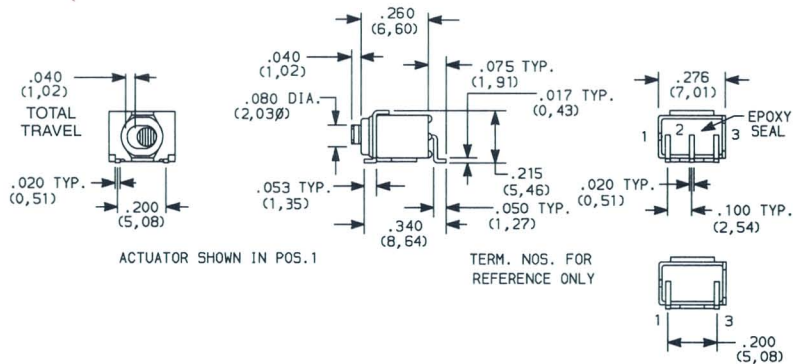
CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint 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
GS01MSAKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		
GS02MSAKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic		
SPST		

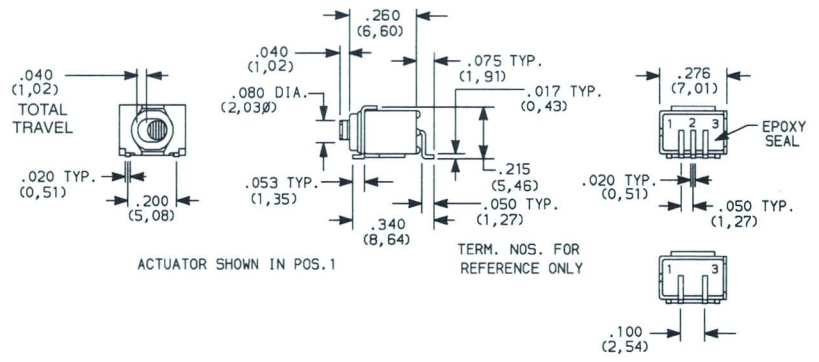


SPST and SPDT

GS02 MODELS 1 & 3 TERMINALS ONLY

SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

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



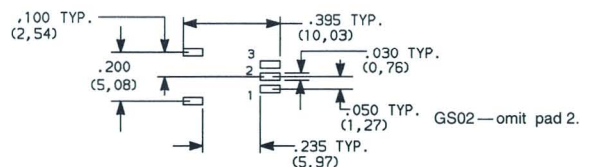
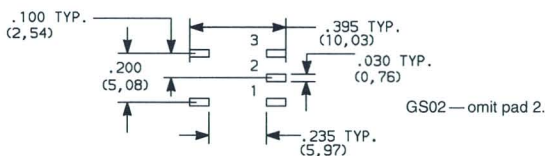
SPST and SPDT

GS02 MODELS 1 & 3 TERMINALS ONLY

SA TERMINAL STYLE

P.C. MOUNTING

SA1 TERMINAL STYLE



Suggested mounting patterns, see CAUTION page A-13.



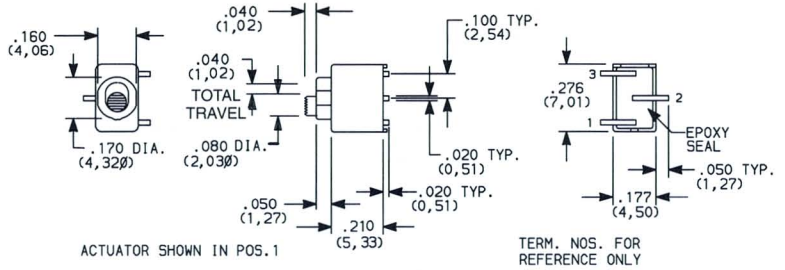
A

SP MODEL WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GS01MSCKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		



SPDT



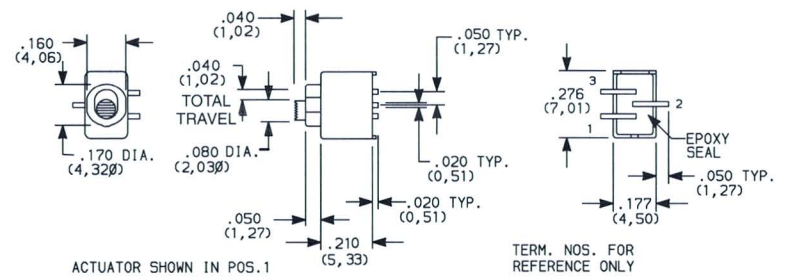
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODEL WITH SC1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GS01MSC1KE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		



SPDT



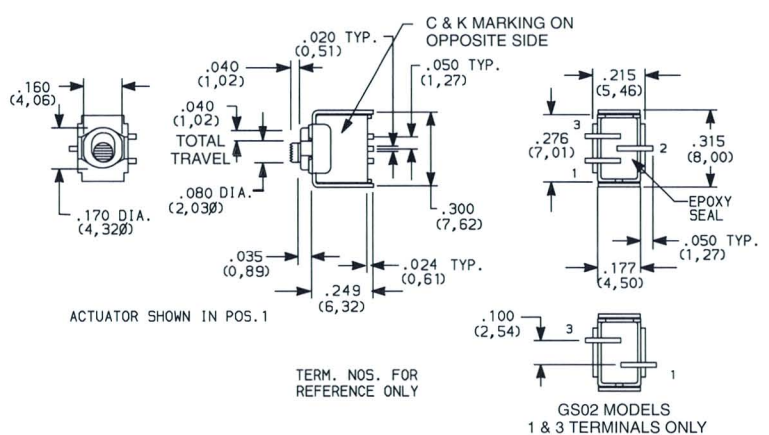
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

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

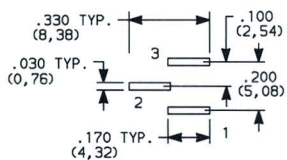


SPST and SPDT

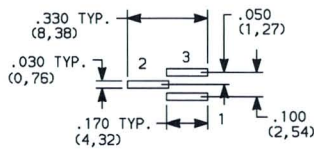


P.C. MOUNTING

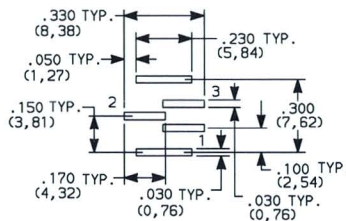
SC TERMINAL STYLE



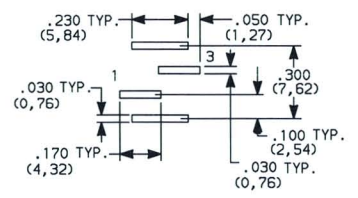
SC1 TERMINAL STYLE



SV1 TERMINAL STYLE GS01



SV1 TERMINAL STYLE GS02



Suggested mounting patterns, see CAUTION page A-13

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.

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

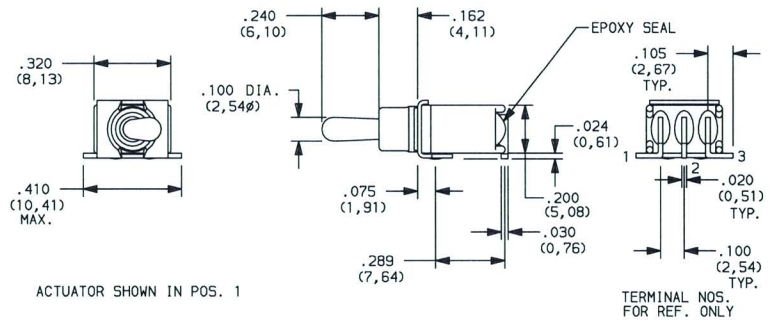
ANTISTATIC—WITH PLASTIC M3 ACTUATOR—SURFACE MOUNT

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

MOM. = MOMENTARY



SPDT



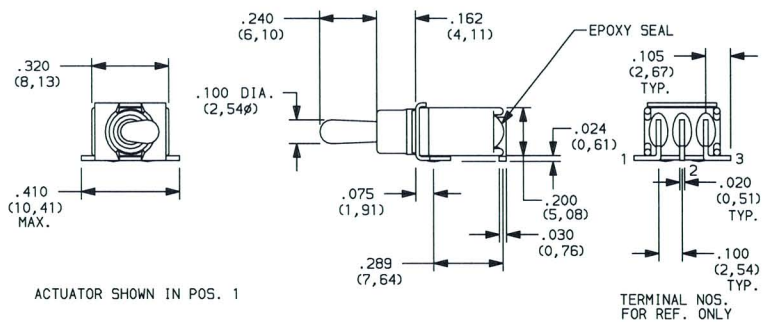
WITH CHROME PLATED BRASS M ACTUATOR—SURFACE MOUNT

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

MOM. = MOMENTARY

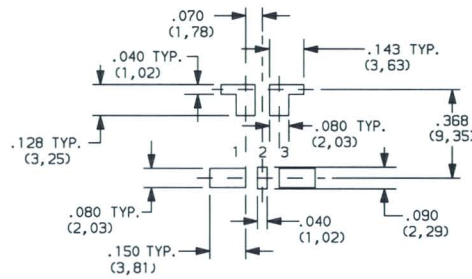


SPDT



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: 10⁹ 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.

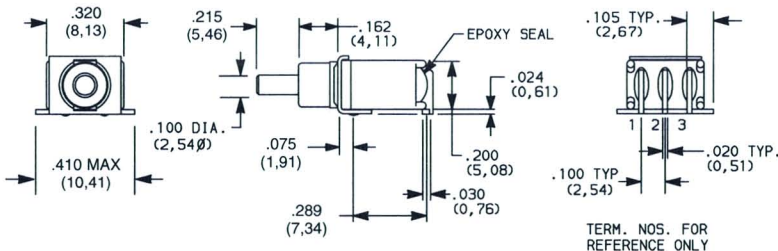
A



- **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
EP11SD1SAKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic		
SPST		
EP12SD1SAKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic		
SPDT		



SPST AND SPDT

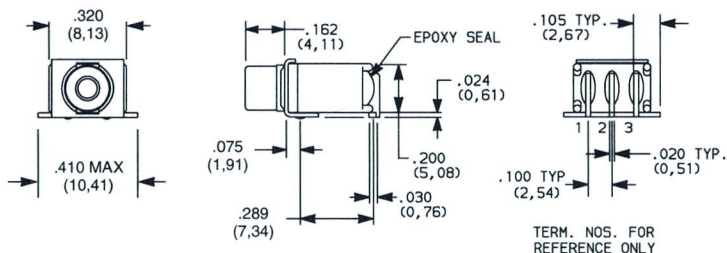
EP11 model—omit term. 2

MOM. = MOMENTARY

SP MODELS WITH FLUSH ACTUATOR

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

NEW

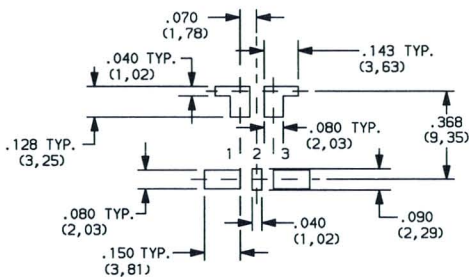


SPST AND SPDT

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**

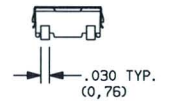
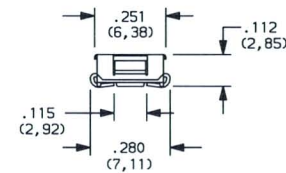
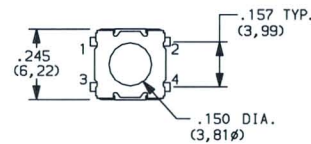
WITH J SURFACE MOUNT TERMINALS

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

MOM. = MOMENTARY



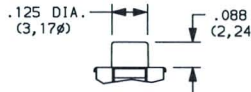
WITH B0 ACTUATOR



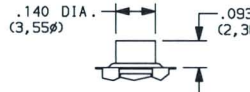
Part No. Shown: KT11B0JM



WITH B1 SILICONE RUBBER ACTUATOR



WITH B2 SILICONE RUBBER ACTUATOR

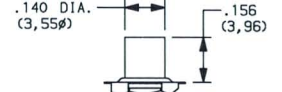


WITH P2 HARD PLASTIC ACTUATOR



NEW

WITH P3 HARD PLASTIC ACTUATOR



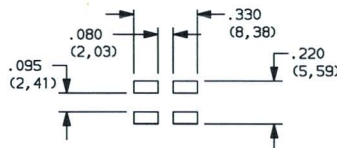
NEW

WITH P4 HARD PLASTIC ACTUATOR

P.C. MOUNTING

J TERMINAL STYLE

Suggested mounting patterns, see CAUTION page A-20.

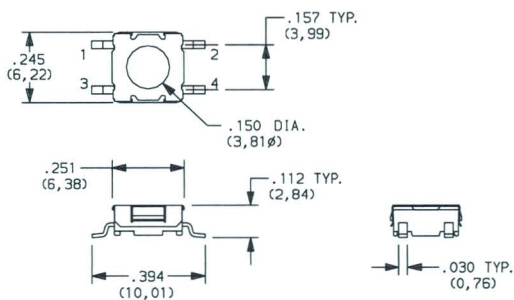


*Process sealed—withstands soldering and cleaning processes.

WITH S SURFACE MOUNT TERMINALS

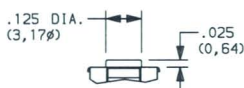
PART NO.	ACTUATOR HEIGHT	SWITCH FUNCTION	
		POS. 1	POS. 2
KT11B0SM	FLUSH	OFF	MOM.
KT11B1SM	.025 (0,64)	OFF	MOM.
KT11B2SM	.088 (2,24)	OFF	MOM.
KT11P2SM	.093 (2,36)	OFF	MOM.
KT11P3SM	.044 (1,12)	OFF	MOM.
KT11P4SM	.156 (3,96)	OFF	MOM.
Conn. Terms		OPEN	1, 2-3, 4
Schematic SPST			

MOM. = MOMENTARY

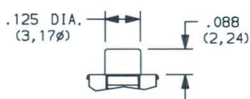


WITH B0 ACTUATOR

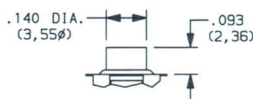
Part No. Shown: KT11B0SM



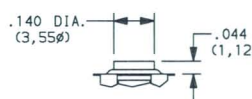
WITH B1 SILICONE RUBBER ACTUATOR



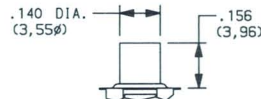
WITH B2 SILICONE RUBBER ACTUATOR



WITH P2 HARD PLASTIC ACTUATOR



NEW WITH P3 HARD PLASTIC ACTUATOR



NEW WITH P4 HARD PLASTIC ACTUATOR

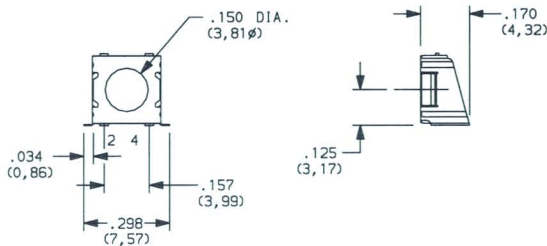
WITH SA RIGHT ANGLE SURFACE MOUNT TERMINALS

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

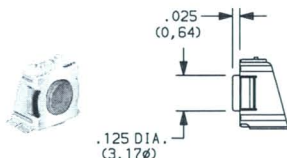
MOM. = MOMENTARY



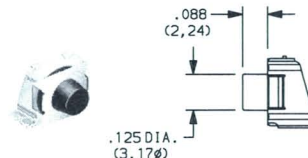
WITH B0 ACTUATOR



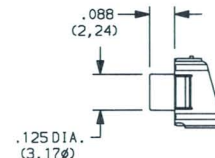
Part No. Shown: KT11B0SAM



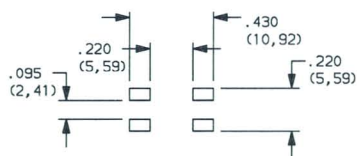
WITH B1 SILICONE RUBBER ACTUATOR



WITH B2 SILICONE RUBBER ACTUATOR



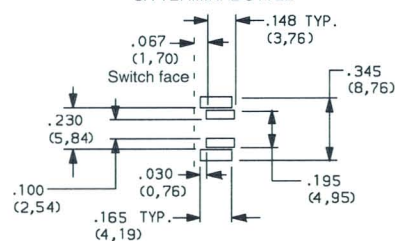
S TERMINAL STYLE



P.C. MOUNTING

Suggested mounting patterns, see CAUTION page A-20.

SA TERMINAL STYLE





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°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 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.

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.

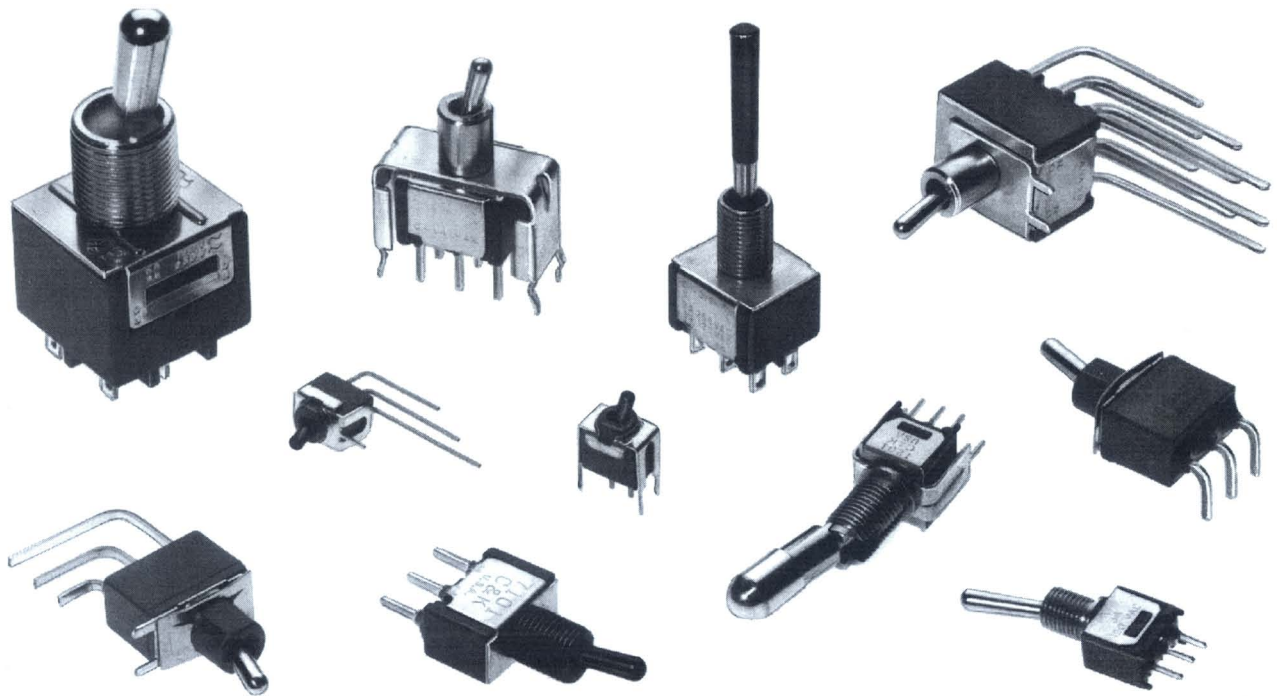
MATERIALS

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.

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



*Process sealed—withstands soldering and cleaning processes.

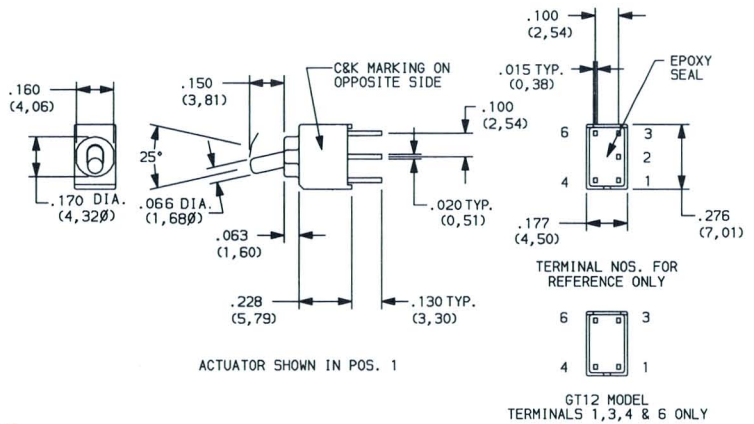


B

- 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

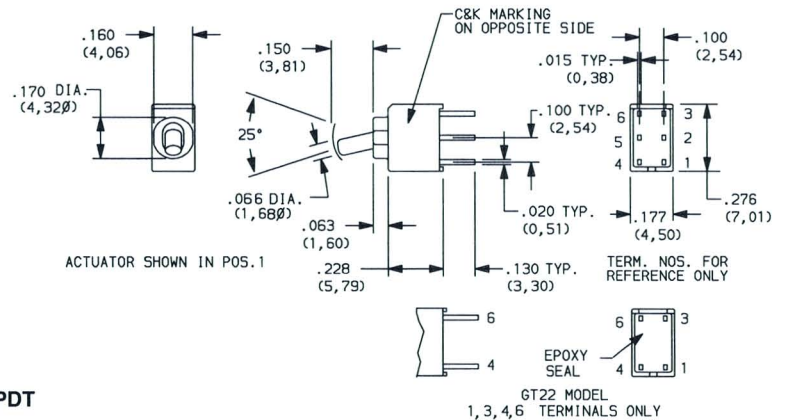
PART NO.	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
GT11MCKE	ON	NONE	ON
GT13MCKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT	<p>Note: Pins 4 and 6 not connected</p>		
GT12MCKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST	<p>Note: Pins 4 and 6 not connected</p>		



SPST and SPDT

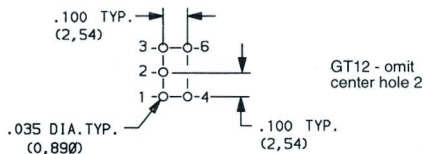
DP MODELS WITH C TERMINALS

PART NO.	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
GT21MCKE	ON	NONE	ON
GT23MCKE	ON	OFF	ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
GT22MCKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1, 6-4
Schematic			
DPST			



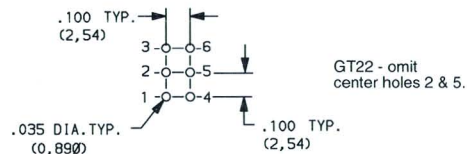
DPST and DPDT

C TERMINAL STYLE GT1X



P.C. MOUNTING

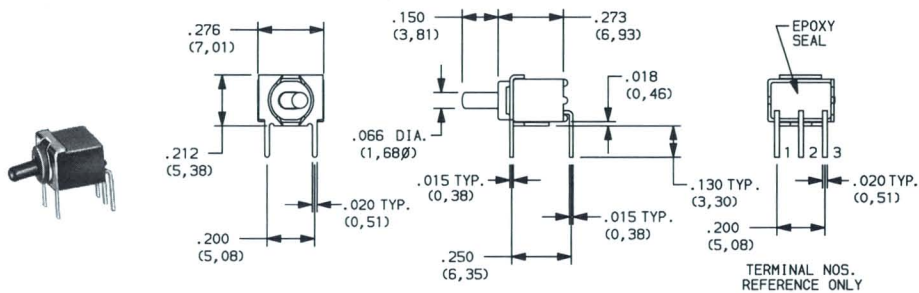
C TERMINAL STYLE GT2X



*Process sealed—withstands soldering and cleaning processes.

SP MODELS WITH A TERMINALS

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



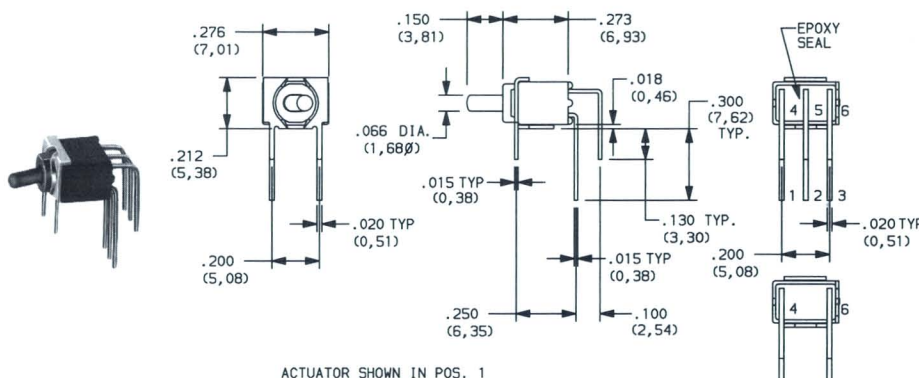
ACTUATOR SHOWN IN POS. 1

TERMINAL NOS. REFERENCE ONLY
GT12 MODEL TERMINALS 1 & 3 ONLY

SPST and SPDT

DP MODELS WITH A TERMINALS

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



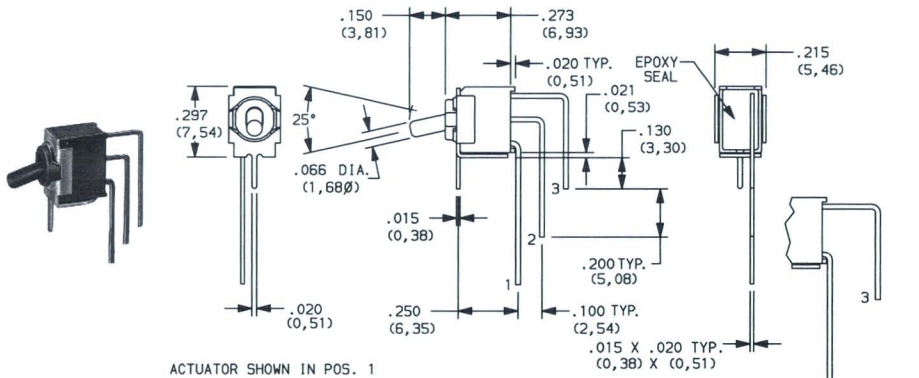
ACTUATOR SHOWN IN POS. 1

TERMINAL NOS. REFERENCE ONLY
GT22 MODEL TERMINALS 1, 3, 4, & 6 ONLY

DPST and DPDT

SP MODELS WITH AV TERMINALS

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

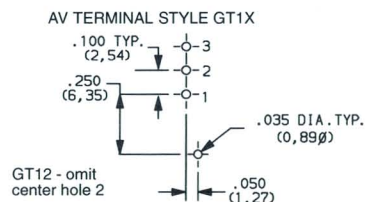
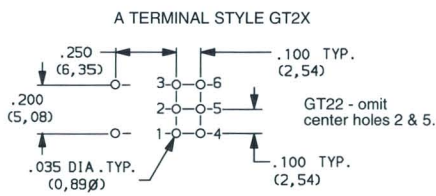
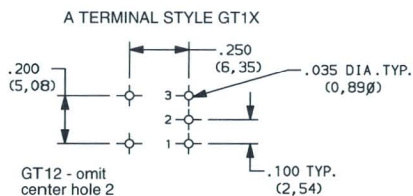


ACTUATOR SHOWN IN POS. 1

TERMINAL NOS. FOR REFERENCE ONLY
GT12 MODEL TERMINALS 1 & 3 ONLY

SPST and SPDT

P.C. MOUNTING

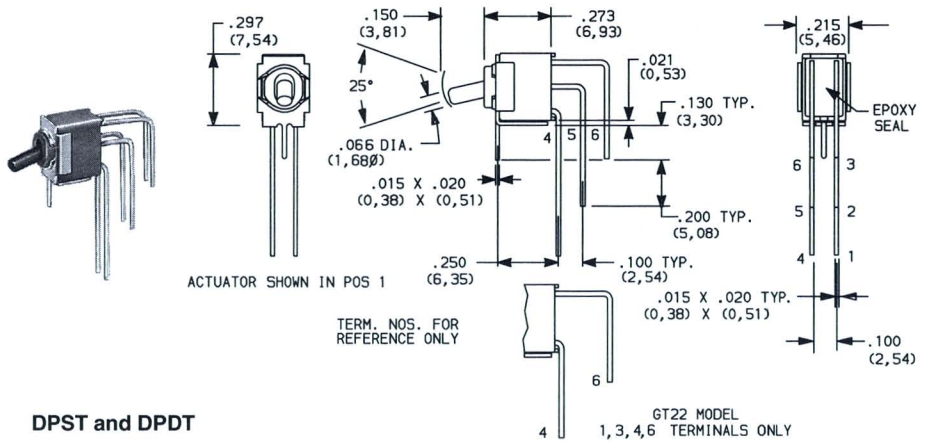


*Process sealed-withstands soldering and cleaning processes.

B

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

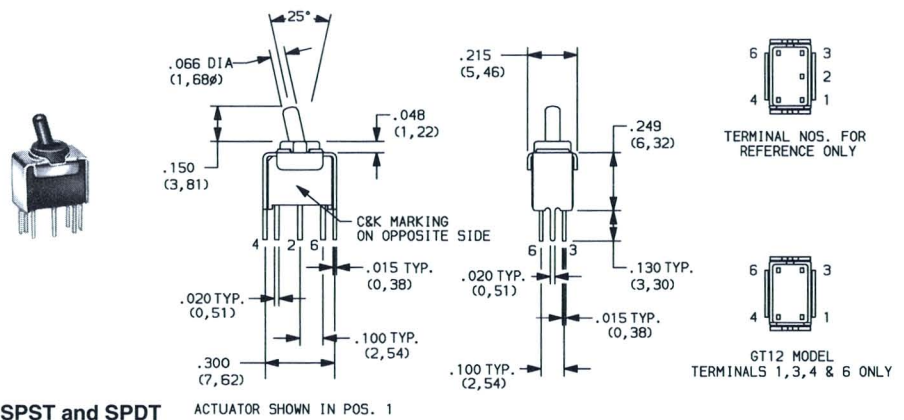
DP MODELS WITH AV TERMINALS



DPST and DPDT

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

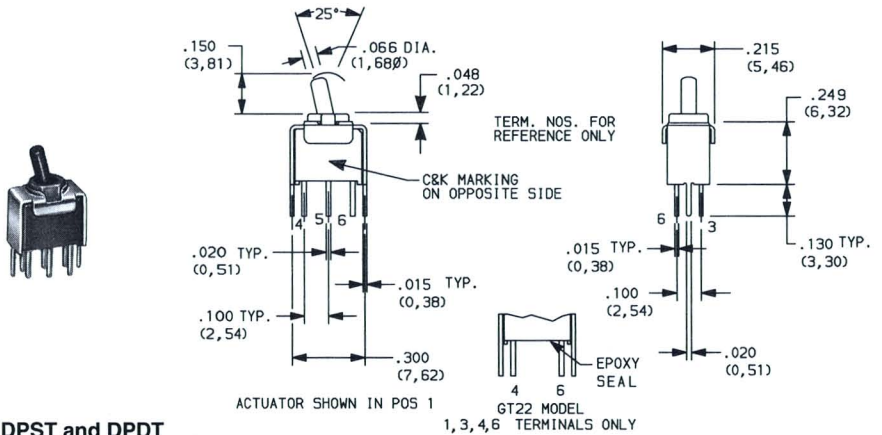
SP MODELS WITH V3 TERMINALS



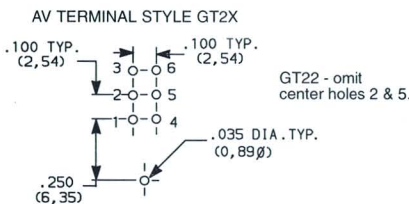
SPST and SPDT

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

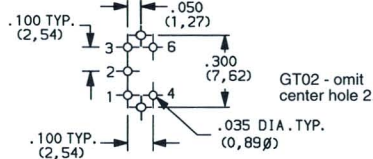
DP MODELS WITH V3 TERMINALS



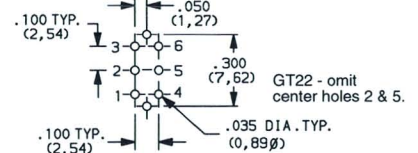
DPST and DPDT



P.C. MOUNTING V3 TERMINAL STYLE GT1X



V3 TERMINAL STYLE GT2X



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.

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).

MATERIALS

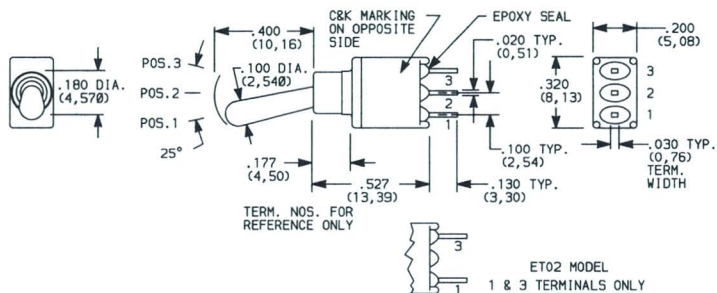
HOUSING & BASE: Glass filled nylon 6/6 or 4/6, flame retardant, heat stabilized (UL 94V-0).
ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.
SWITCH SUPPORT: Brass, tin plated.
MOVABLE CONTACT: Phosphor bronze with gold plate over nickel 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.



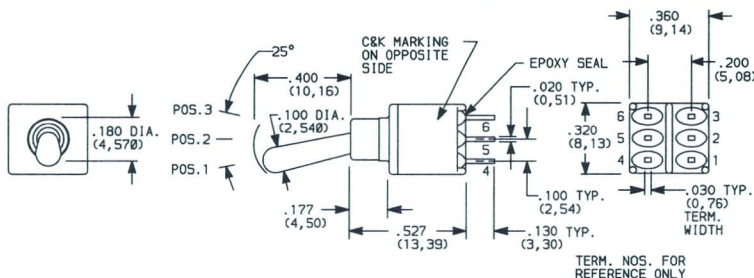
*Process sealed—withstands soldering and cleaning processes.

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.



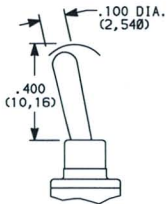


*Process sealed-withstands soldering and cleaning processes.

ACTUATOR

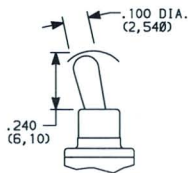
All actuators except M3: finish, chrome.

S



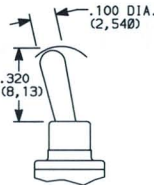
Standard with C or W terminations.

M

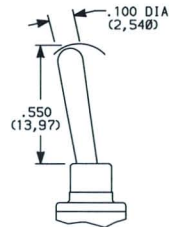


Standard with A, AV, V3, V31 terminations.

L

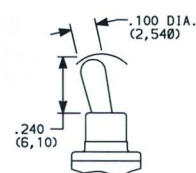


S1



M3

ESD RESISTANT INSULATING TOGGLE



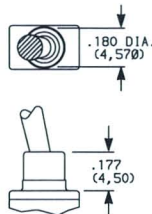
Material: Nylon 4/6 (UL 94V-0), black standard. Static resistance: 9,000 V DC min. @ sea level, actuator to terminals. Available with all ET0X models. Not available with F1 conductive bushing option. Not UL approved.

BUSHING

D1 (STD.)

F1 ESD RESISTANT CONDUCTIVE BUSHING

NEW

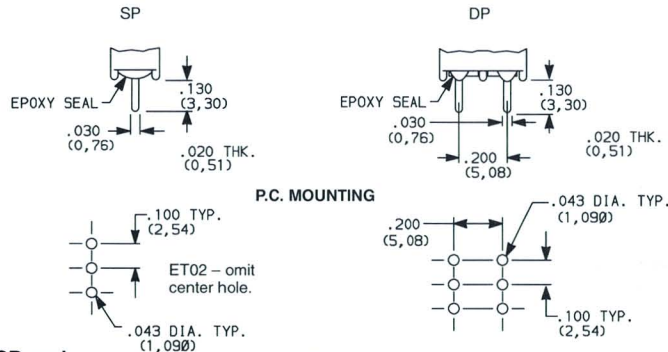


Internal actuator o-ring seal std.

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

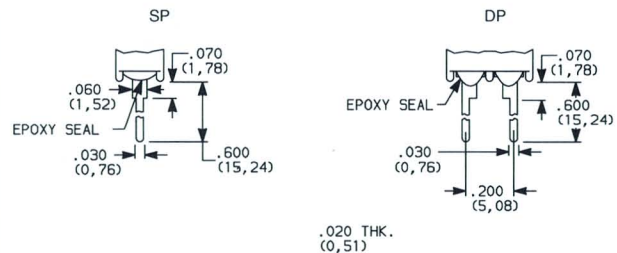
C



SP and DP

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

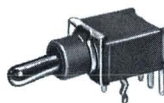
W WIRE WRAP



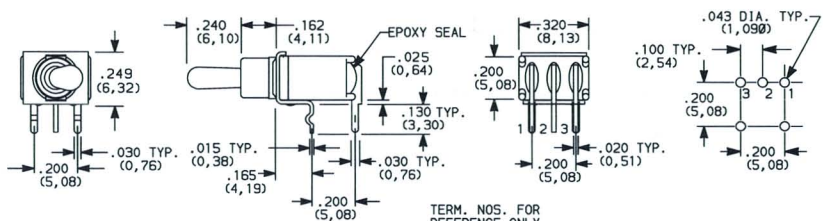
SP and DP

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

A



SPDT



TERM. NOS. FOR REFERENCE ONLY

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

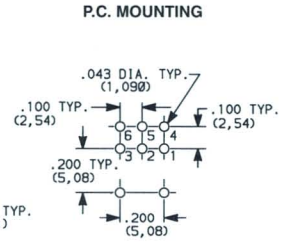
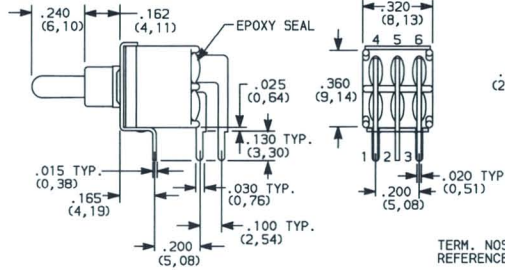
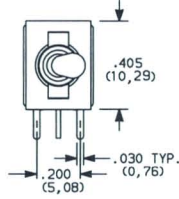
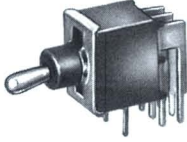
Part No. Shown: ET01MD1ABE



*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

A



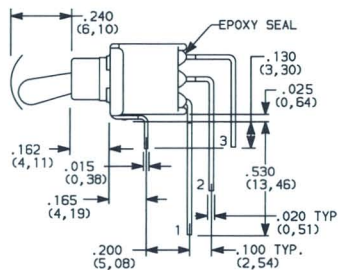
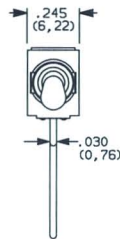
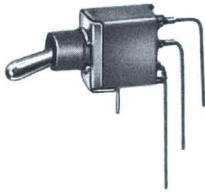
TERM. NOS. FOR REFERENCE ONLY

DPDT

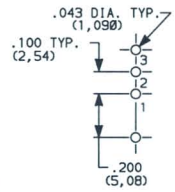
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21MD1ABE

AV



PC MOUNTING



ET02 — omit center hole 2.

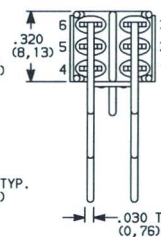
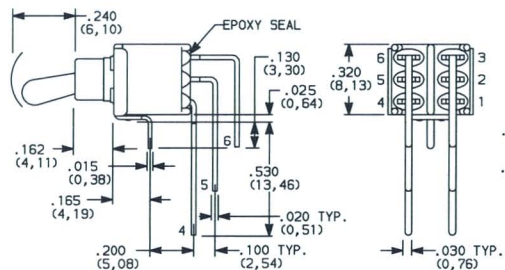
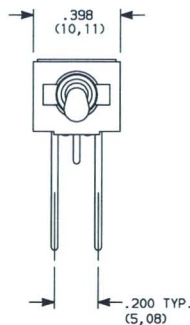
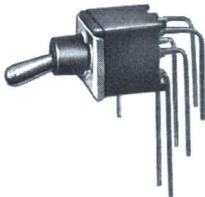
TERM. NOS. FOR REFERENCE ONLY

SPST and SPDT

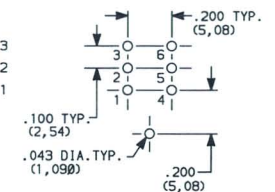
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET01MD1AVBE

AV



PC MOUNTING



TERM. NOS. FOR REFERENCE ONLY

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.

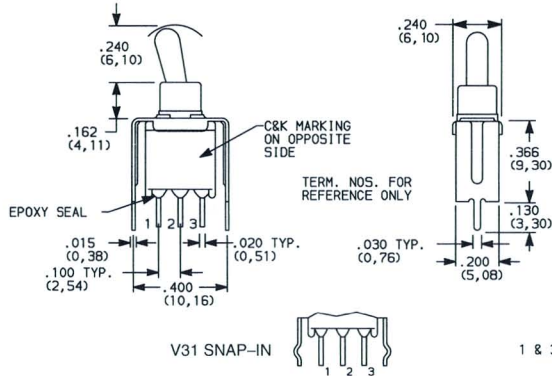
TERMINATIONS

V3
V31 SNAP-IN **NEW**

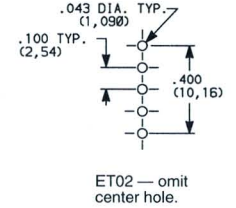
B



SPST and SPDT



P.C. MOUNTING



ET02 — omit center hole.

ET02 MODEL
1 & 3 TERMINALS ONLY

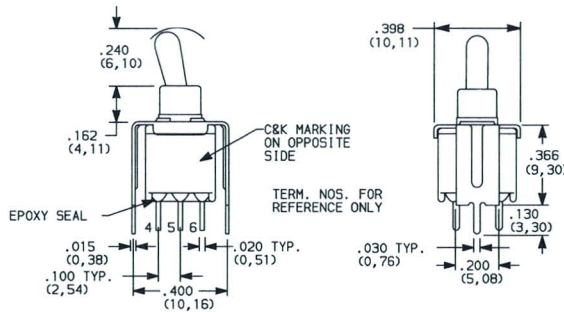
Actuator shown in pos. 1.
B contact material std.

Part No. Shown: ET01MD1V3BE

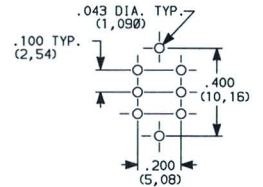
V3



DPDT



P.C. MOUNTING



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

Part No. Shown: ET21MD1V3BE

CONTACT MATERIAL

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

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.

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: 10⁹ 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.

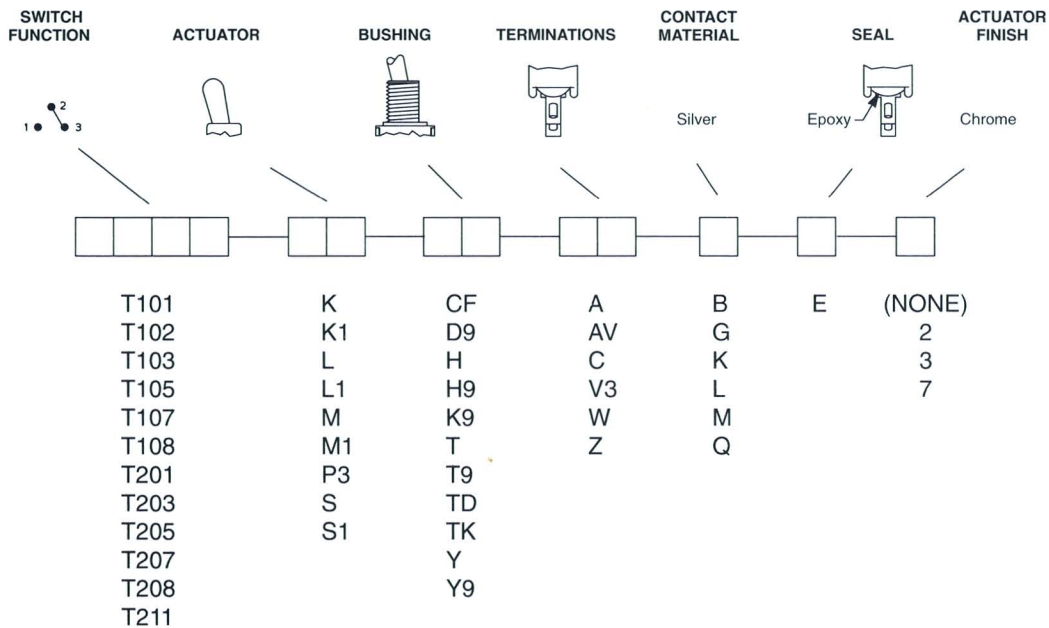
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



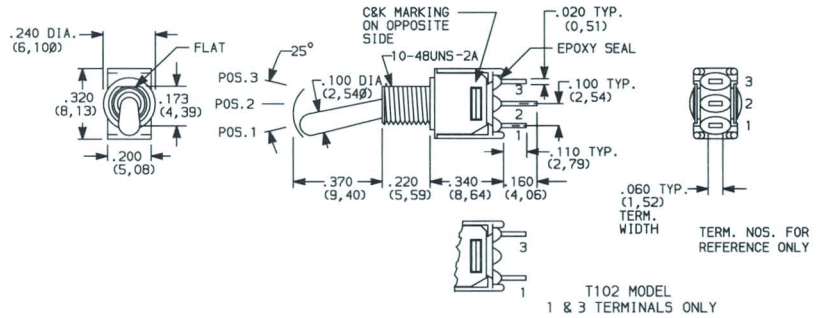
 models available, see page B-13.

Easy Build-A-Switch:

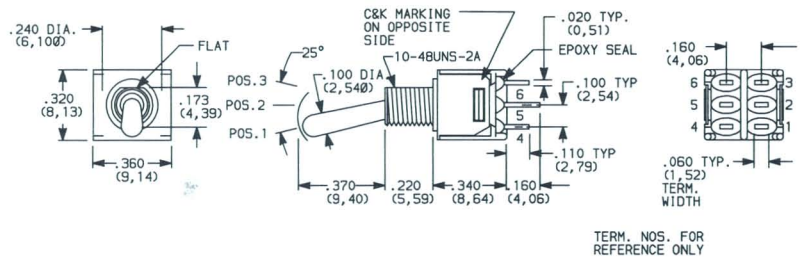
Below is a complete listing of available options for T SERIES TINY TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-13; all available options are shown 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



DPDT

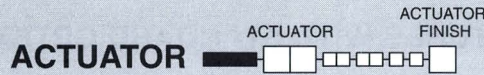
SWITCH FUNCTION

NO. POLES	MODEL* NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	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	

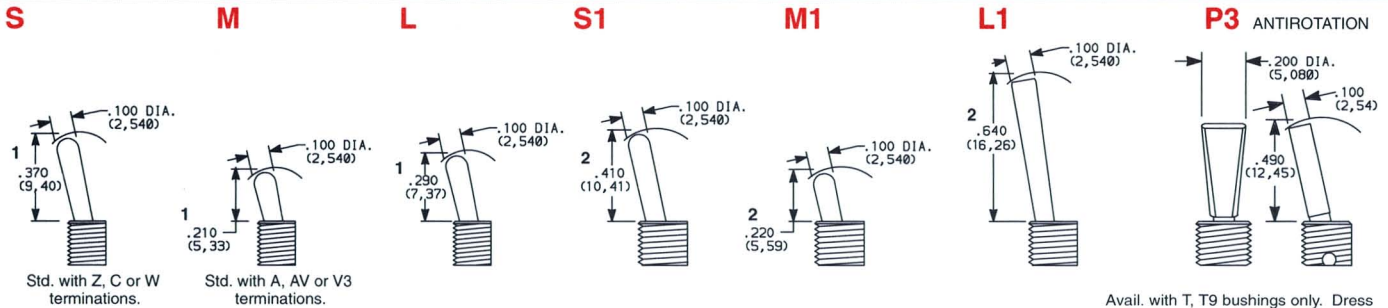
MOM. = MOMENTARY

* 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.



All actuators except K, K1: finish, chrome. No finish selection required.



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

K1 LOCKING LEVER

ACTUATOR CAP FINISH

K, K1 actuators only.

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.

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

K, K1 Locking Positions



-01, -02 Models
2 Pos. Lock



-03, -11 Models
3 Pos. Lock



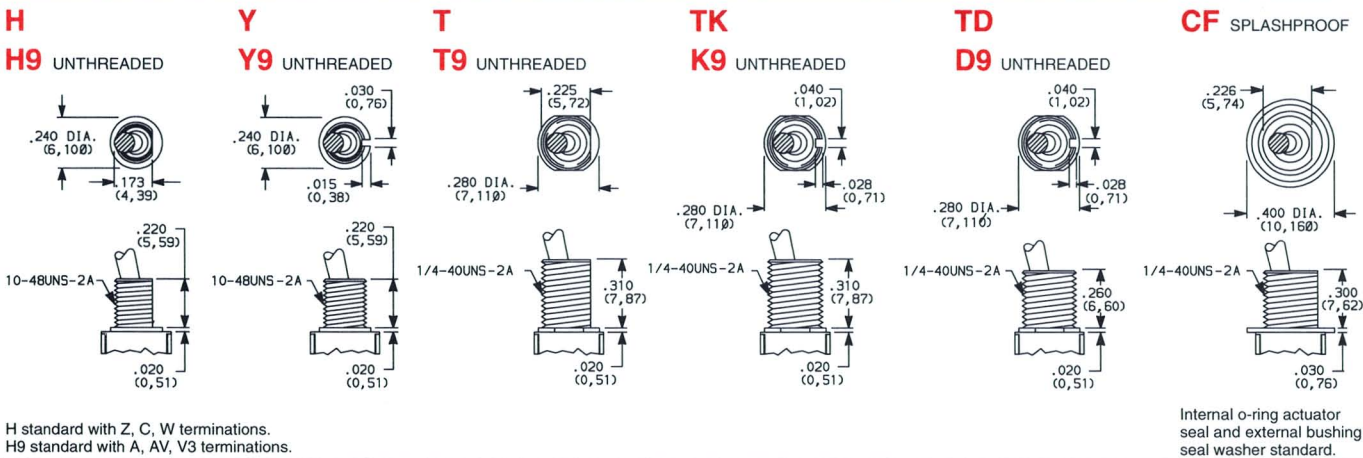
-08 Models
1 Pos. Lock

Keyway on right side.

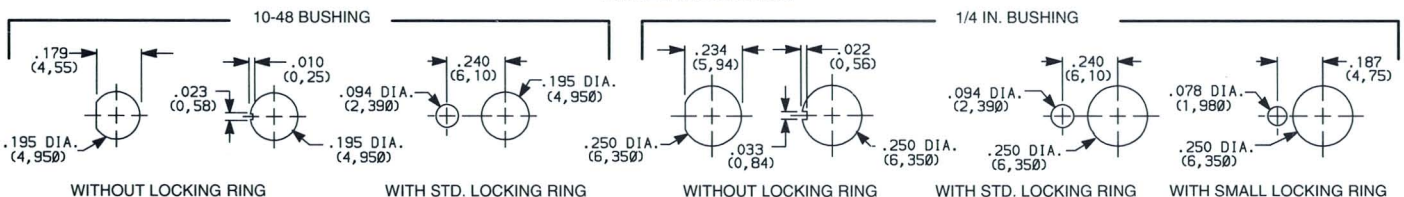
Keyway on right side. Bushing option code not required. Not avail. with TX05, TX07 models.



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

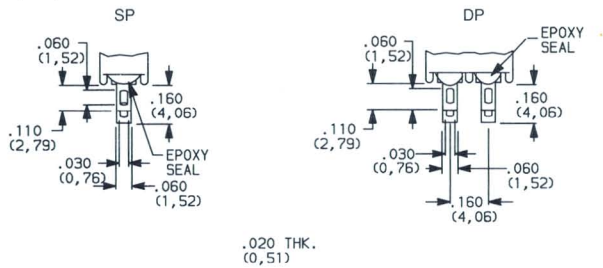


PANEL MOUNTING



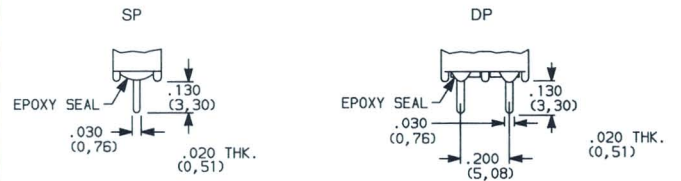
TERMINATIONS

Z (STD)

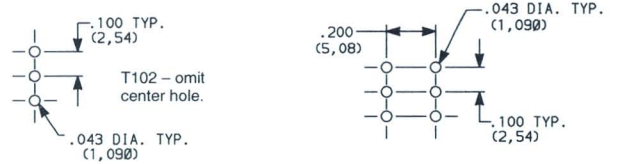


Q contact material std.
Not avail. with K, L, or M contact material.

C

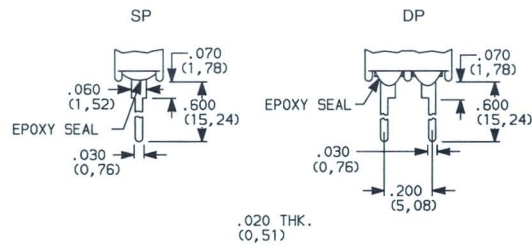


P.C. MOUNTING



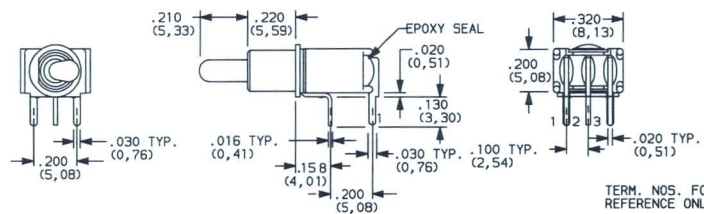
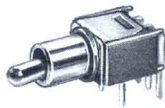
Q contact material std.

W WIRE WRAP

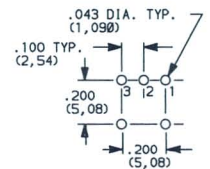


B contact material std.

A



P.C. MOUNTING



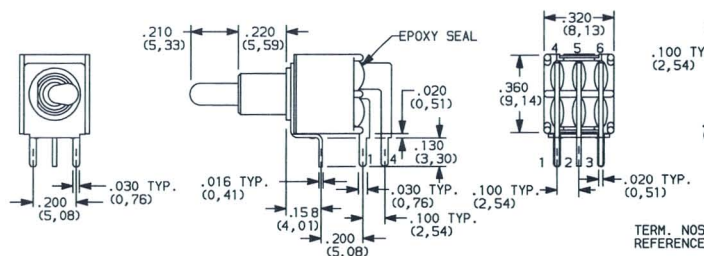
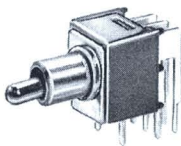
TERM. NOS. FOR REFERENCE ONLY

SPDT

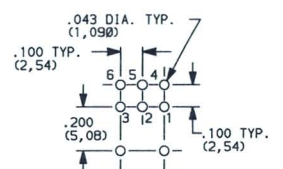
Actuator shown in pos.1.
B contact material std.
Not available with T102 model.

Part No. Shown: T101MH9ABE

A



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

DPDT

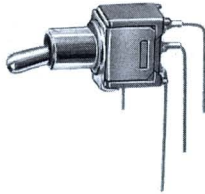
Actuator shown in pos.1.
B contact material std.

Part No. Shown: T201MH9ABE



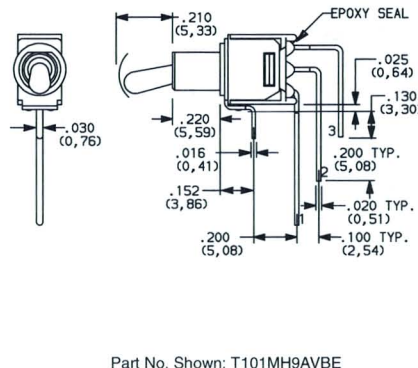
TERMINATIONS

AV

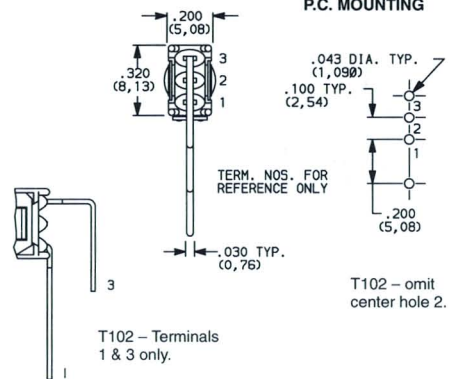


SPST and SPDT

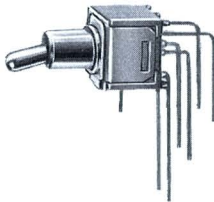
Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1 B contact material std.



Part No. Shown: T101MH9AVBE

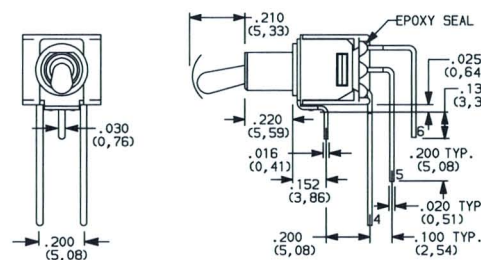


AV

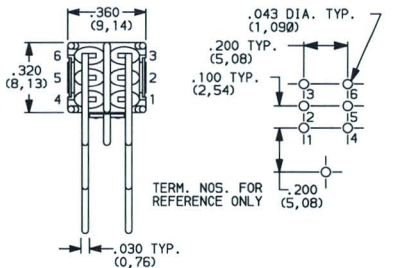


DPDT

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



Part No. Shown: T201MH9AVBE

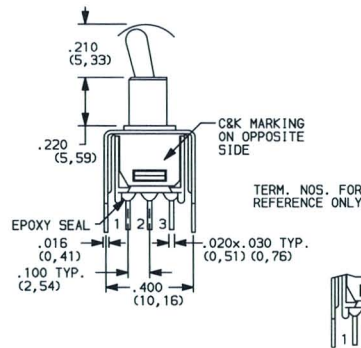


V3

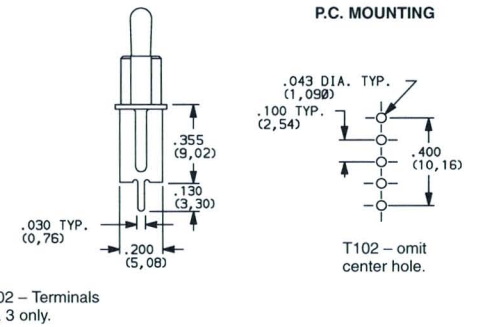


SPST and SPDT

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



Part No. Shown: T101MH9V3BE

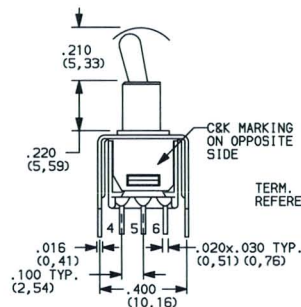


V3

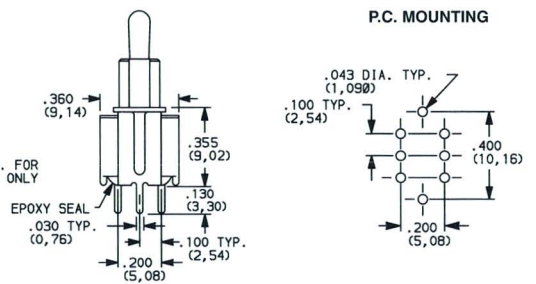


DPDT

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



Part No. Shown: T201MH9V3BE



CONTACT MATERIAL

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

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.

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: 10⁹ 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).

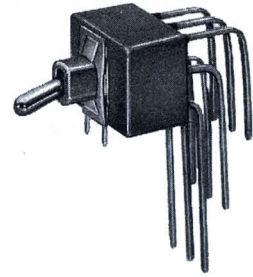
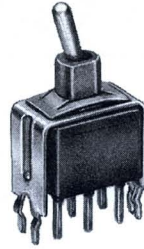
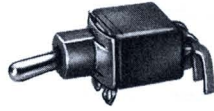
CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact material).

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.

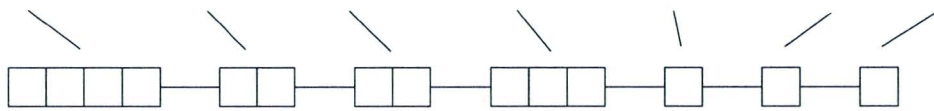


models available, see page B-20

B

Easy Build-A-Switch:

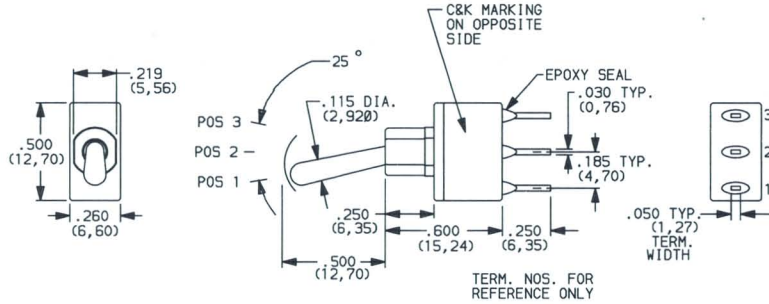
Below is a complete listing of available options for E SERIES SEALED TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page B-19; all available options are shown 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.



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				

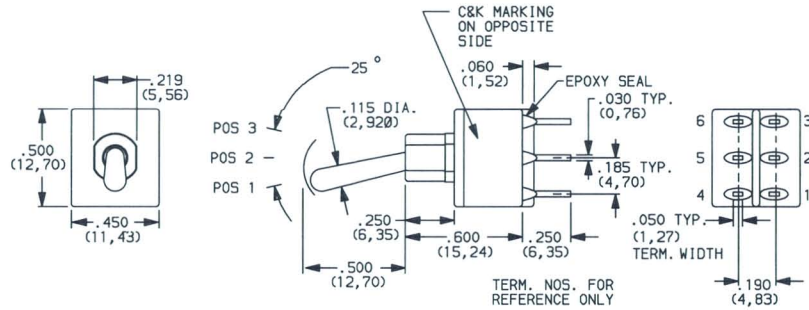
*Process sealed—withstands soldering and cleaning processes.

SWITCHES WITH STANDARD OPTIONS



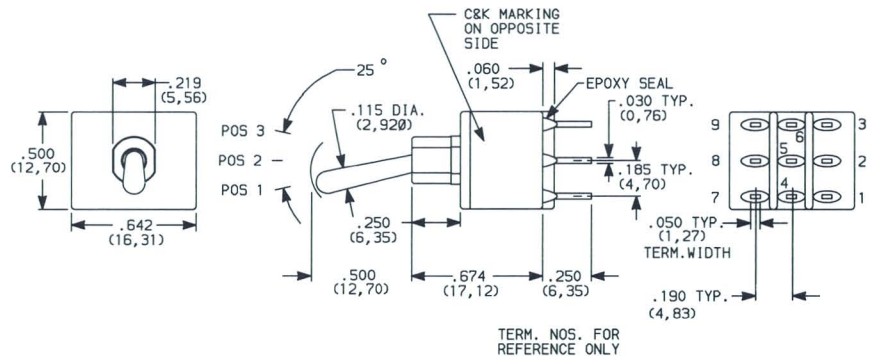
SPDT

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	<p>SPDT</p>
	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	<p>DPDT</p>
	E203	ON	OFF	ON				
	E205	MOM.	OFF	MOM.				
	E207	ON	OFF	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	
	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	<p>3PDT</p>
	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.

ACTUATOR

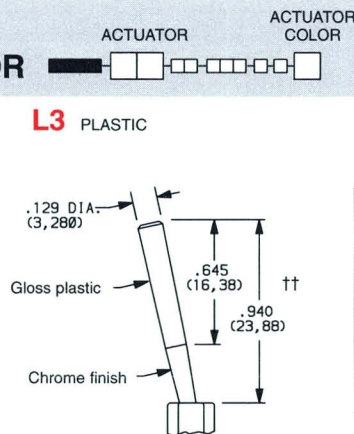
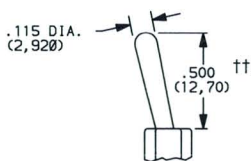
S

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.

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.

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

*Process sealed—withstands soldering and cleaning processes.

BUSHING

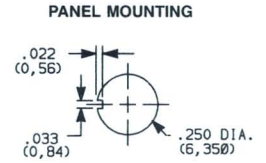
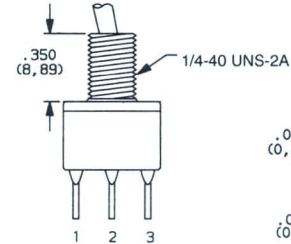
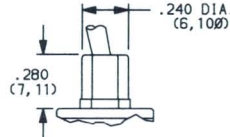
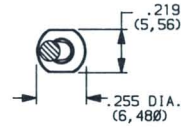
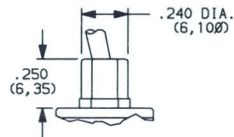
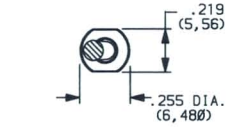
D1 (STD.)

F1 ESD RESISTANT CONDUCTIVE BUSHING

NEW

D9

Y



E3XX models not available with D9 bushing.

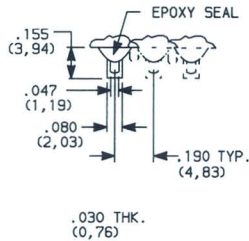
F1 conductive bushing option is impregnated with carbon fibers; dissipates electrostatic discharge (ESD) up to 20,000 V from actuator to ground. Available with M, S actuator options and A, A3, AW—AW5, R, R2, AV1-AV5, V2-V91 termination options. Note: ESD protection depends on proper grounding of switch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

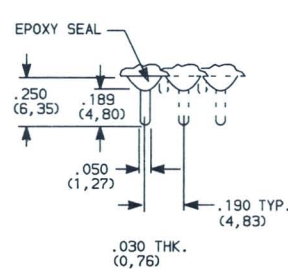
Z (STD.)



SPDT thru 3PDT

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

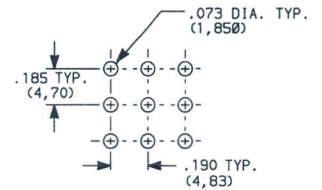
C



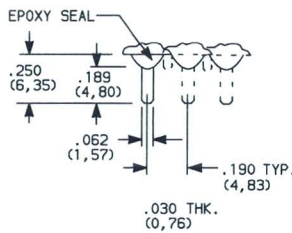
SPDT thru 3PDT

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

P.C. MOUNTING



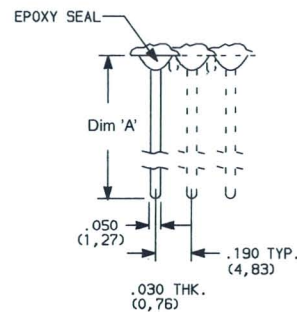
Z3 QUICK CONNECT



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'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)



*Process sealed-withstands soldering and cleaning processes.

TERMINATIONS

B

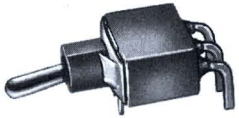
A

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: E101MD1ABE



A

A3 SNAP-IN

SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED

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

SPDT

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

B

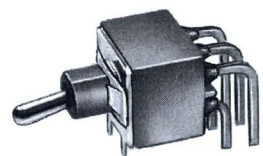
A

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: E201MD1ABE



A

A3 SNAP-IN

SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4-AW5 EXTENDED

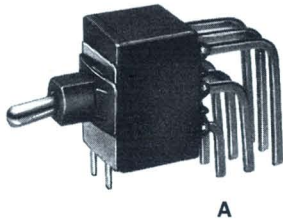
Option	Dim 'A'
AW	.21 (5,3)
AW1	.42 (10,7)
AW4	.52 (13,2)
AW5	.76 (19,3)

DPDT

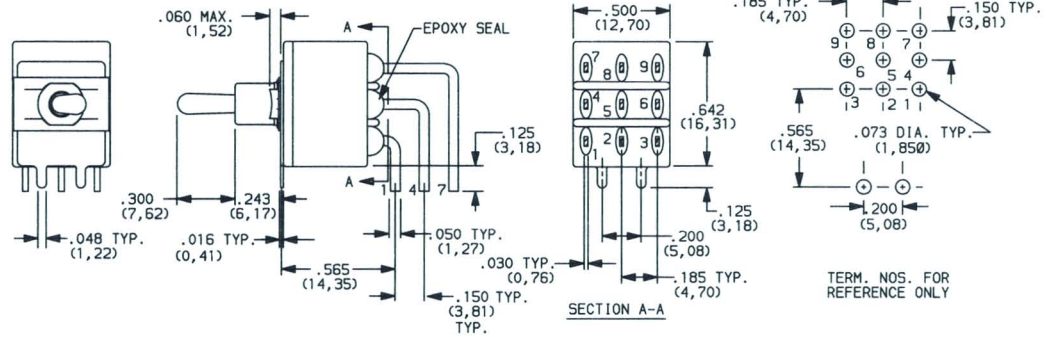
Term. bend radii and lead-in mfg. option. Actuator shown in pos.1. B contact material std. Not available with Y bushing.

TERMINATIONS

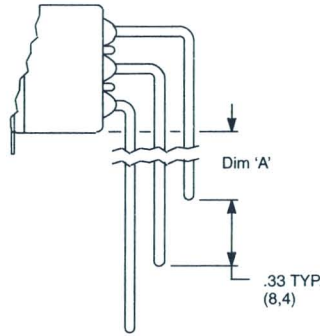
A



A



AW4-AW5 EXTENDED



Option	Dim 'A'
AW4	.18 (4,6)
AW5	.42 (10,7)

3PDT

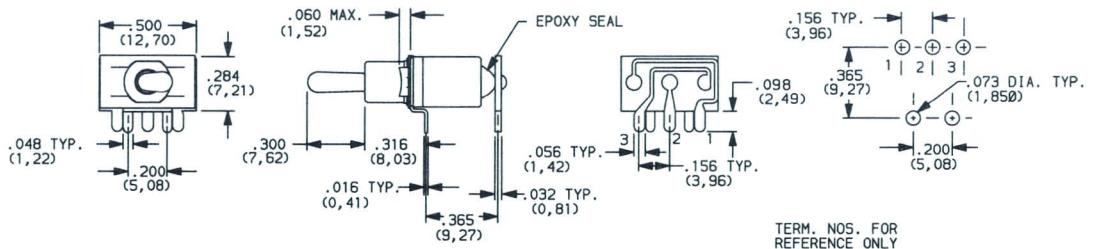
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with D9,Y bushings.

R

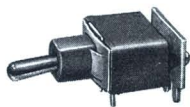


SPDT

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

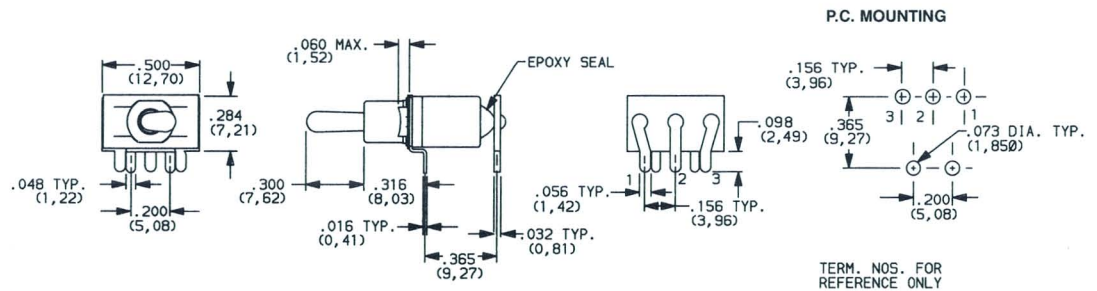


R2



SPDT

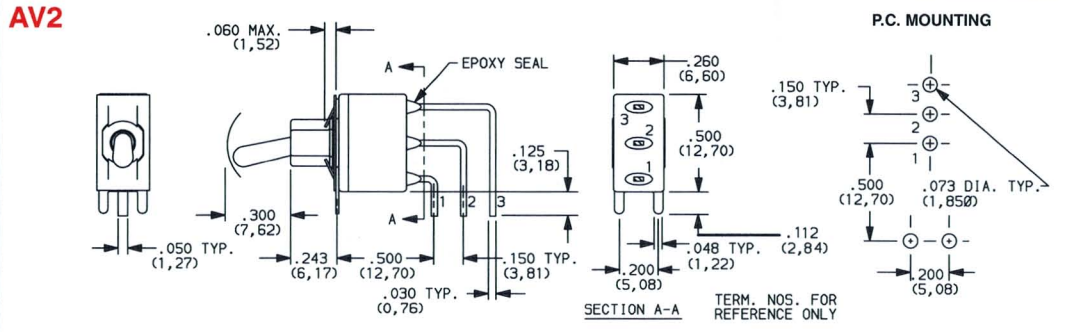
Contact makes on opposite side act. thrown.
Actuator shown in pos.1.
Available with B contact material only.
Not available with Y bushing.



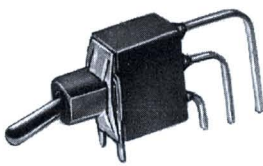
*Process sealed-withstands soldering and cleaning processes.

TERMINATIONS

B



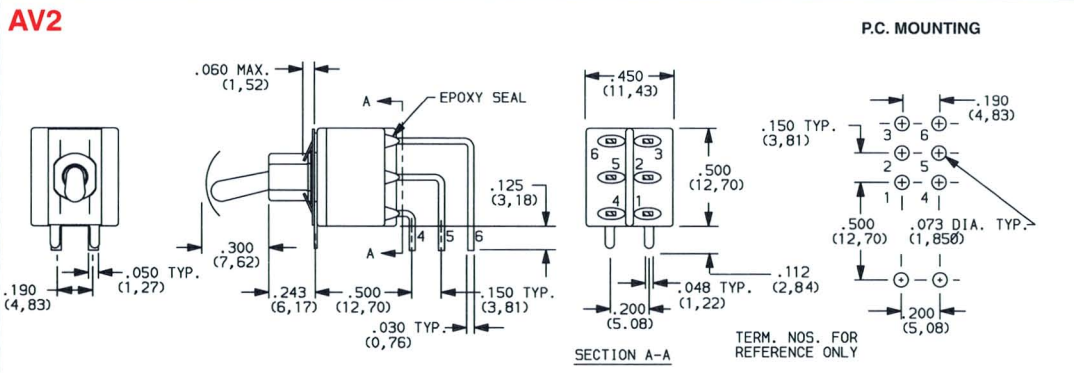
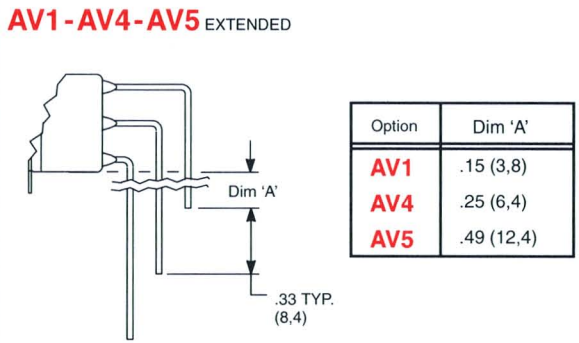
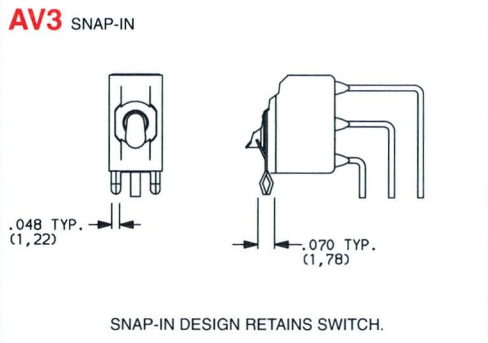
Part No. Shown: E101MD1AV2BE



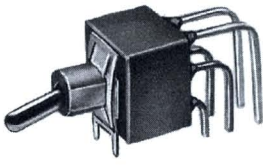
AV2

SPDT

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



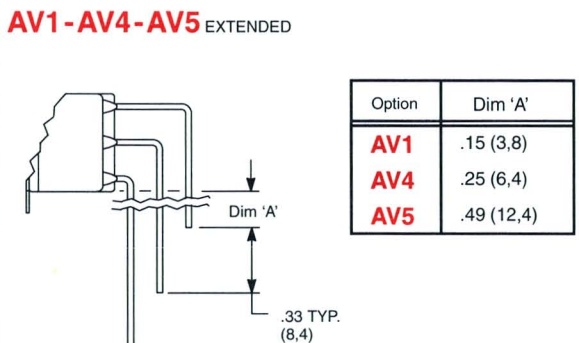
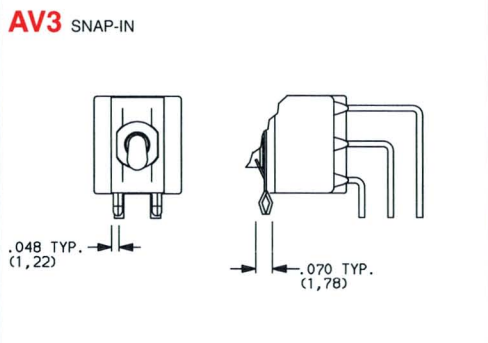
Part No. Shown: E201MD1AV2BE



AV2

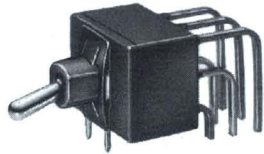
DPDT

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

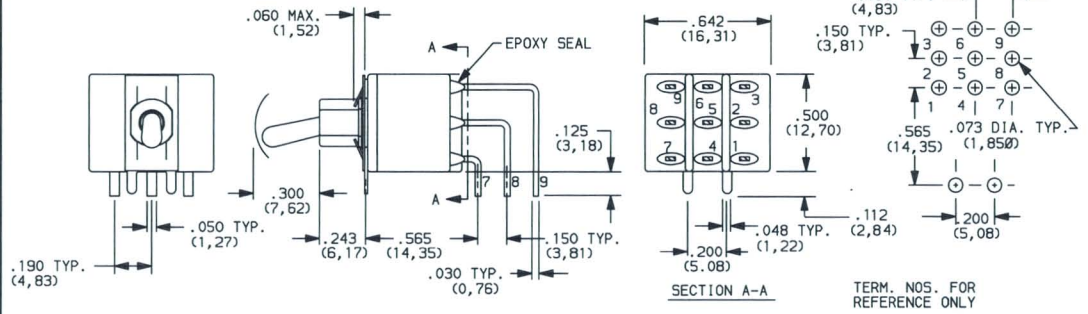


TERMINATIONS

AV2



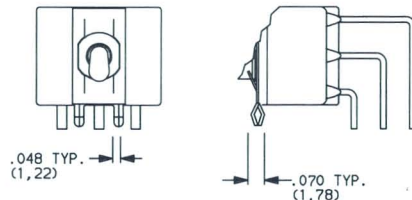
AV2



3PDT

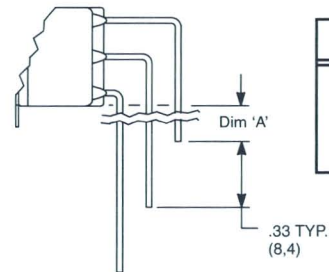
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with D9, Y bushings.

AV3 SNAP-IN

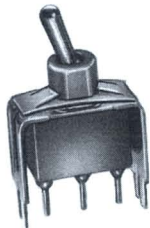


SNAP-IN DESIGN RETAINS SWITCH.

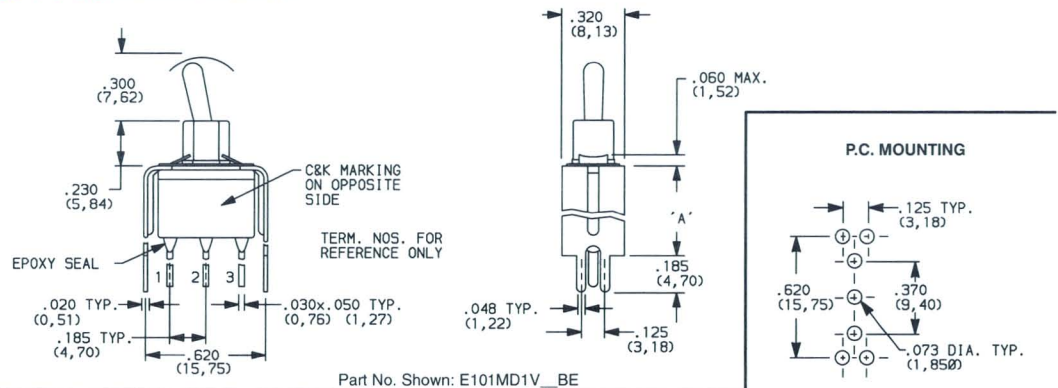
AV1-AV4-AV5 EXTENDED



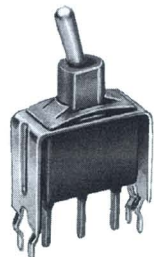
V3-V4-V9 REPLACES V30-V40-V90



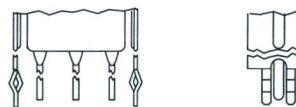
V3



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)

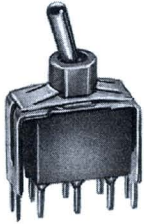
SPDT

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

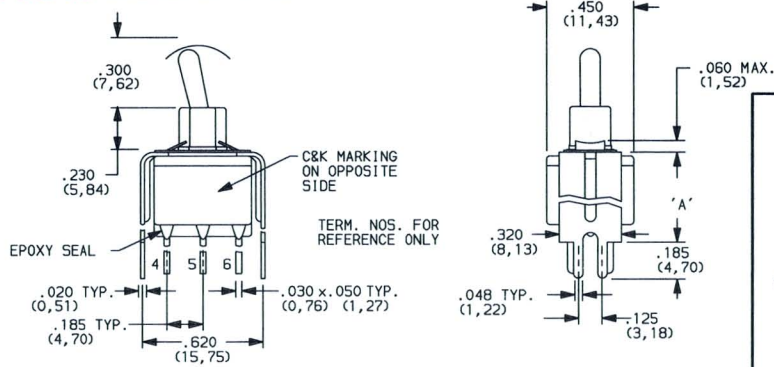
*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

B



V3-V4-V9 REPLACES V30-V40-V90



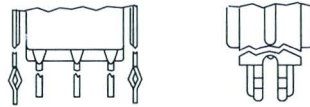
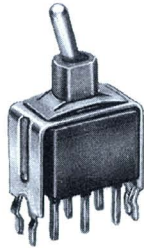
P.C. MOUNTING

PC mounting diagram showing terminal layout with dimensions: .125 TYP. (3,18) for terminal spacing, .620 (15,75) for terminal width, .370 (9,40) for terminal height, .073 DIA. TYP. (1,85) for terminal diameter, and .190 (4,83) for terminal length.

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

V3

V31-V41-V91 SNAP-IN

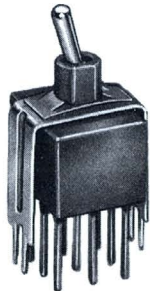


V31

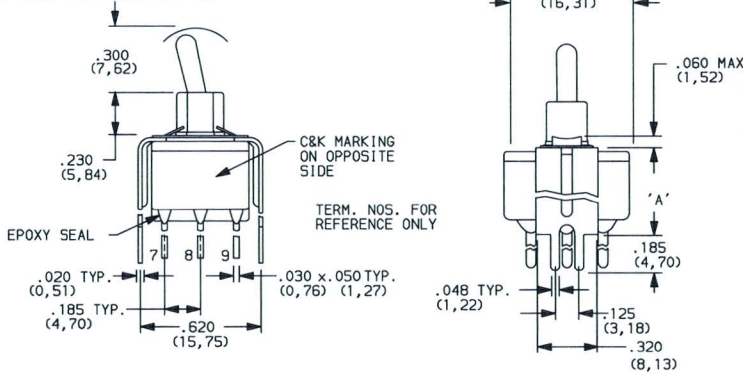
SNAP-IN DESIGN RETAINS SWITCH.

DPDT

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



V4-V9 REPLACES V40-V90



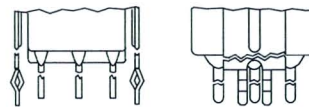
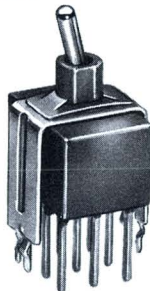
P.C. MOUNTING

PC mounting diagram showing terminal layout with dimensions: .125 TYP. (3,18) for terminal spacing, .620 (15,75) for terminal width, .370 (9,40) for terminal height, .073 DIA. TYP. (1,85) for terminal diameter, and .190 (4,83) for terminal length.

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

V4

V41-V91 SNAP-IN



V41

SNAP-IN DESIGN RETAINS SWITCH.

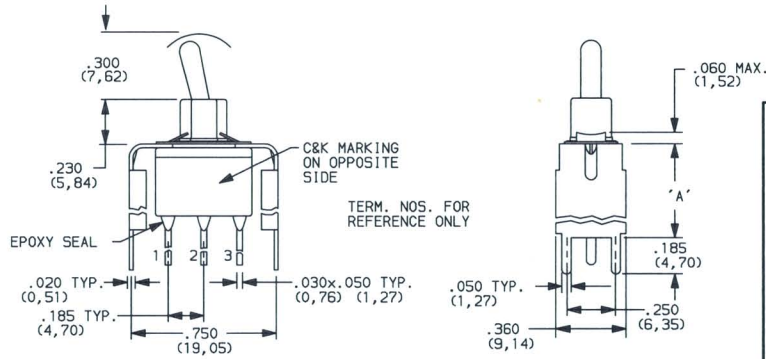
3PDT

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

*Process sealed—withstands soldering and cleaning processes.

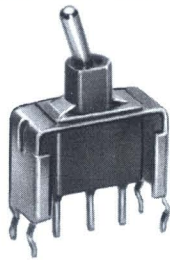
TERMINATIONS

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



Part No. Shown: E101MD1V_BE

V21-V61-V71-V81 SNAP-IN

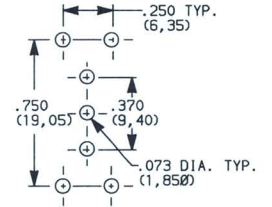


V61



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

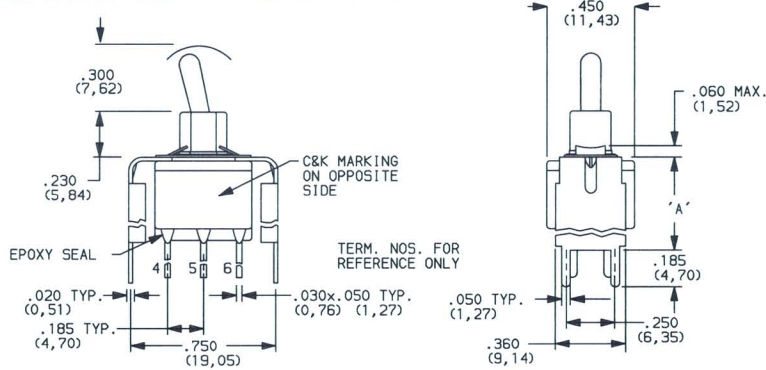


Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11, 68)
V7, V71	.630 (16, 00)
V8, V81	.953 (24, 21)

SPDT

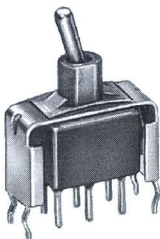
Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

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

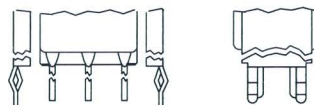


Part No. Shown: E201MD1V_BE

V21-V61-V71-V81 SNAP-IN

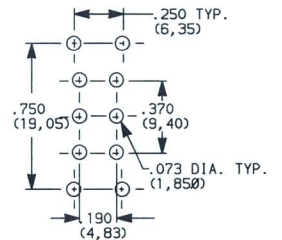


V61



SNAP-IN DESIGN RETAINS SWITCH.

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)

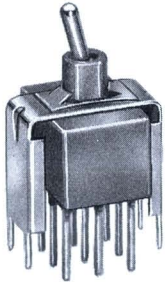
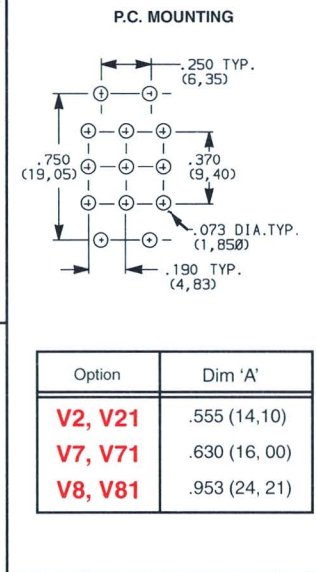
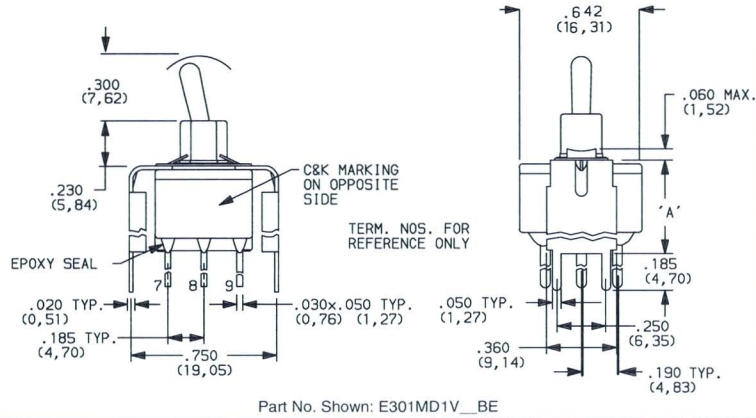
DPDT

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

*Process sealed—withstands soldering and cleaning processes.

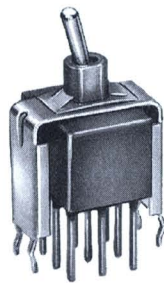
TERMINATIONS

V2-V7-V8 REPLACES V20-V70-V80

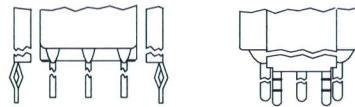


V7

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

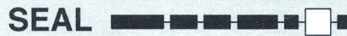
OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250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

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

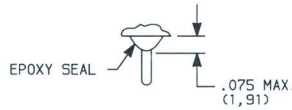
- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, with gold plate over nickel plate.
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, silver plated.
- CENTER CONTACT & ALL TERMINALS: Copper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



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: 10^9 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.

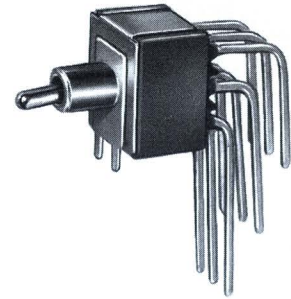
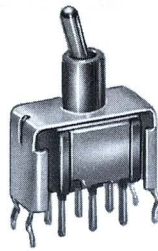
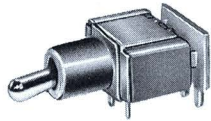
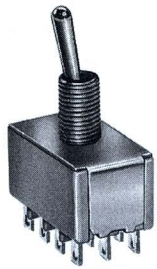
SWITCH SUPPORT RETAINER: Stainless steel.

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.



B

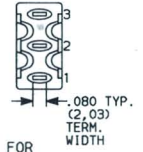
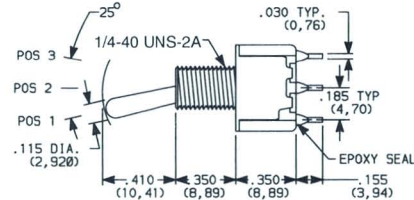
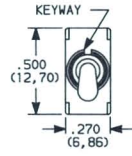
UL **CS**® models available, see page B-32

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		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							

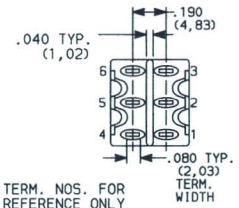
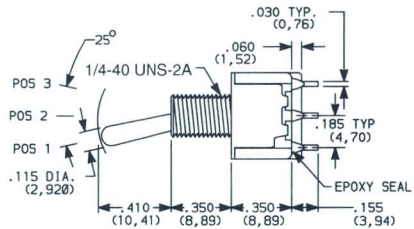
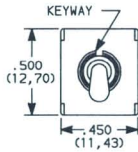
SWITCHES WITH STANDARD OPTIONS



TERM. NOS. FOR REFERENCE ONLY

SPDT

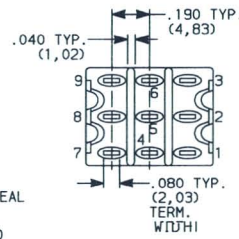
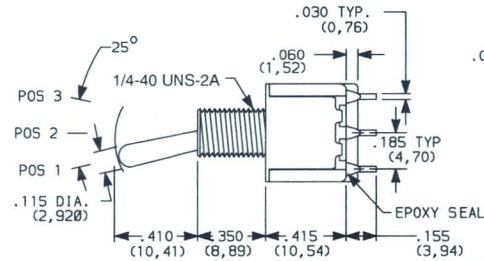
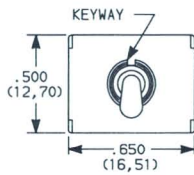
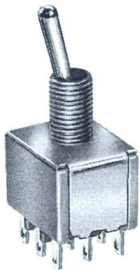
Part No. Shown: 7101SYZQE



TERM. NOS. FOR REFERENCE ONLY

DPDT

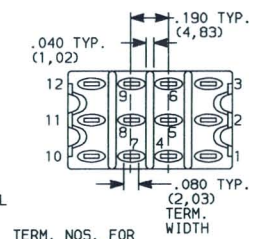
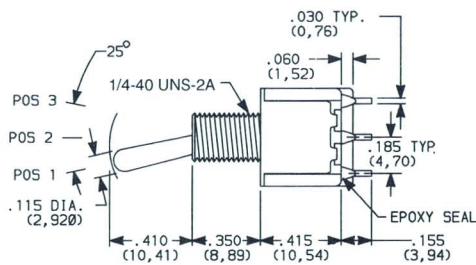
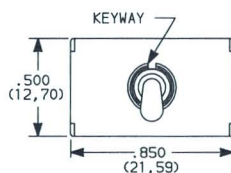
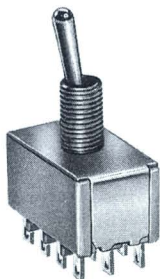
Part No. Shown: 7201SYZQE



TERM. NOS. FOR REFERENCE ONLY

3PDT

Part No. Shown: 7301SYZQE



TERM. NOS. FOR REFERENCE ONLY

4PDT

Part No. Shown: 7401SYZQE



SWITCH FUNCTION

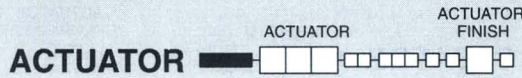
B

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	
7215*	U215*	MOM.	ON	MOM.					
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.					

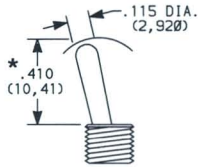
MOM. = MOMENTARY

* 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.

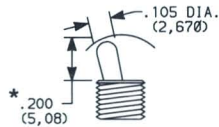


S
SP ANTIROTATION^{1,2}

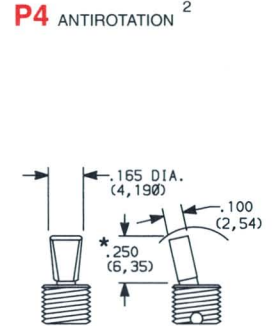
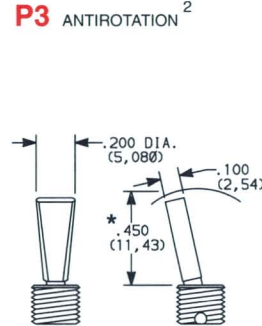
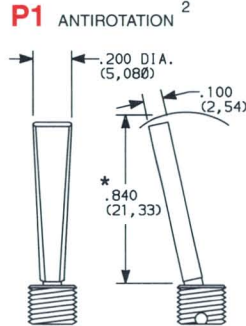


S actuator standard when ordered with Z, C, Z3 or W-W5 terminations.

M
MP ANTIROTATION^{1,2}

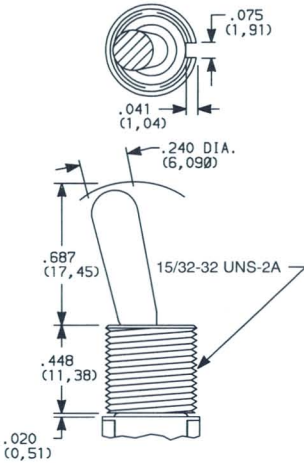


M actuator standard when ordered with all terminations except Z, C, Z3, W-W5 terminations.



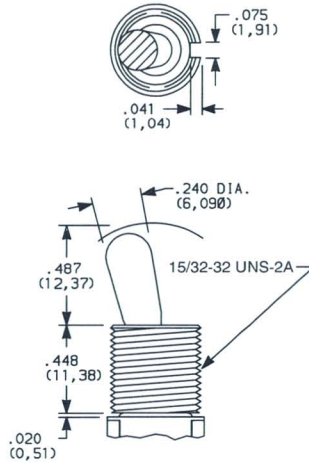
Dress nut P/N 709901201 supplied standard with threaded bushing. (P/N 709903201 with metric threaded bushings).

T
TP ANTIROTATION²

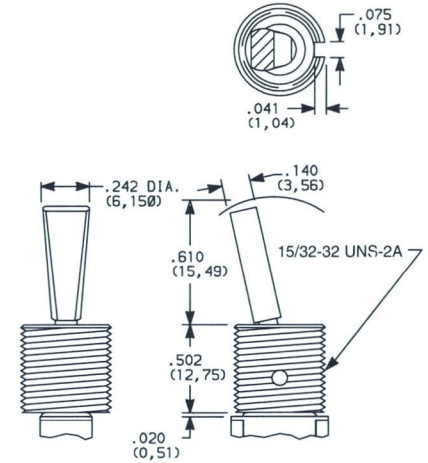


Bushing option code not required unless CW splashproof bushing desired. TP, T1P actuators not available with CW splashproof bushing. All TXX actuators not available on single pole models with A-A7, AW-AW7, R, R2 terminations.

T1
T1P ANTIROTATION²

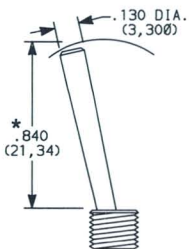


T2P ANTIROTATION²

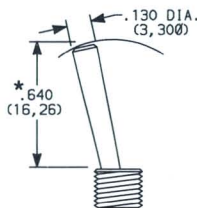


Bushing option code not required. T2P actuator not available with CW splashproof bushing or single pole models with A-A7, AW-AW7, R, R2 terminations.

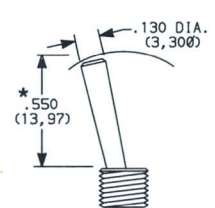
L
LP ANTIROTATION^{1,2}



L1
L1P ANTIROTATION^{1,2}



L2
L2P ANTIROTATION^{1,2}



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.

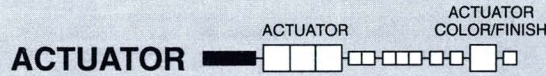
** See BUSHING FINISH page B-35.

¹ S, M, L, L1, L2, TXX actuators not available with Y1 bushing.

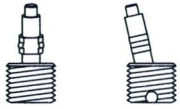
² SP, MP, P1, P3, P4, TXX, LP, L1P, L2P actuators not available with D8, H4 bushing.

* 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.

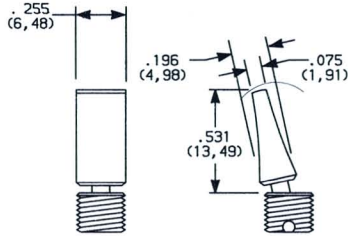


L40 ANTIROTATION¹

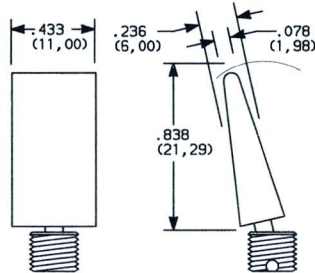


No color choice required.

L41 PLASTIC LEVER HANDLE- ANTIROTATION¹

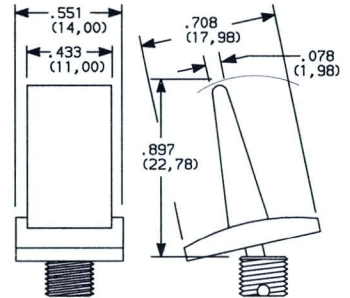


L42 PLASTIC LEVER HANDLE- ANTIROTATION¹



Finish: matte (L41, L42, L43).

L43 PLASTIC LEVER HANDLE- ANTIROTATION¹



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.

ACTUATOR COLOR

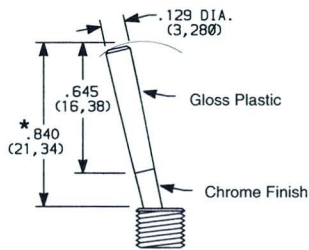
LXX actuators (except L40).

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.

L3 PLASTIC

L3P ANTIROTATION

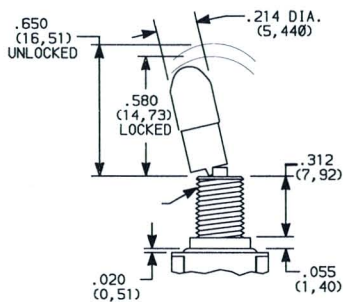


* Add .070 (1,78) for D, D8, D9 bushings; subtract .020 (0,51) for H3 bushing.

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

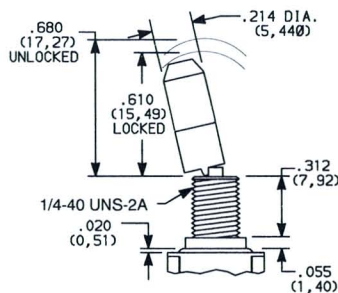
K LOCKING LEVER

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

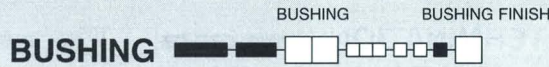


-07,-13 Models
2 Pos. Lock

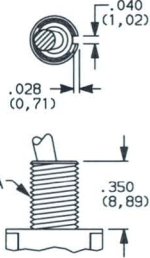


-08 Models
1 Pos. Lock

Keyway on right side.

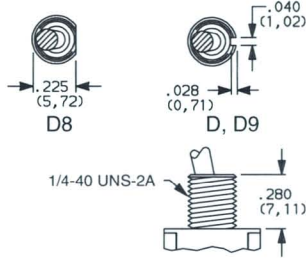


Y
Y9 UNTHREADED



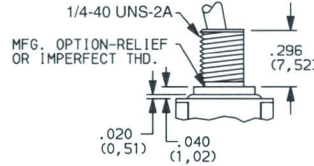
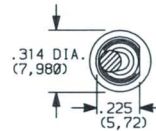
Y bushing standard with Z, C, Z3 or W-W5 terminations.

D KEYWAY
D8 UNTHREADED - FLAT³
D9 UNTHREADED - KEYWAY

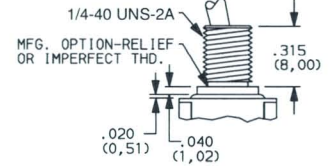
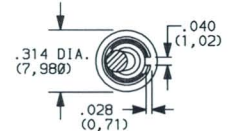


D9 bushing standard with all terminations except Z, C, Z3, or W-W5. Add .070 (1,78) to all actuator lengths with D, D8, D9 bushings.

H HIGH TORQUE^{1,2}

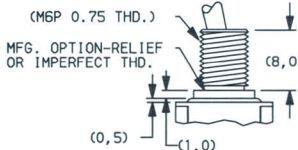
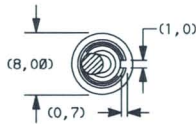


H3 HIGH TORQUE^{1,2}

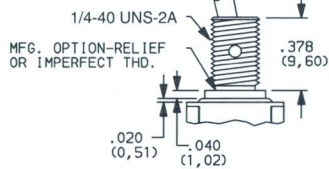
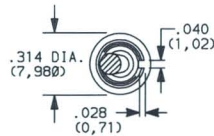


Subtract .020 (0,51) from all actuator lengths for H3 bushing.

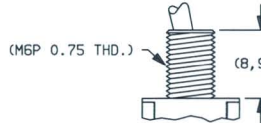
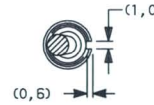
H4 METRIC HIGH TORQUE^{1,2,3}



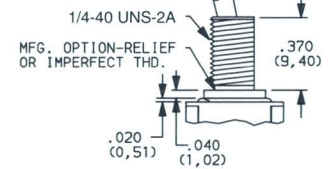
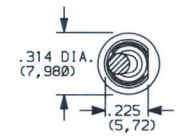
Y1 HIGH TORQUE^{1,2,4}



Y3 METRIC

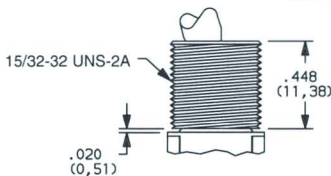
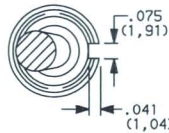


Y4 HIGH TORQUE^{1,2,5}



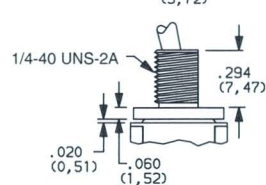
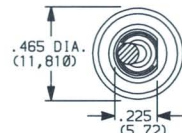
CW SPLASHPROOF^{1,2}

For T, T1 actuators.



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

For actuators other than T, T1.



Internal actuator seal and external bushing seal washer standard

BUSHING FINISH

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

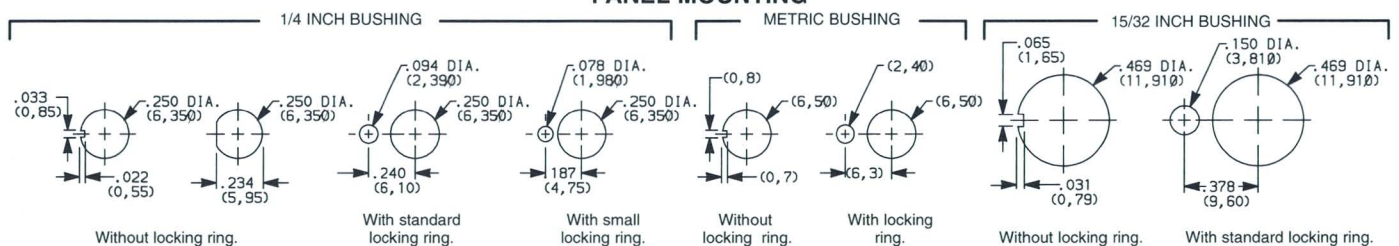
Select bushing finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black bushings or actuators are specified. All hardware is available separately, see catalog section H.

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.

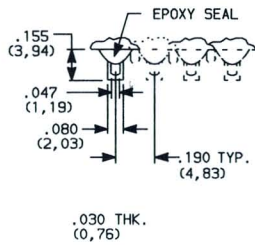
Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

PANEL MOUNTING



TERMINATIONS

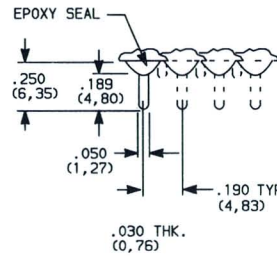
Z (STD.)



SPDT thru 4PDT

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

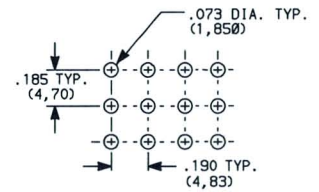
C



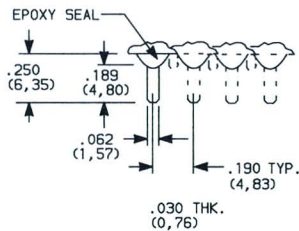
SPDT thru 4PDT

Q contact material std.

P.C. MOUNTING



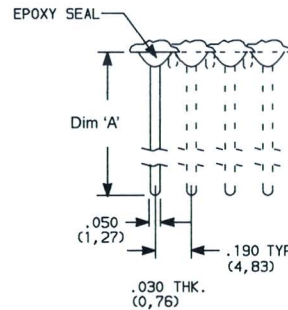
Z3 QUICK CONNECT



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

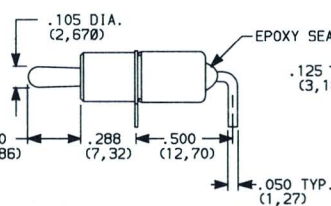
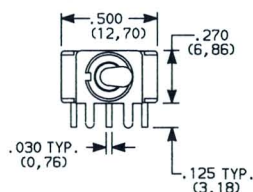
B contact material std.

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

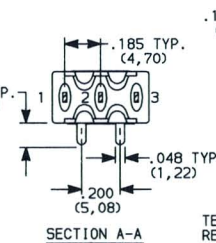


A

A

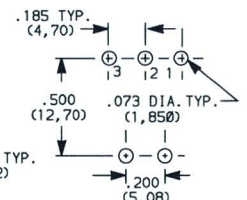


Part No. Shown: 7101MD9ABE

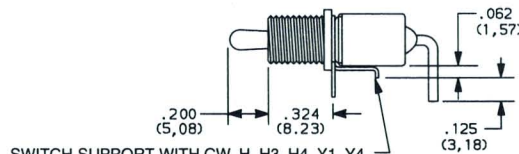


SECTION A-A

P.C. MOUNTING



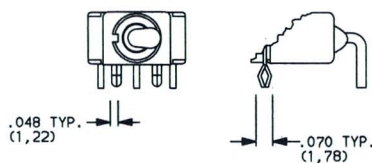
TERM. NOS. FOR REFERENCE ONLY



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

Part No. Shown: 7101MHABE

A3 SNAP-IN

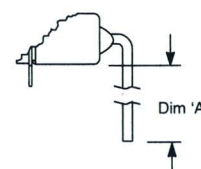


SNAP-IN DESIGN RETAINS SWITCH.

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.

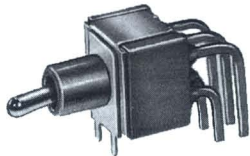
AW-AW1-AW3-AW4-AW5 EXTENDED



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

TERMINATIONS

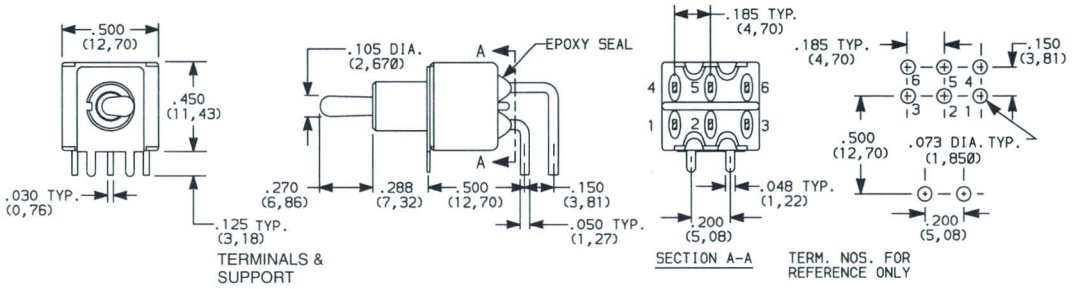
A



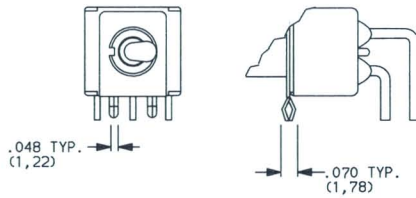
A

DPDT

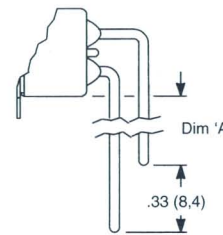
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.



A3 SNAP-IN

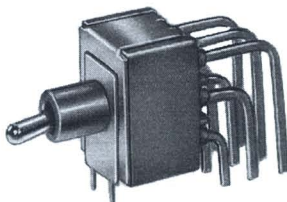


AW-AW1-AW4-AW5 EXTENDED



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

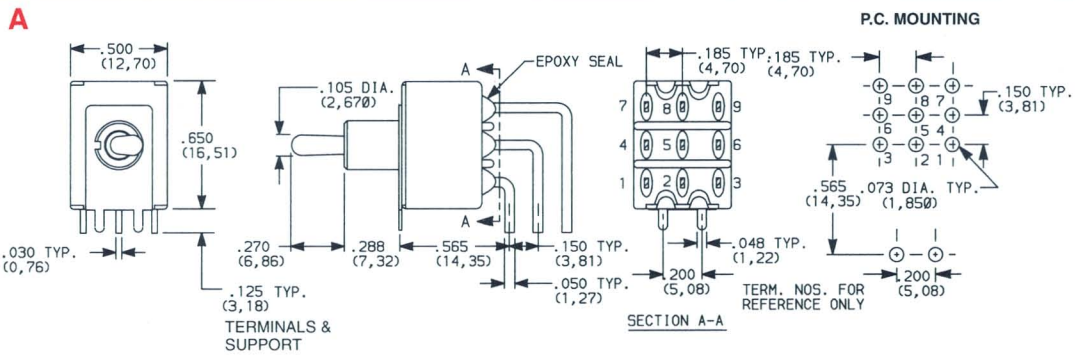
A



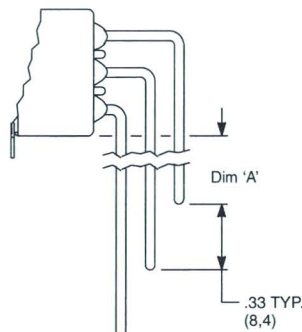
A

3PDT

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



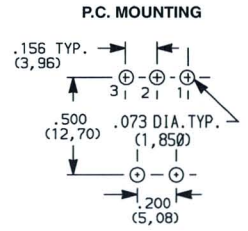
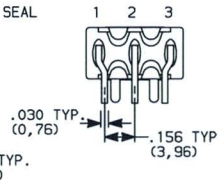
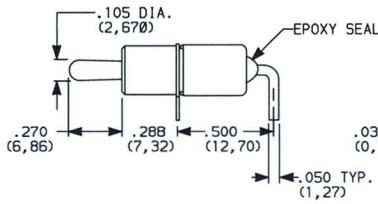
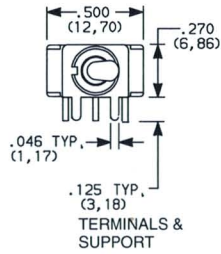
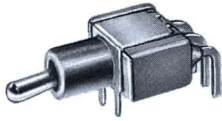
AW4-AW5 EXTENDED



Option	Dim 'A'
AW4	.18 (4,6)
AW5	.40 (10,2)

TERMINATIONS

A2

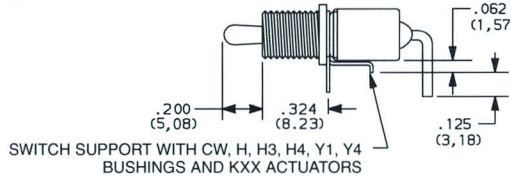


Part No. Shown: 7101MD9A2BE

TERM. NOS. FOR REFERENCE ONLY

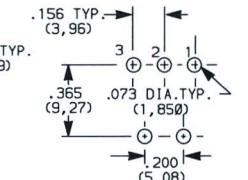
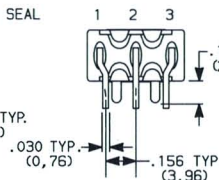
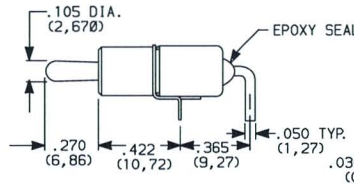
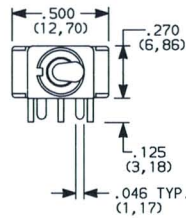
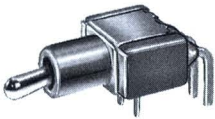
SPDT

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



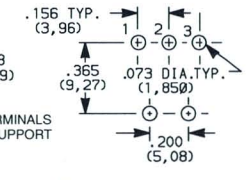
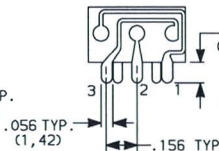
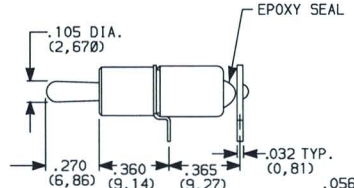
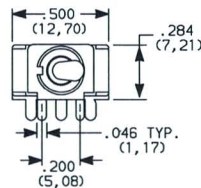
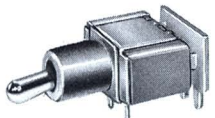
Part No. Shown: 7101MD9A4BE

TERM. NOS. FOR REFERENCE ONLY

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.

R

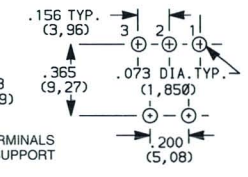
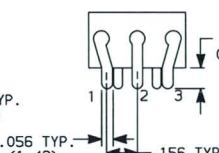
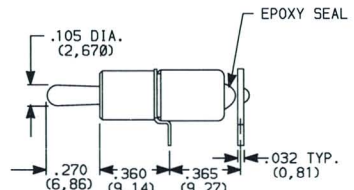
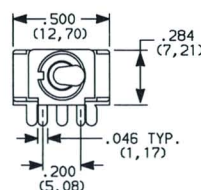
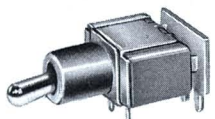


Part No. Shown: 7101MD9RBE

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 KXX, TXX actuators, CW, H, H3, H4, Y1, Y4 bushings, I seal option.

R2



Part No. Shown: 7101MD9R2BE

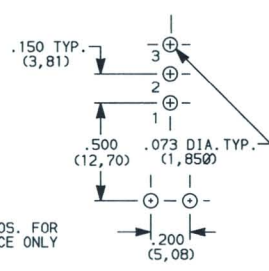
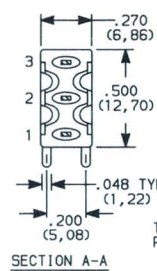
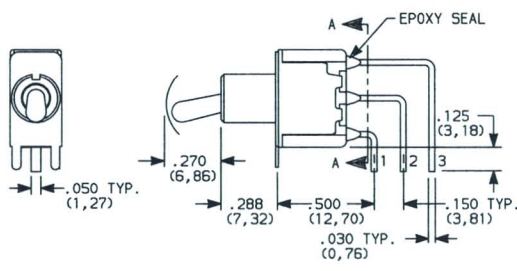
TERM. NOS. FOR REFERENCE ONLY

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

TERMINATIONS

AV2

P.C. MOUNTING

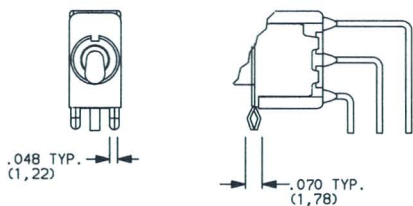


TERM. NOS. FOR REFERENCE ONLY

SECTION A-A

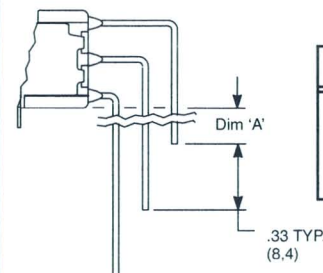
Part No. Shown: 7101MD9AV2BE

AV3 SNAP-IN

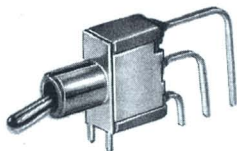


SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)



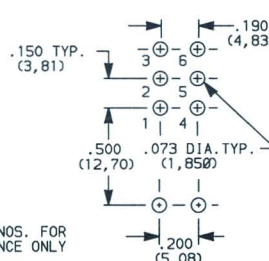
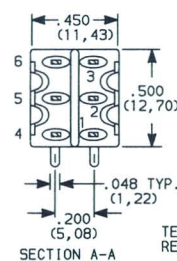
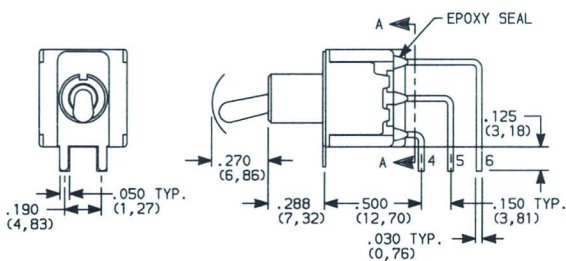
AV2

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

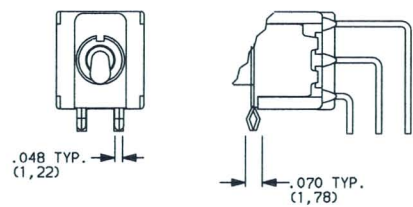


TERM. NOS. FOR REFERENCE ONLY

SECTION A-A

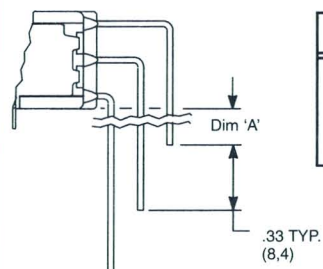
Part No. Shown: 7201MD9AV2BE

AV3 SNAP-IN

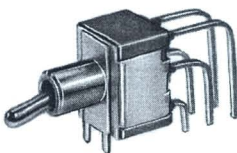


SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)



AV2

DPDT

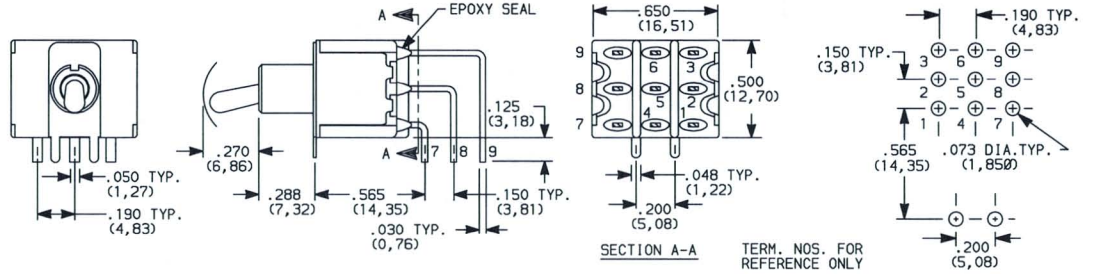
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

TERMINATIONS

B

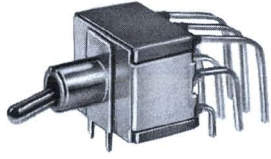
AV2

P.C. MOUNTING



SECTION A-A TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 7301MD9AV2BE



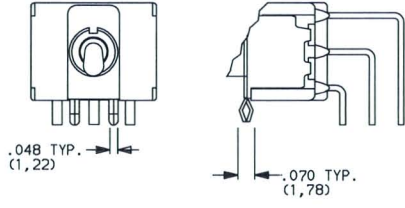
AV2

3PDT

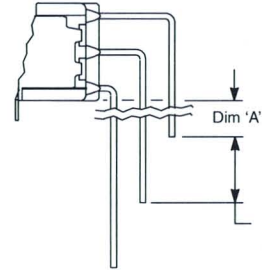
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

AV3 SNAP-IN

AV1-AV4-AV5 EXTENDED



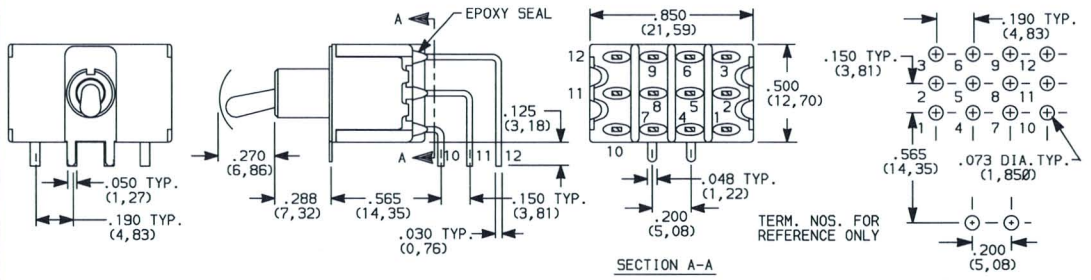
SNAP-IN DESIGN RETAINS SWITCH.



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

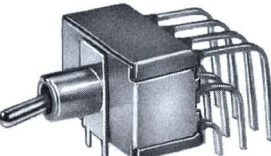
AV2

P.C. MOUNTING



SECTION A-A TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 7401MD9AV2BE



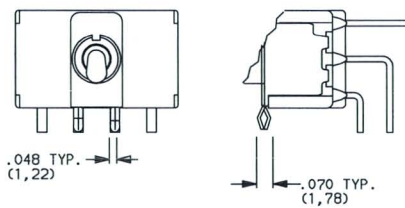
AV2

4PDT

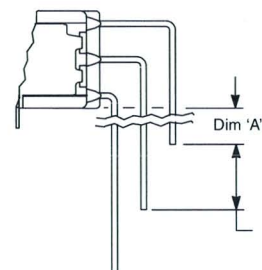
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

AV3 SNAP-IN

AV1-AV4-AV5 EXTENDED



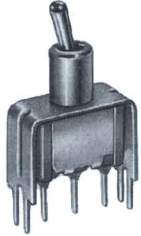
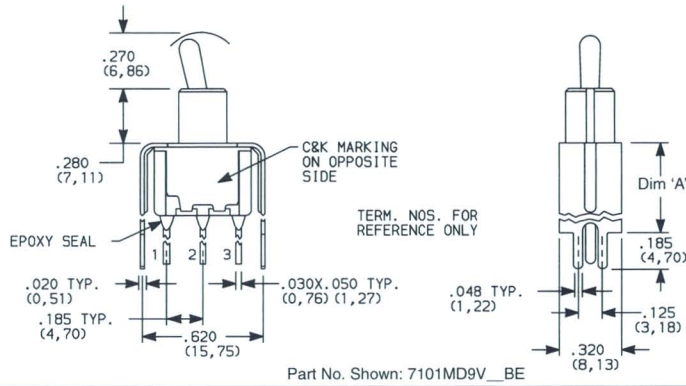
SNAP-IN DESIGN RETAINS SWITCH.



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

TERMINATIONS

V3-V4-V9 REPLACES V30-V40-V90

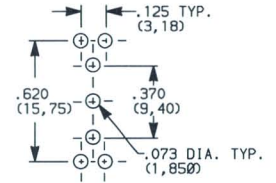


V3

SPDT

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

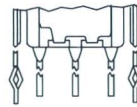
P.C. MOUNTING



V31-V41-V91 SNAP-IN



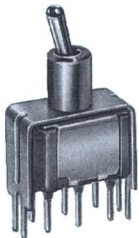
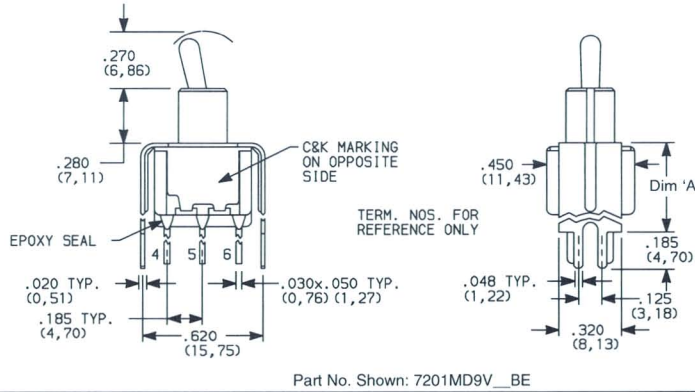
V31



SNAP-IN DESIGN RETAINS SWITCH.

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

V3-V4-V9 REPLACES V30-V40-V90

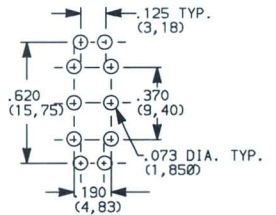


V3

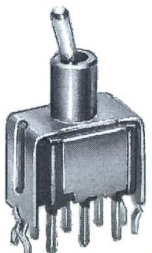
DPDT

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

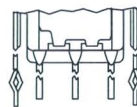
P.C. MOUNTING



V31-V41-V91 SNAP-IN



V31



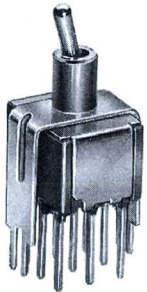
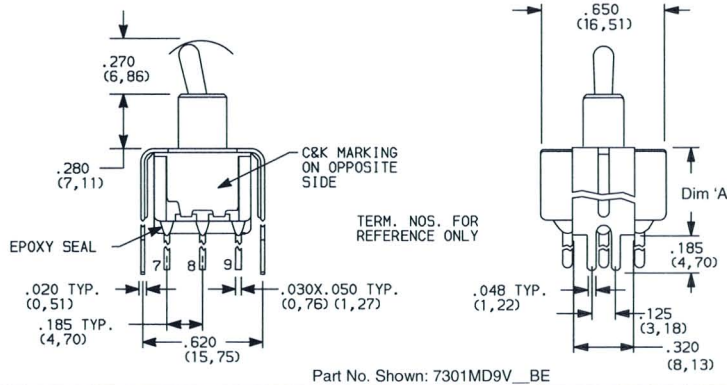
SNAP-IN DESIGN RETAINS SWITCH.

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

TERMINATIONS

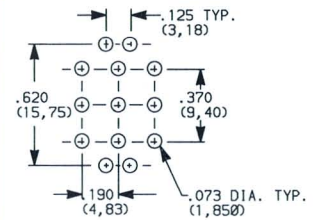
B

V4-V9 REPLACES V40-V90



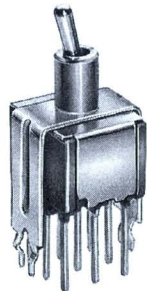
V4

P.C. MOUNTING

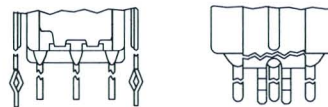


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN



V41

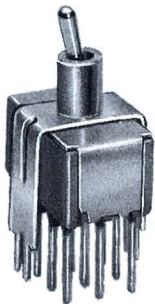
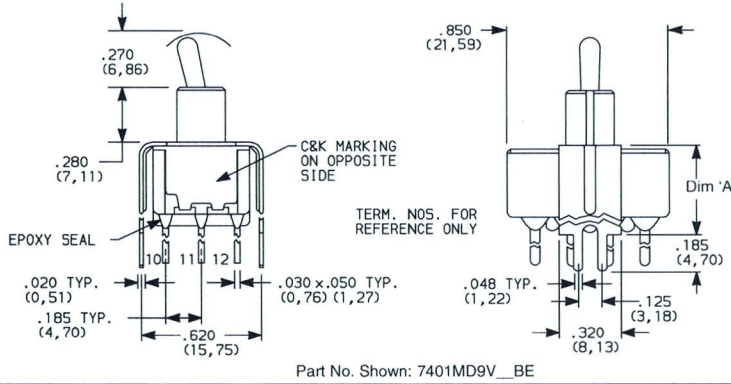


SNAP-IN DESIGN RETAINS SWITCH.

3PDT

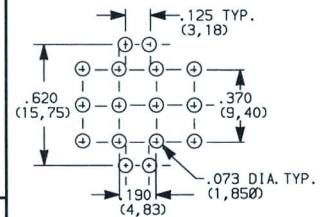
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

V4-V9 REPLACES V40-V90



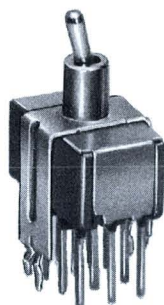
V4

P.C. MOUNTING

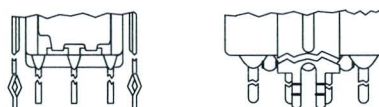


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN



V41



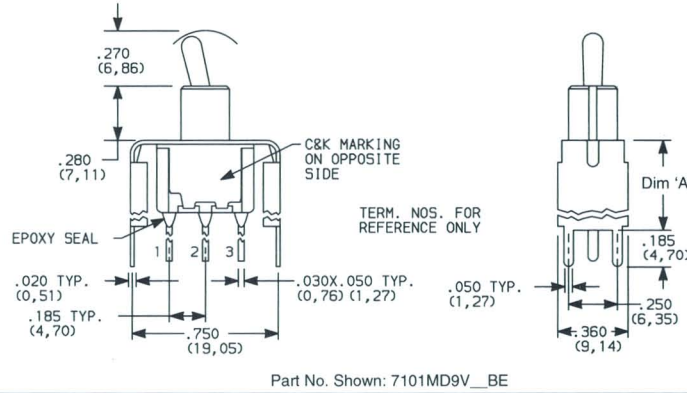
SNAP-IN DESIGN RETAINS SWITCH.

4PDT

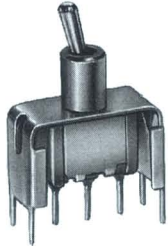
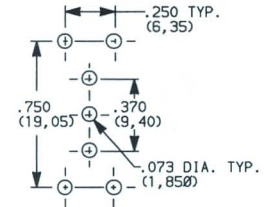
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

TERMINATIONS

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



P.C. MOUNTING

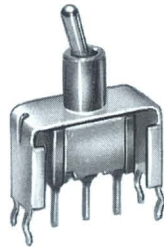


V6

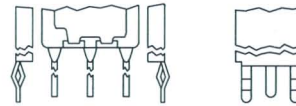
SPDT

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

V21-V61-V71-V81 SNAP-IN



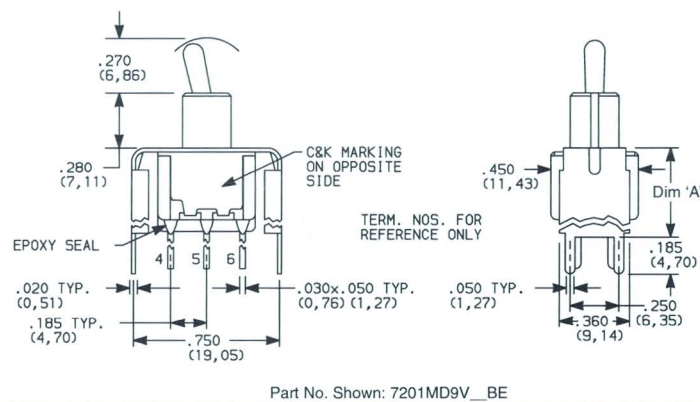
V61



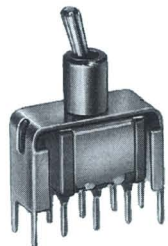
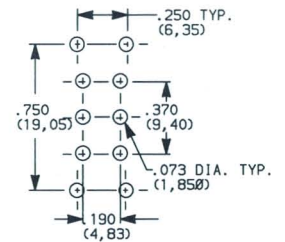
SNAP-IN DESIGN RETAINS SWITCH.

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 REPLACES V20-V60-V70-V80



P.C. MOUNTING

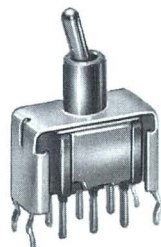


V6

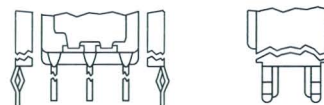
DPDT

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

V21-V61-V71-V81 SNAP-IN



V61

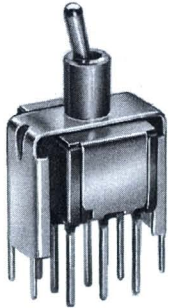


SNAP-IN DESIGN RETAINS SWITCH.

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

TERMINATIONS

B

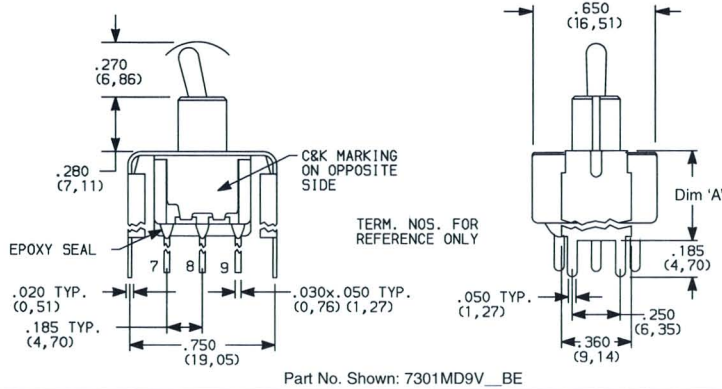


V7

3PDT

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

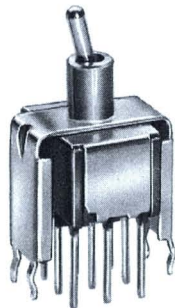
V2-V7-V8 REPLACES V20-V70-V80



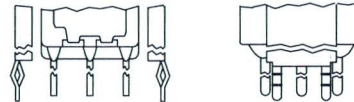
P.C. MOUNTING

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

V21-V71-V81 SNAP-IN

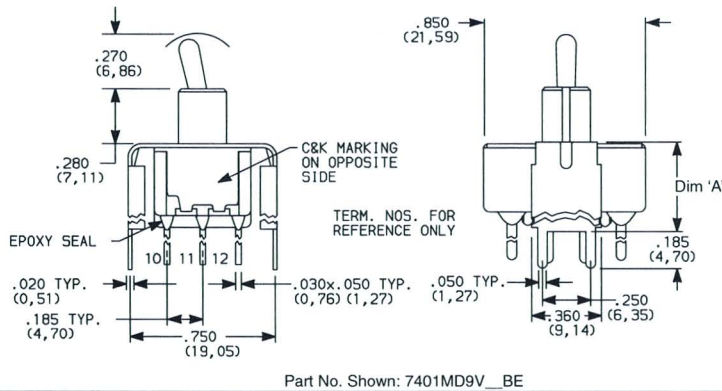


V71



SNAP-IN DESIGN RETAINS SWITCH.

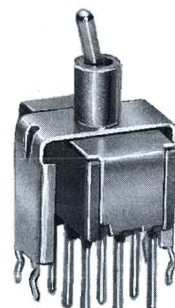
V2-V7-V8 REPLACES V20-V70-V80



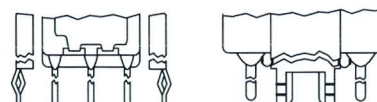
P.C. MOUNTING

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.

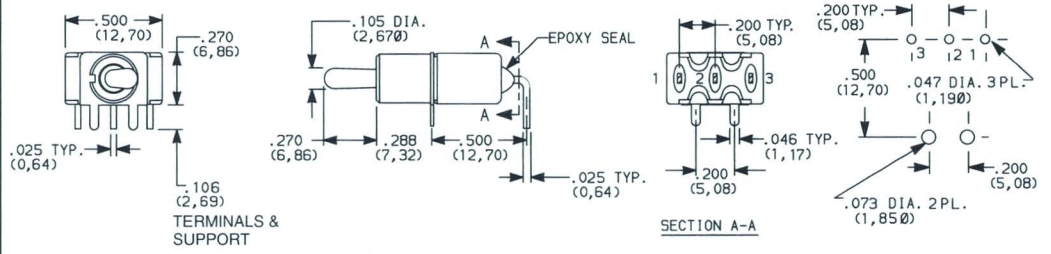
4PDT

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

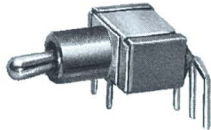
TERMINATIONS

REPLACES W SERIES

A7 .025 SQ. WIRE-WRAP—200 SPACING



Part No. Shown: 7101MD9A7BE



A7

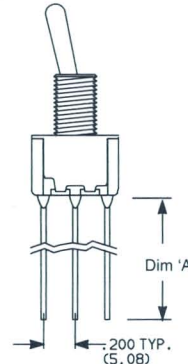
AW6-AW7 SNAP-IN



Terminals - .025 (0,64) sq.

Option	Dim 'A'
AW6	.42 (10,7)
AW7	.55 (14,0)

W6-W7 .025 SQ. WIRE-WRAP—200 SPACING



Terminals - .025 (0,64) sq.

Option	Dim 'A'
W6	.655 (16,64)
W7	.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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
L		TIN-LEAD ⁶		

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

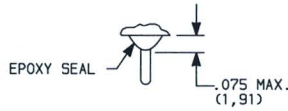
- ¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² END CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ END CONTACTS: Coin silver, silver plated.
- ⁵ CENTER CONTACT & ALL TERMINALS: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

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

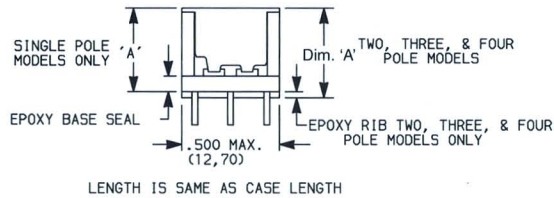
B contact material standard with all terminations except Z, C, Z3.
 B contact material must be ordered with A7, AW6-AW7, R, R2, W6-W7 terminations.
 Q contact material standard with Z, C, Z3 terminations.
 K, L, M contact materials not available with Z terminations.

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.

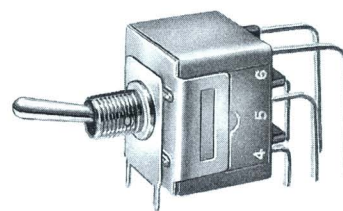
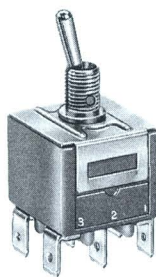
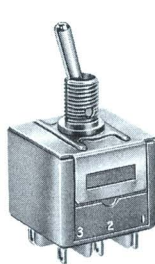
SPECIFICATIONS

- 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: 10⁹ 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.

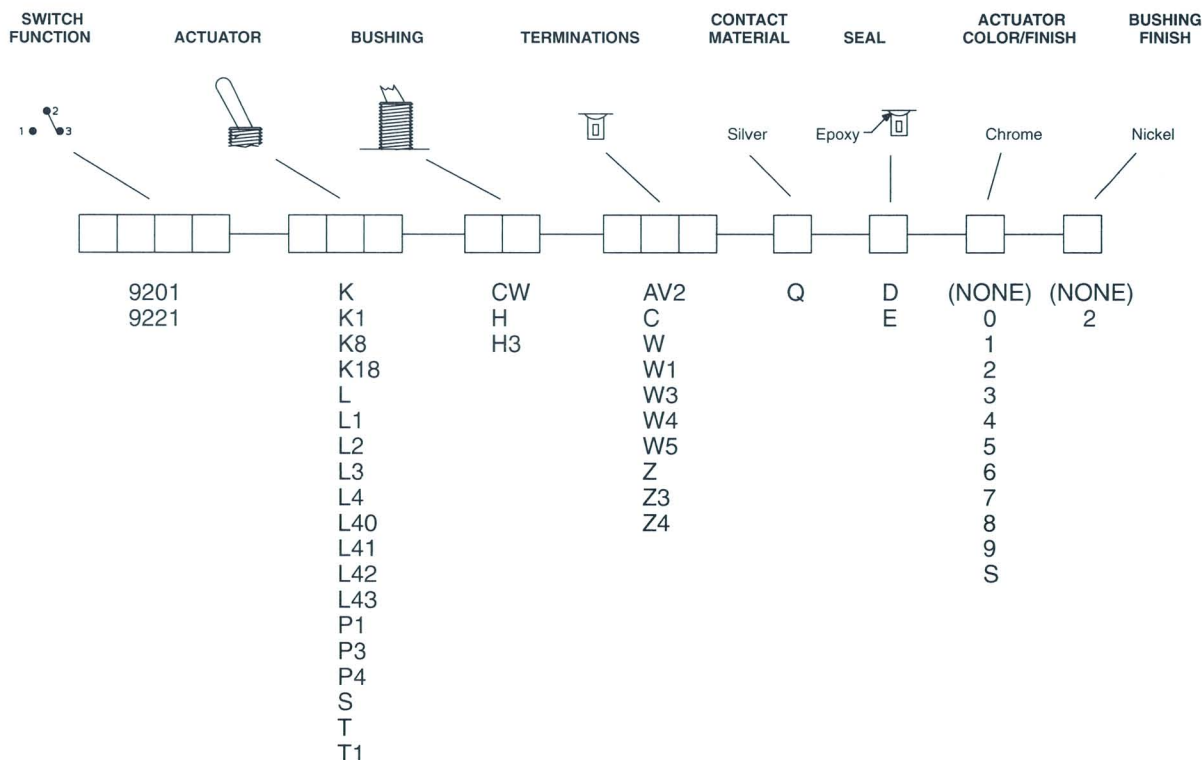
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



All 9000 Series models meet international dimensional and electrical requirements.

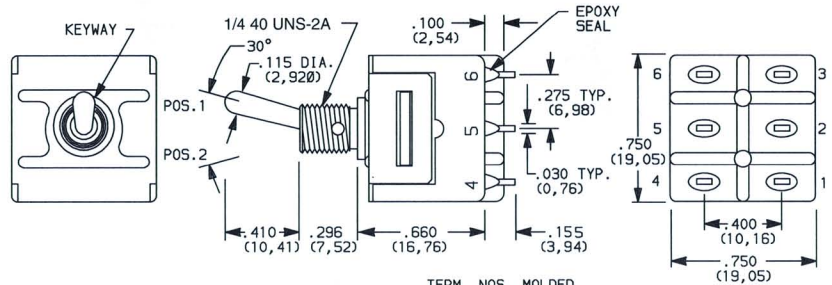
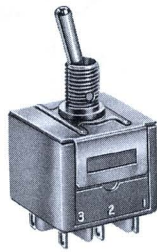
Easy Build-A-Switch:

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.





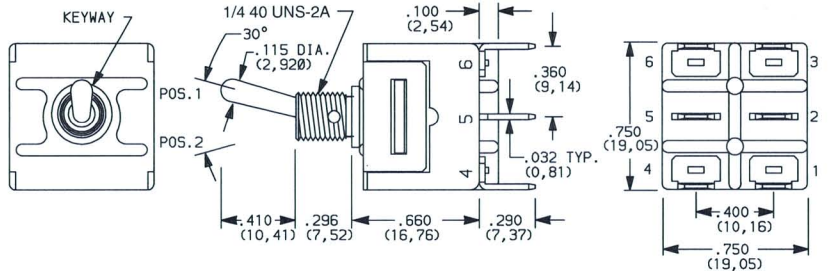
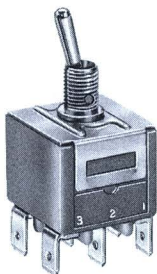
SWITCHES WITH STANDARD OPTIONS



**DPDT
6 AMP MODEL**

Part No. Shown: 9201SH3ZQE

TERM. NOS. MOLDED
ON SIDE OF CASE



**DPDT
10 AMP MODEL**

Part No. Shown: 9221SH3Z4QD

TERM. NOS. MOLDED
ON SIDE OF CASE

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.

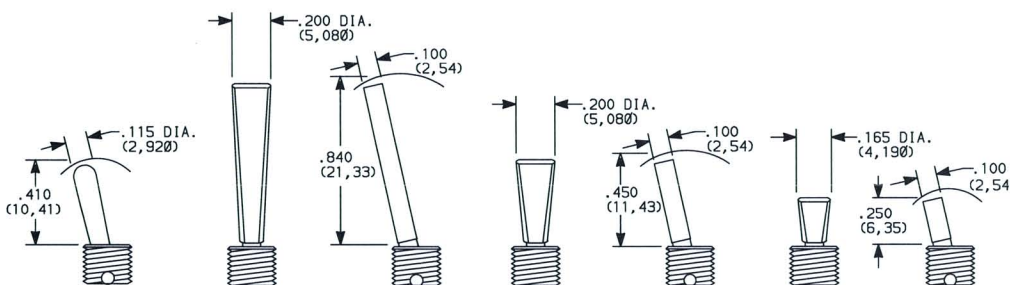
ACTUATOR

S (STD.)

P1

P3

P4



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

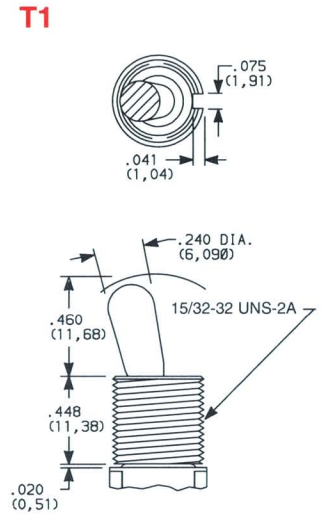
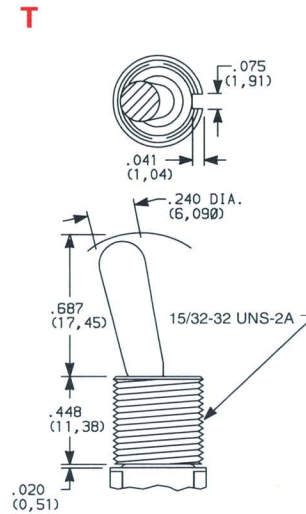
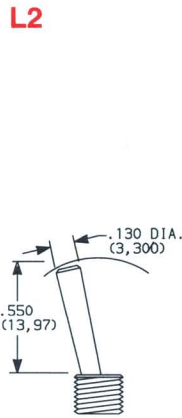
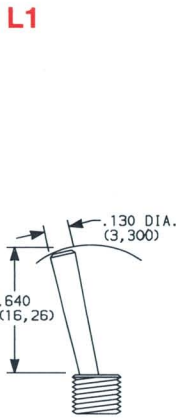
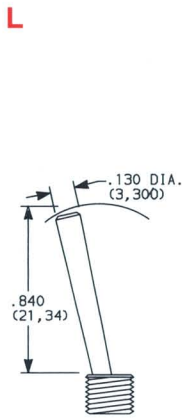
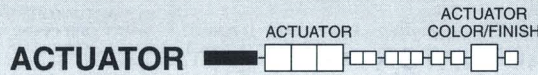
Antirotation: Standard on all actuators, provides anti-'push-in' feature on actuator.

ACTUATOR FINISH

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.



ACTUATOR FINISH

LX, TX Actuators

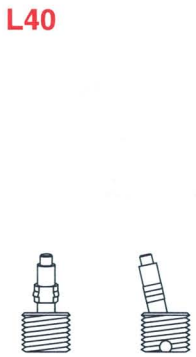
Bushing option code not required unless CW splashproof bushing desired.

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

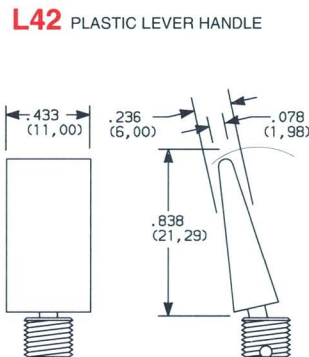
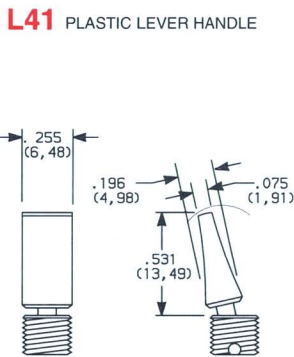
Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

* See BUSHING FINISH, page B-50.

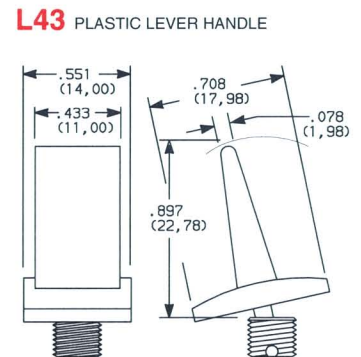
Antirotation: Standard on all actuators except T, T1, provides anti-'push-in' feature on actuator.



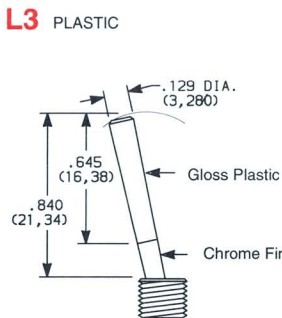
No color choice required.



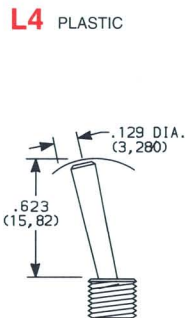
Finish: matte (L41, L42, L43).



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.



Finish: gloss



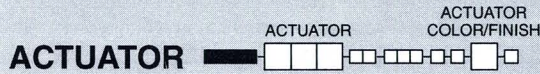
ACTUATOR COLOR

LXX, Actuators (except L40)

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.

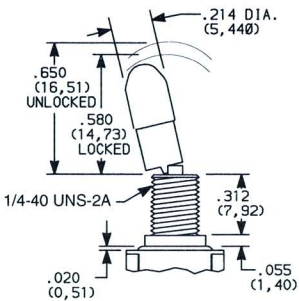
* See BUSHING FINISH, below.

K, K1, K8, K18 Locking Positions



2 Pos. Lock

Keyway on right side.

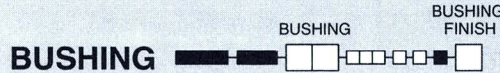


Keyway on right side.

Bushing option code not required.

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

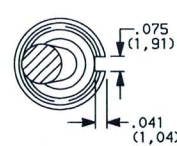
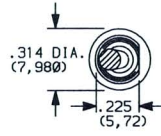
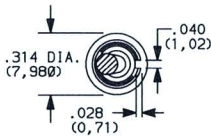
Please note: Overtightening mounting nut may cause actuator to bind.



H3 (STD.)

H

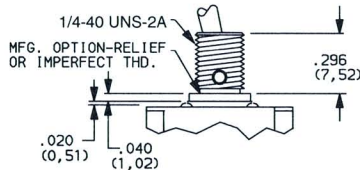
CW SPLASHPROOF



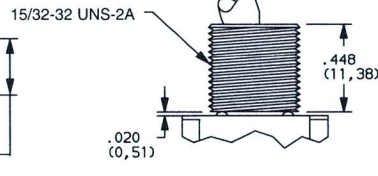
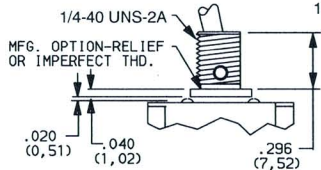
BUSHING FINISH

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.



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



For T, T1 actuators only.

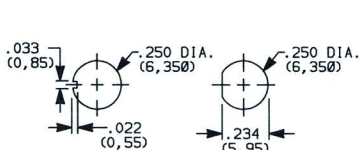
Internal actuator seal standard External bushing seal washer available from: Multi-Flex Seals, Inc., Hackensack, NJ P/N MFS-60064

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.

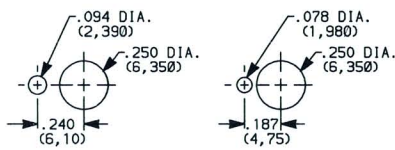
PANEL MOUNTING

1/4 INCH BUSHINGS

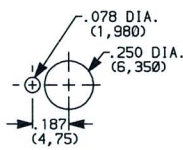
15/32 INCH BUSHINGS



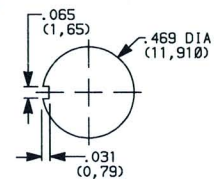
Without locking ring.



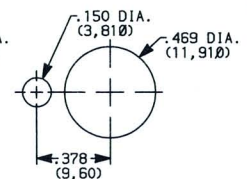
With standard locking ring.



With small locking ring.



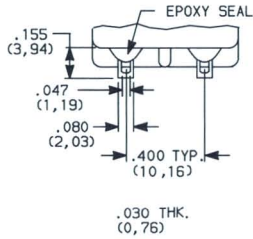
Without locking ring.



With locking ring.

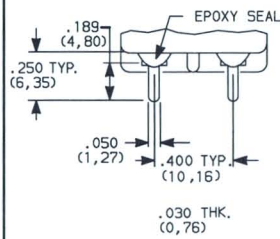
TERMINATIONS

Z (STD.)



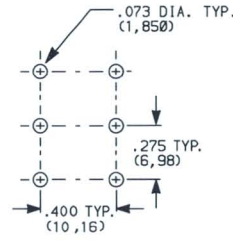
9201 MODEL ONLY

C

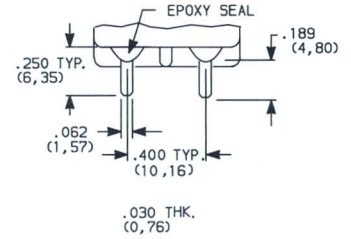


9201 MODEL ONLY

P.C. MOUNTING



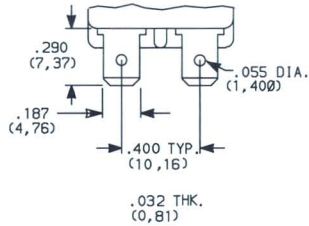
Z3 QUICK CONNECT



9201 MODEL ONLY

Mating quick connector available; order part no. 530100000.

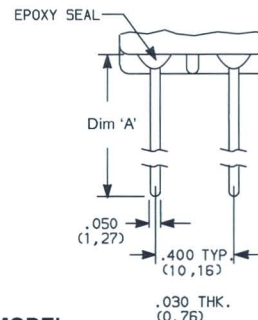
Z4 QUICK CONNECT



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

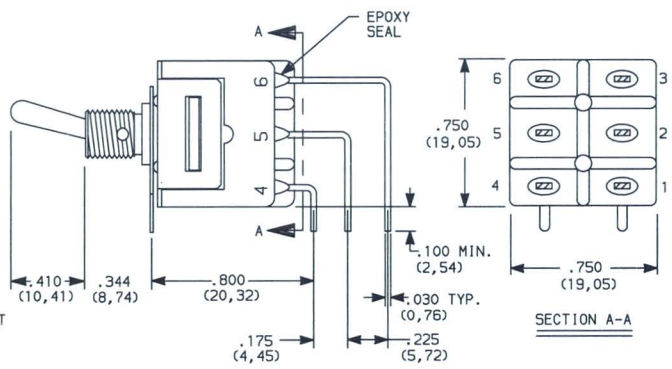
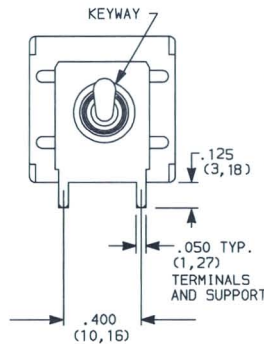
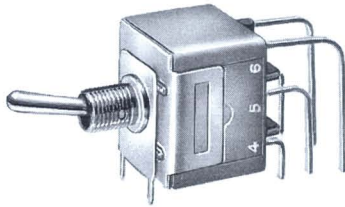
W-W1-W3-W4-W5 WIRE WRAP



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

9201 MODEL ONLY

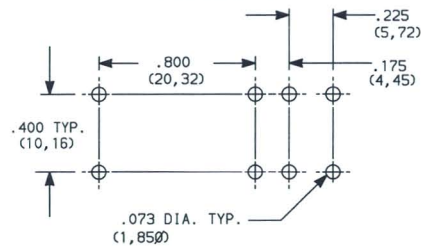
AV2



TERM. NOS. MOLDED ON SIDE OF CASE

9201 MODEL ONLY

P.C. MOUNTING

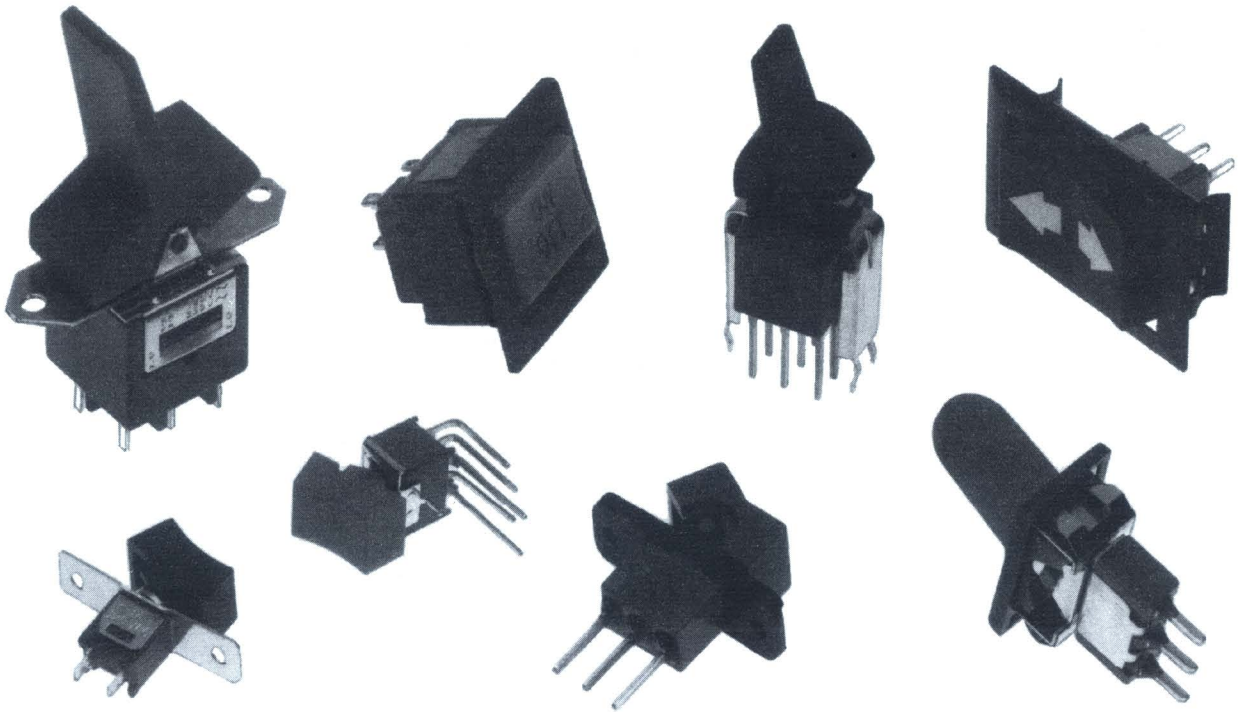


Term. bend radii and lead-in mfg. option
Term spacing greater than 3mm at all points
Actuator shown in pos. 1.

Part No. Shown: 9201SH3AV2QE

SECTION C

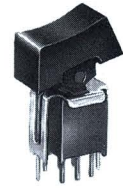
ROCKER AND LEVER HANDLE SWITCHES



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



*Process sealed—withstands soldering and cleaning processes.



models available, see page C-3.

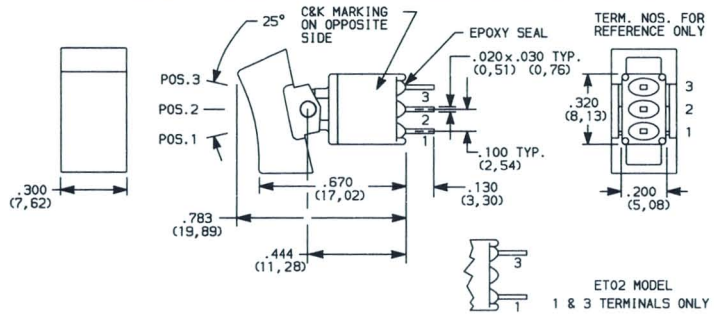
Easy Build-A-Switch:

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					

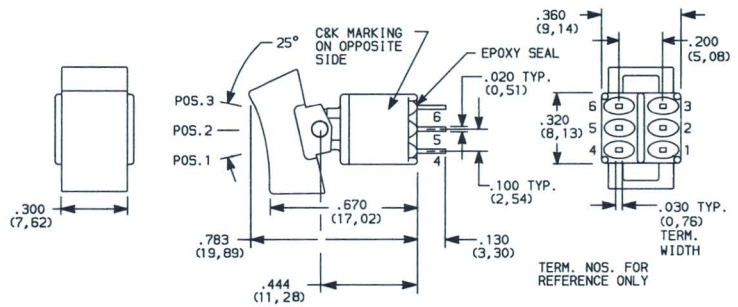
*Process sealed—withstands soldering and cleaning processes.

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	2-3	OPEN	2-1	
	ET03	ON	OFF	ON				
	ET05	MOM.	OFF	MOM.				
	ET07	ON	OFF	MOM.				
	ET08	ON	NONE	MOM.				
	ET02	OFF	NONE	ON				
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				

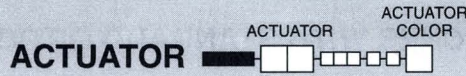
MOM. = MOMENTARY

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

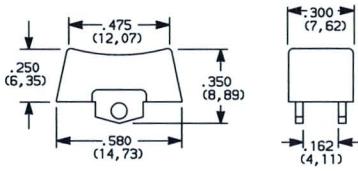
** Wiring for 3-way switch, see page X.



*Process sealed—withstands soldering and cleaning processes.

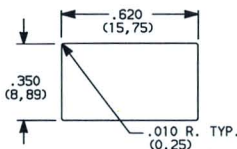


J1

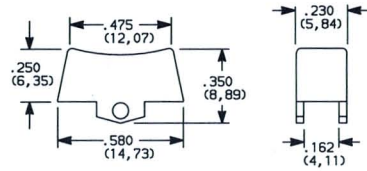


Standard with all models except ET0X with A terminations.

PANEL MOUNTING - J1

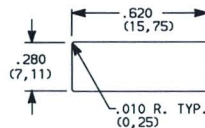


J6



Standard with ET0X models with A terminations.

PANEL MOUNTING - J6



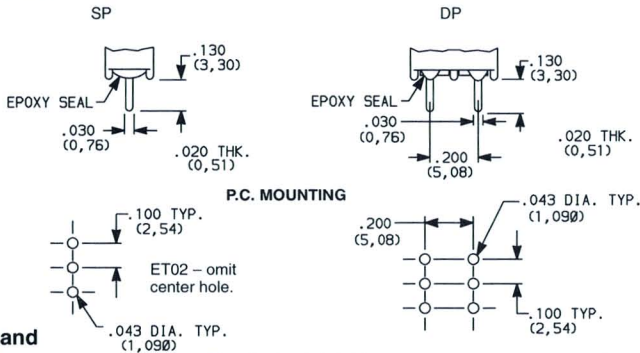
ACTUATOR COLOR

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

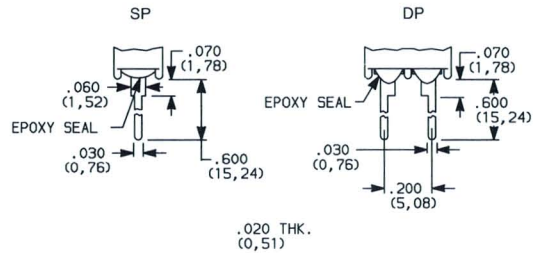
C (STD.)



SP and DP

B contact material std.

W WIRE WRAP



SP and DP

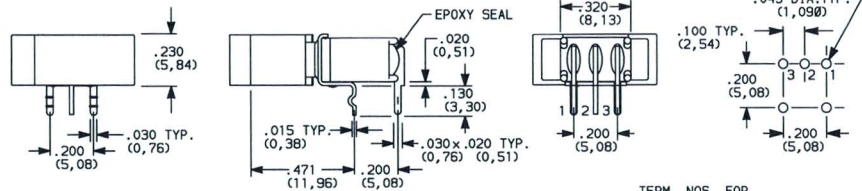
B contact material std.

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.



TERM. NOS. FOR REFERENCE ONLY

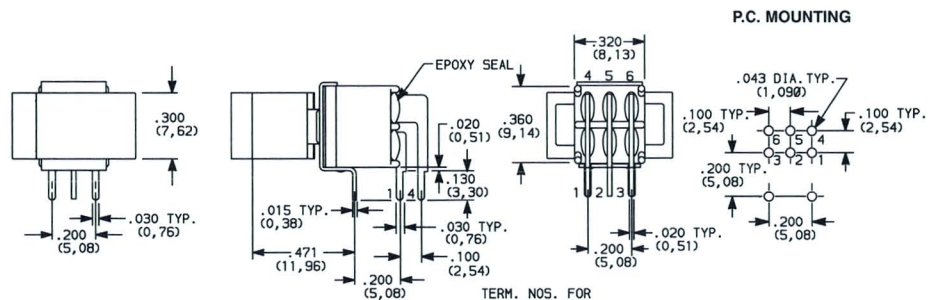
Part No. Shown: ET01J6ABE2

A



DPDT

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



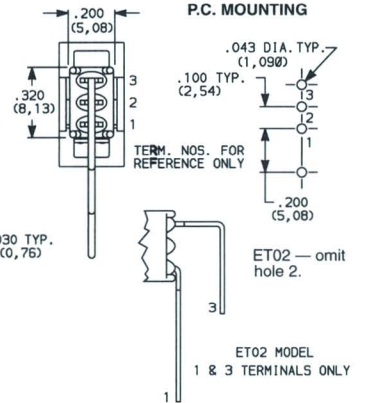
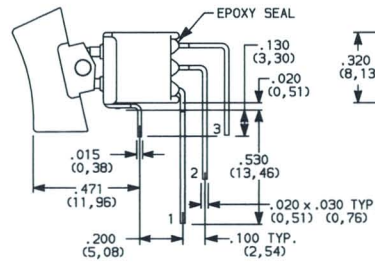
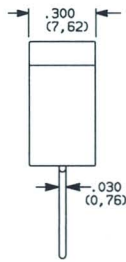
TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: ET21J1ABE2

*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

AV

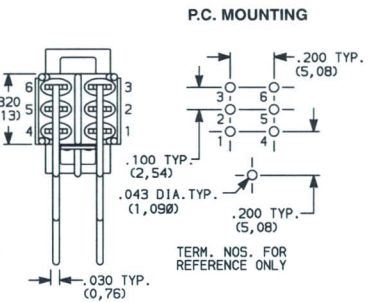
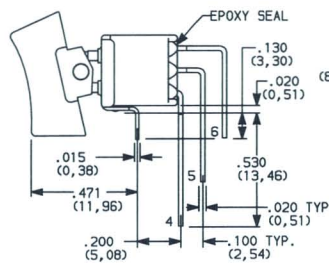
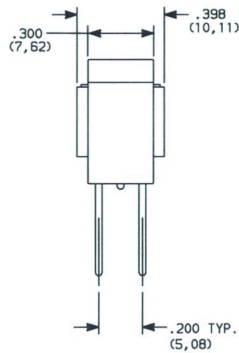
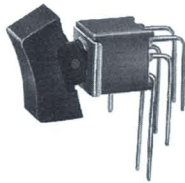


SPST and SPDT

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

Part No. Shown: ET01J1AVBE2

AV



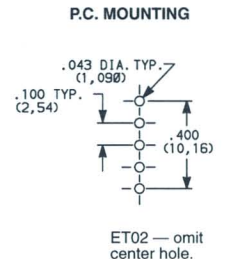
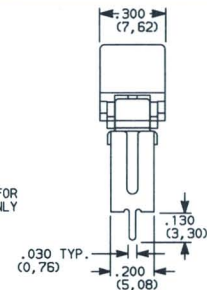
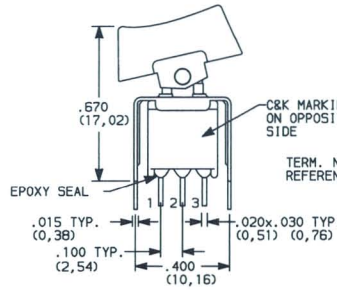
DPDT

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**

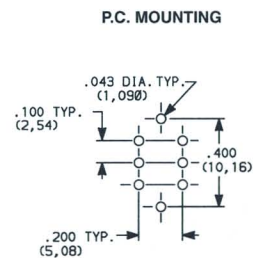
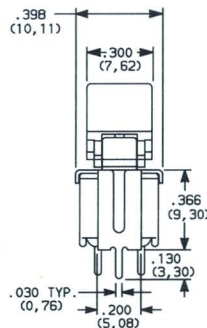
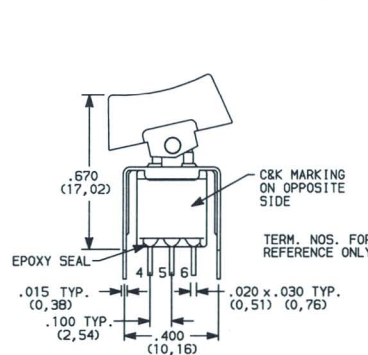


SPST and SPDT

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

Part No. Shown: ET01J1V3BE2

V3



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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	ETX1 MODELS: 3 AMPS @ 120 V AC OR 28 V DC. ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	ETX1 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 3 AMPS @ 120 V AC OR 28 V DC. ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.
L		TIN-LEAD ⁶		

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.

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.

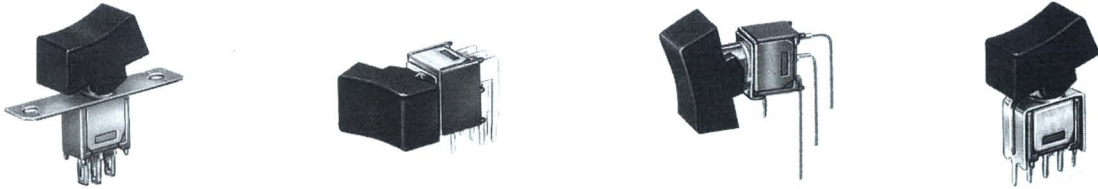
SPECIFICATIONS


- 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: 10⁹ 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.



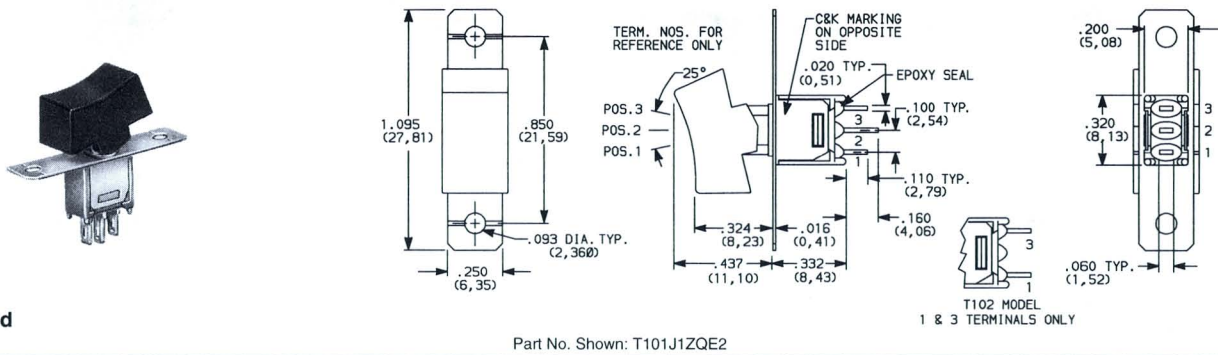
 models available, see page C-8.

Easy Build-A-Switch:

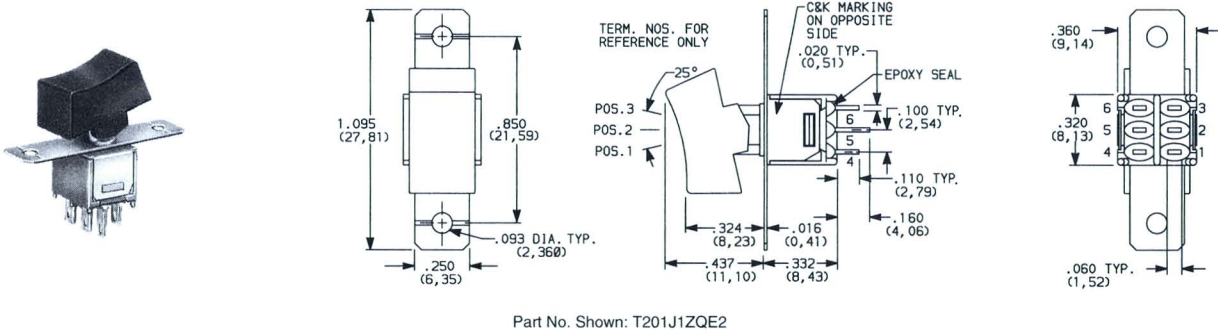
Below is a complete listing of available options for T SERIES TINY ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page C-8; all available options are shown and 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	 Epoxy	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



DPDT

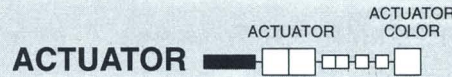
SWITCH FUNCTION

NO. POLES	MODEL† NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	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	OPEN	N/A	3-1	
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				

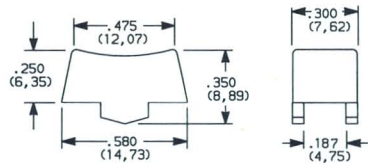
MOM. = MOMENTARY

† 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.

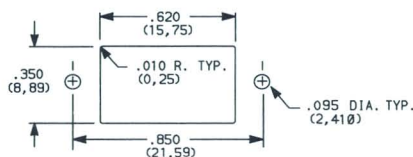


J1

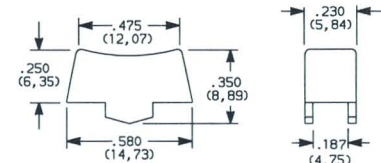


Std. with all models except T10X with A terminations.

PANEL MOUNTING—J1

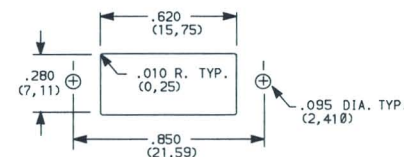


J6



Std. on all T10X models with A terminations.

PANEL MOUNTING—J6



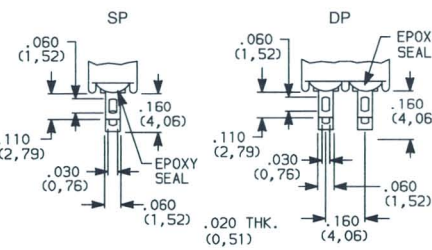
ACTUATOR COLOR

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

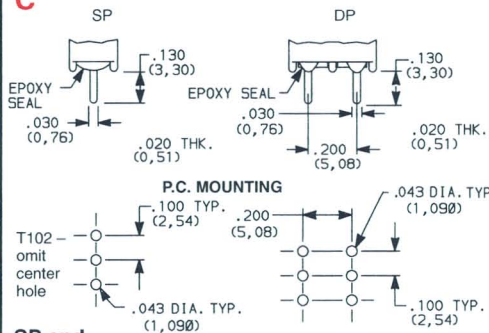
Z (STD.)



SP and DP

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

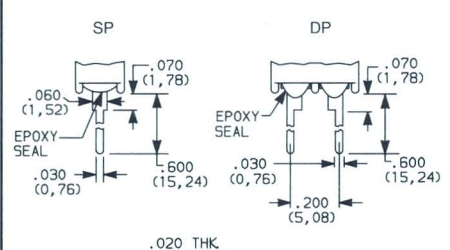
C



SP and DP

Q contact material std.

W WIRE WRAP



SP and DP

B contact material std.

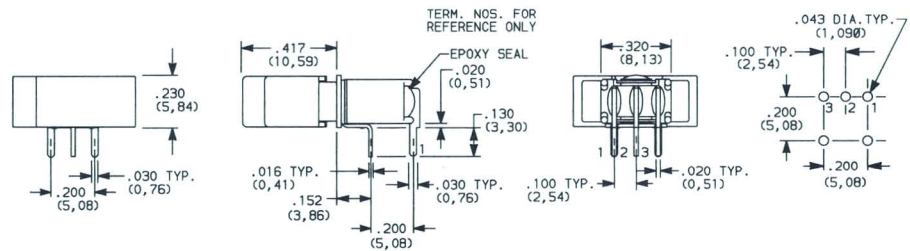
Models with Z, C or W terminations supplied with panel mounting bracket standard, as shown on page C-8.

A



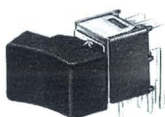
SPDT

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



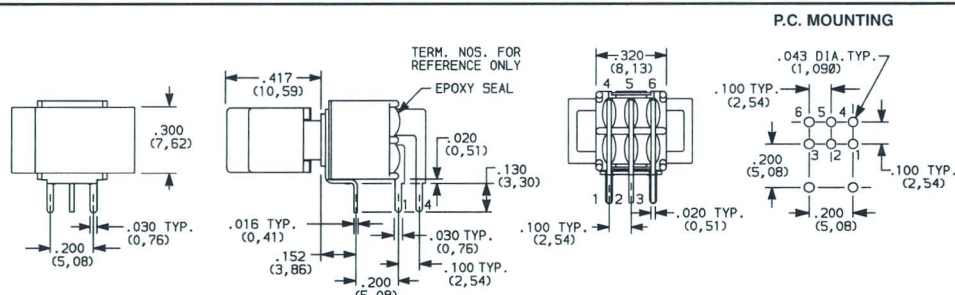
Part No. Shown: T101J6ABE2

A



DPDT

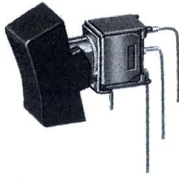
Actuator shown in pos.1.
B contact material std.
J1 actuator std. on T2XX models with A terminations.



Part No. Shown: T201J1ABE2

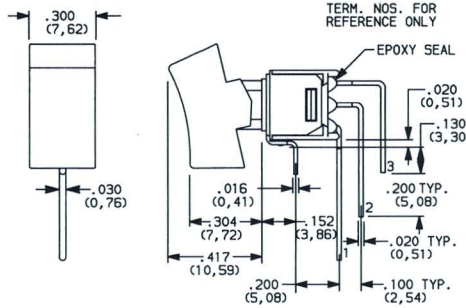
TERMINATIONS

AV

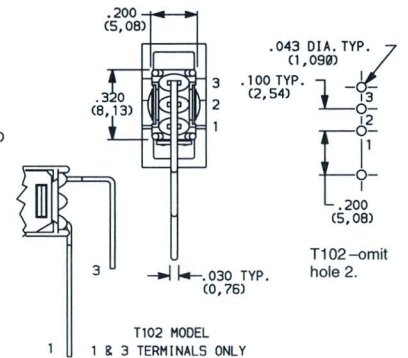


SPST and SPDT

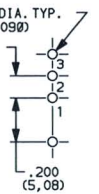
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.



Part No. Shown: T101J1AVBE2



P.C. MOUNTING



T102—omit hole 2.

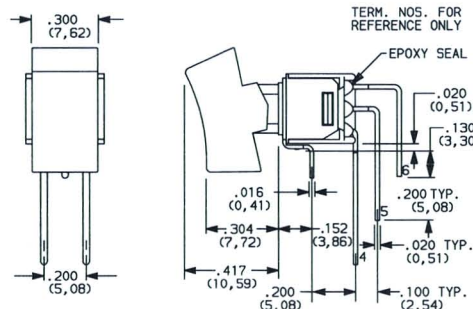
T102 MODEL
1 & 3 TERMINALS ONLY

AV

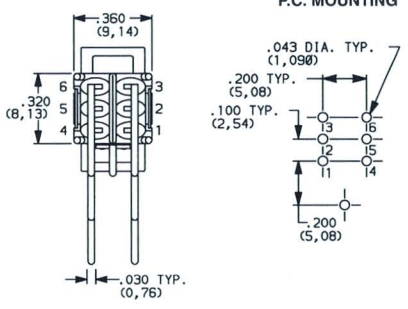


DPDT

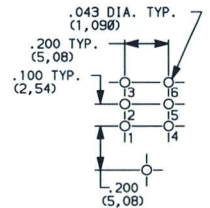
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.



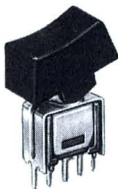
Part No. Shown: T201J1AVBE2



P.C. MOUNTING

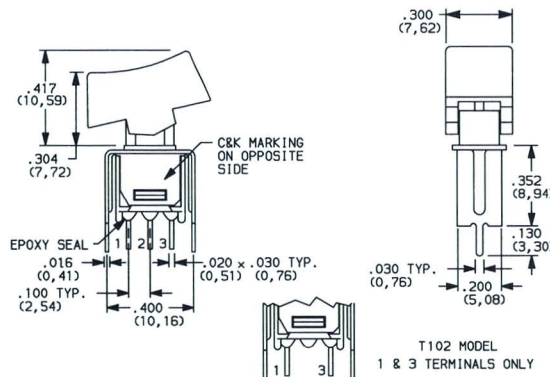


V3

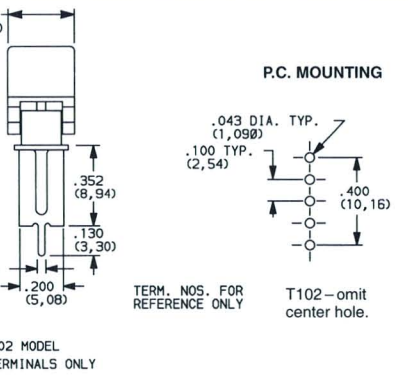


SPST and SPDT

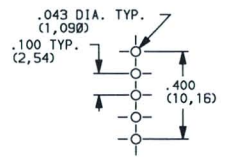
Actuator shown in pos.1.
B contact material std.



Part No. Shown: T101J1V3BE2



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

T102—omit center hole.

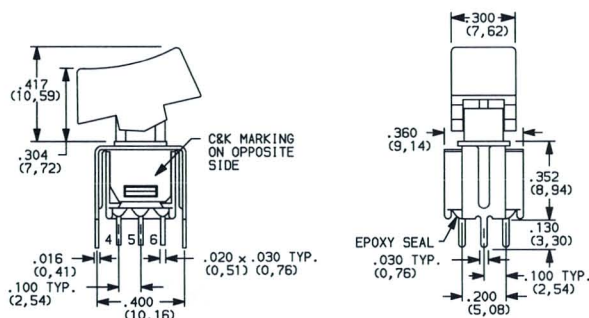
T102 MODEL
1 & 3 TERMINALS ONLY

V3

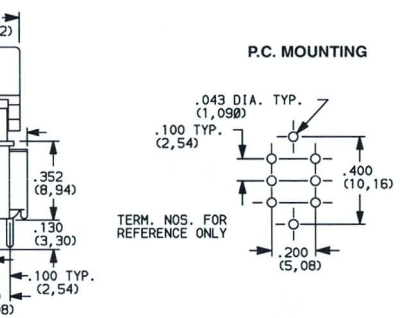


DPDT

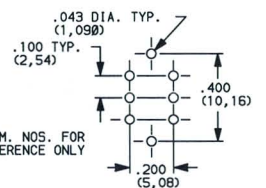
Actuator shown in pos.1.
B contact material std.



Part No. Shown: T201J1V3BE2



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

CONTACT MATERIAL

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

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.

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: 10⁹ 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).

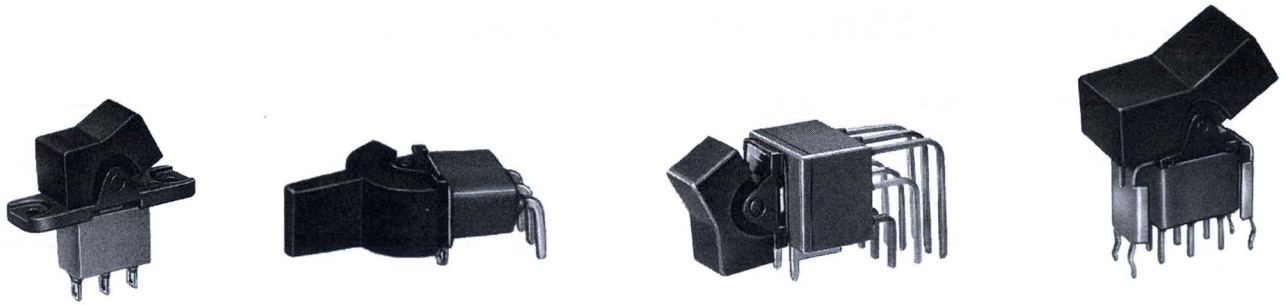
CENTER CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact material).

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.

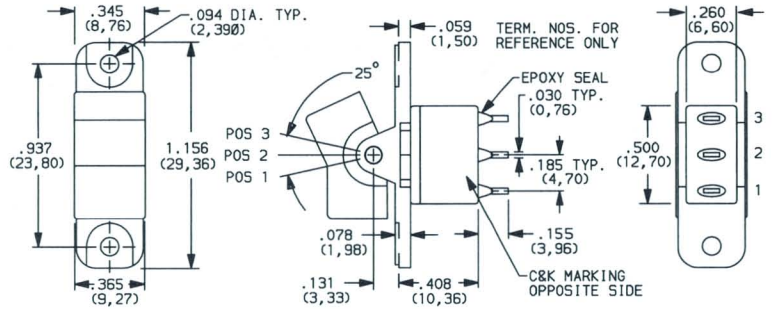
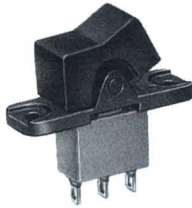
Easy Build-A-Switch:

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		2 1
E105	J3	AV2	V81	K		3 2
E107	J4	AV3	V91	L		4 C
E108	J5	AV5	W	M		5 S
E201	J11	AW	W1	Q		6
E203	J21	AW1	W3			7
E205	J50	AW3	W4			8
E207	J54	AW4	W5			9
E208	J60	AW5	Z			
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				

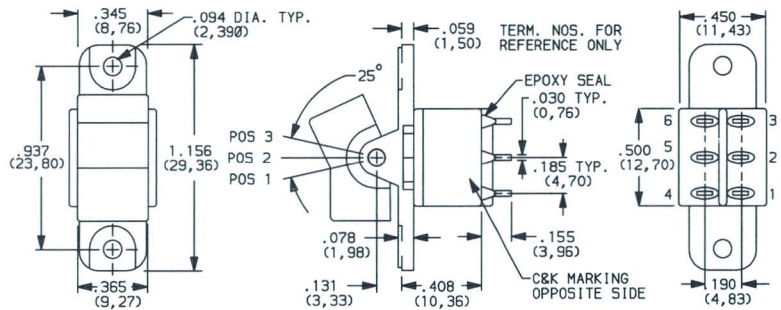
*Process sealed—withstands soldering and cleaning processes.

SWITCHES WITH STANDARD OPTIONS



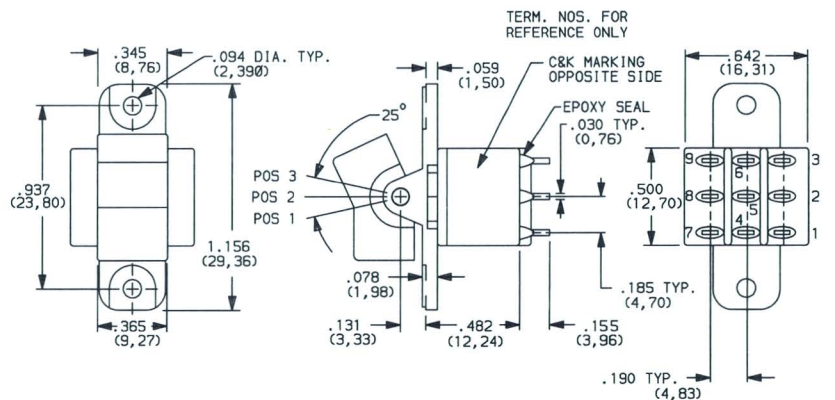
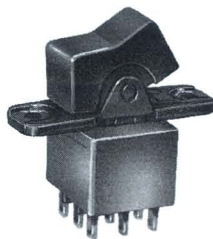
SPDT

Part No. Shown: E101J1ZBE2



DPDT

Part No. Shown: E201J1ZBE2



3PDT

Part No. Shown: E301J1ZBE2



E Series

Sealed* Anti-Static Rocker and Lever Handle Switches

*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	 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	 DPDT
	E203	ON	OFF	ON				
	E205	MOM.	OFF	MOM.				
	E207	ON	OFF	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	
	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	 3PDT
	E303	ON	OFF	ON				
	E305	MOM.	OFF	MOM.				
	E307	ON	OFF	MOM.				
	E308	ON	NONE	MOM.				

MOM. = MOMENTARY

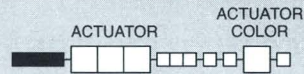
† All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

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

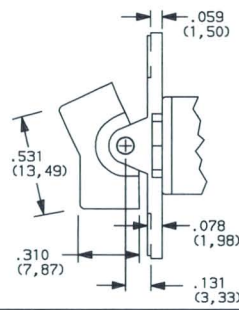
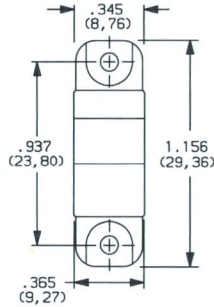
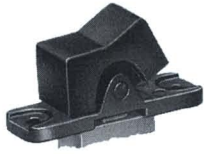


*Process sealed—withstands soldering and cleaning processes.

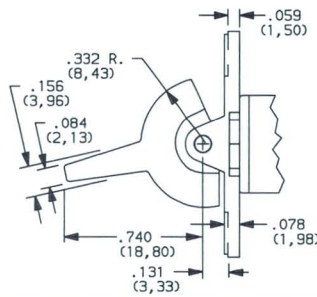
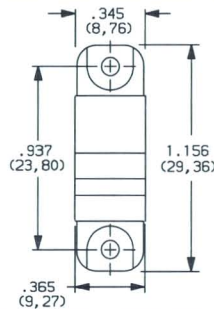
ACTUATORS—PANEL REAR MOUNT



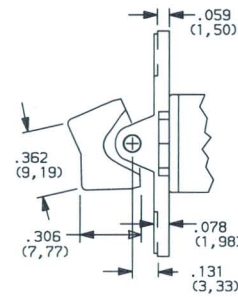
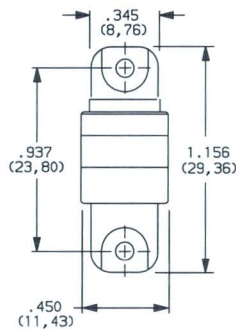
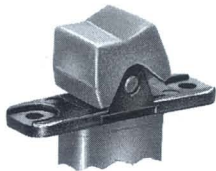
J1 (STD.)



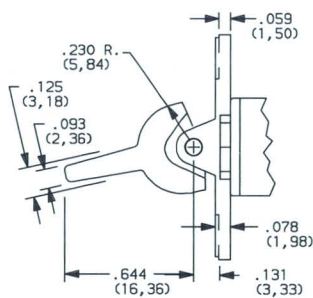
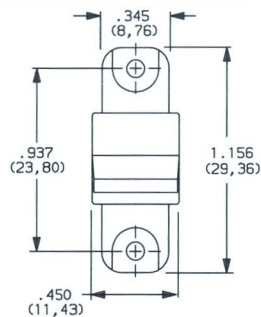
J2



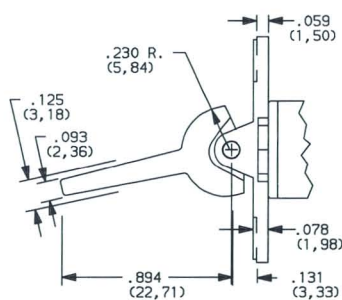
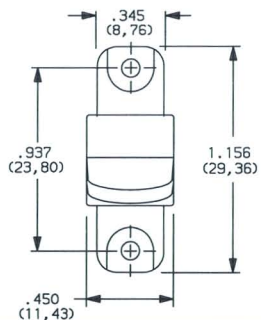
J54



J64



J94



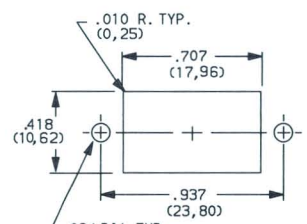
ACTUATOR COLOR

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

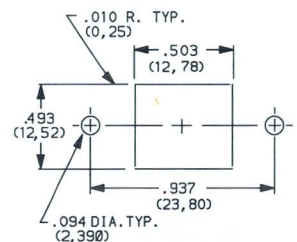
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-26. Internal o-ring actuator seal std. Actuators and hardware are available separately,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

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

J1 - J2 PANEL MOUNTING

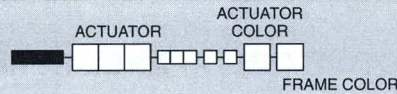


J54 - J64 - J94 PANEL MOUNTING

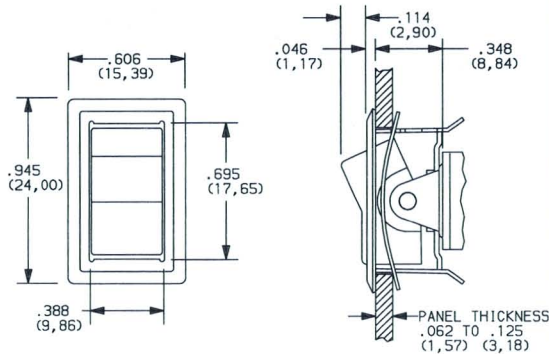


*Process sealed—withstands soldering and cleaning processes.

ACTUATORS—REAR MOUNT

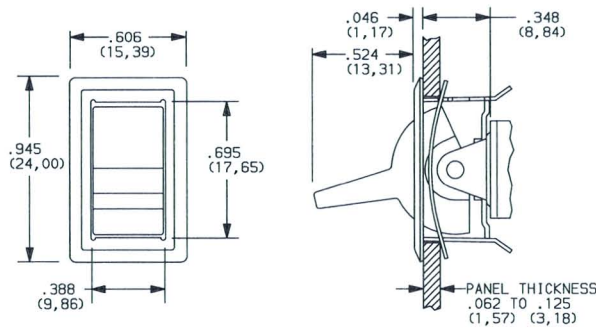
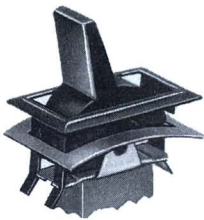


J11



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

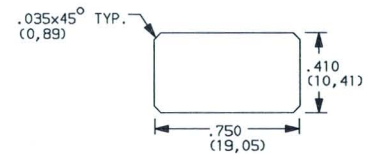
FRAME COLOR

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

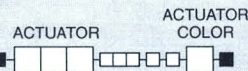
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Frames are available separately, see catalog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

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

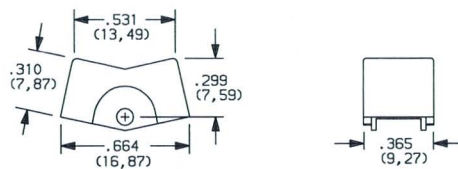
J11 - J21 PANEL MOUNTING



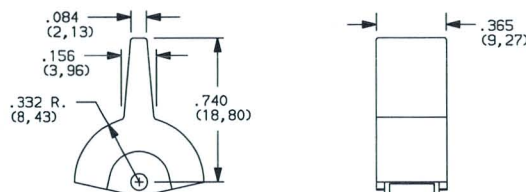
ACTUATORS—P.C. MOUNT



J1



J2



ACTUATOR COLOR

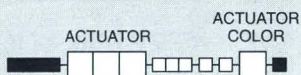
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

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.

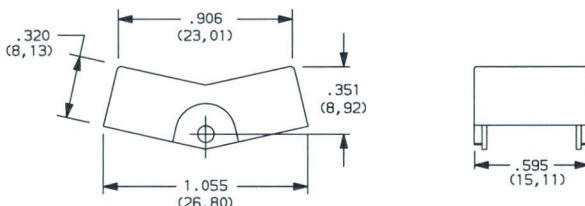
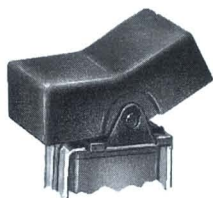
Available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations.

*Process sealed—withstands soldering and cleaning processes.

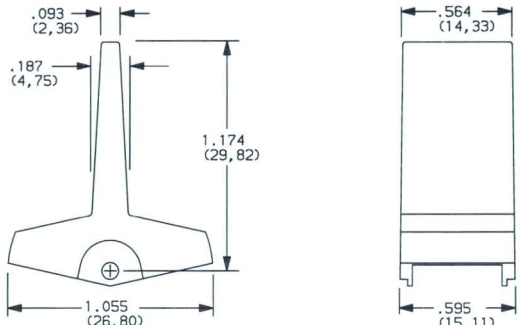
ACTUATORS—P.C. MOUNT



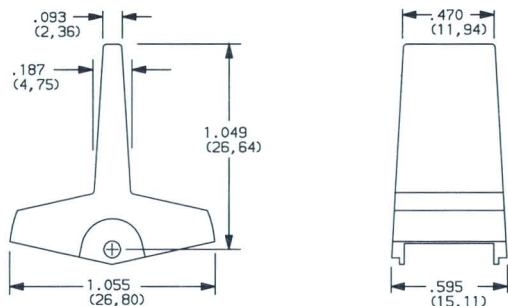
J3



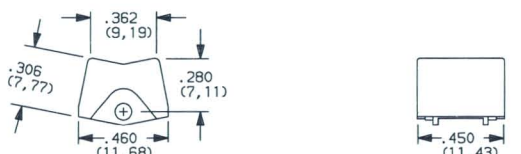
J4



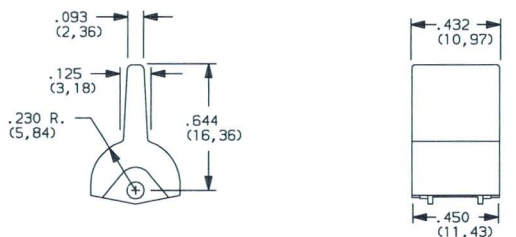
J5



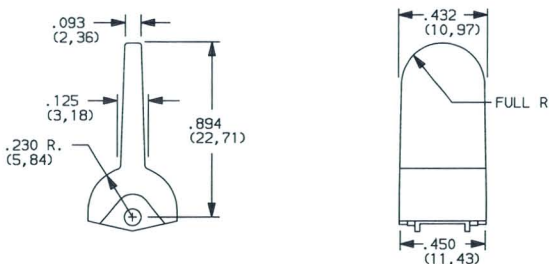
J50



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.

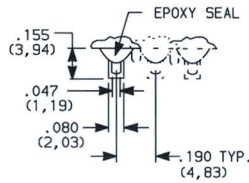
J3, J4, J5 actuators available with AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between actuator and P.C. board, and care must be exercised to accommodate this condition.

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

*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

Z (STD.)

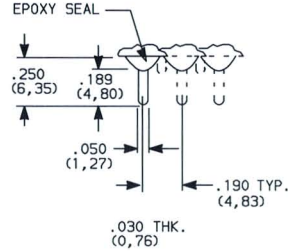


.030 THK.
(0,76)

SPDT thru
3PDT

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

C

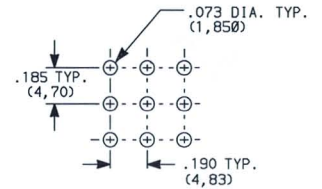


.030 THK.
(0,76)

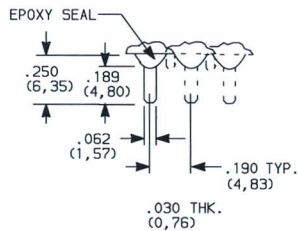
SPDT thru
3PDT

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

P.C. MOUNTING



Z3 QUICK CONNECT

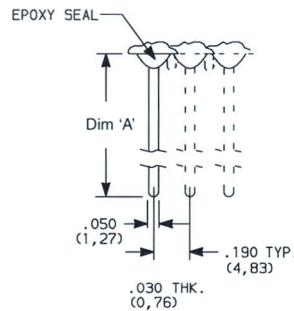


.030 THK.
(0,76)

SPDT thru
3PDT

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

W-W1-W3-W4-W5 WIRE WRAP



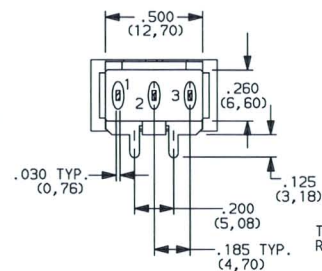
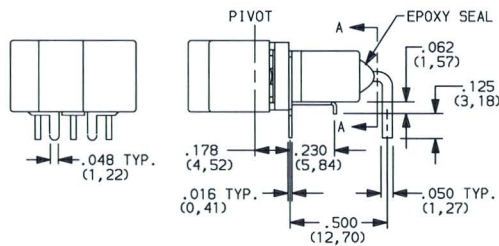
.030 THK.
(0,76)

SPDT thru
3PDT

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

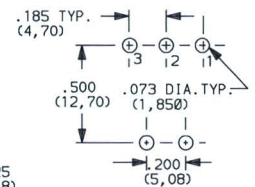
Option	DIM 'A'
W	.750 (19,05)
W1	.964 (24,48)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

A



SECTION A-A

P.C. MOUNTING



TERM. NOS. FOR
REFERENCE ONLY

Part No. Shown: E101J1ABE2

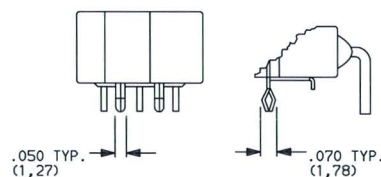


A

SPDT

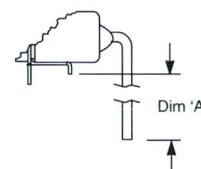
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Note: P.C. pattern must clear switch support leg.
Available actuators, see pages C-16 and C-17.

A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED



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

*Process sealed-withstands soldering and cleaning processes.

TERMINATIONS

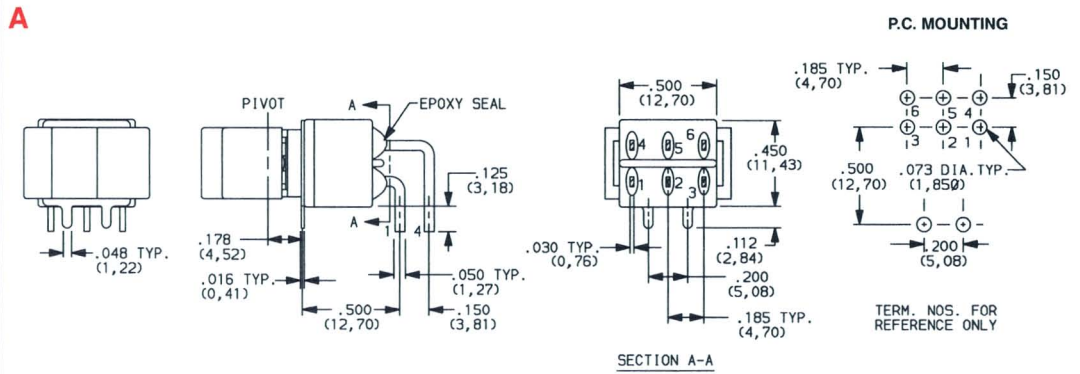
A



DPDT

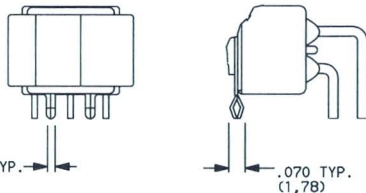
A

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.



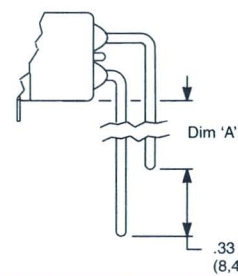
Part No. Shown: E201J1ABE2

A3 SNAP-IN



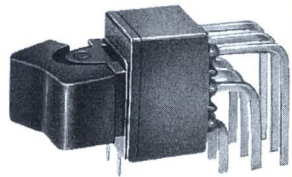
SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4-AW5 EXTENDED



Option	DIM 'A'
AW	.21 (5,3)
AW1	.42 (10,7)
AW4	.52 (13,2)
AW5	.76 (19,3)

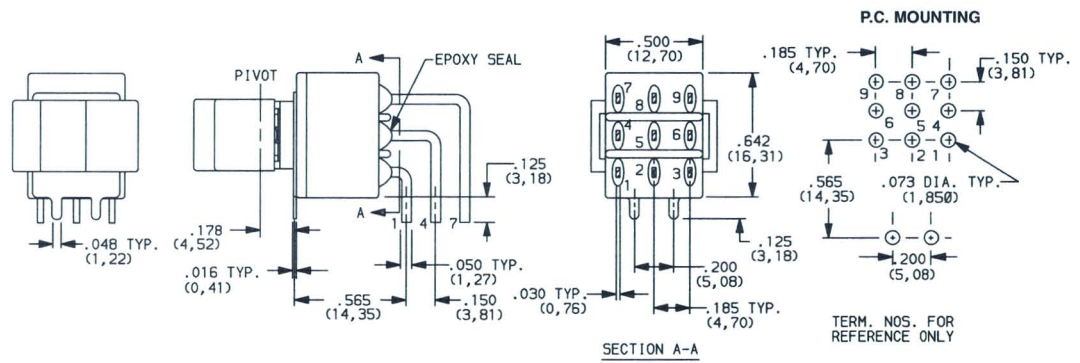
A



3PDT

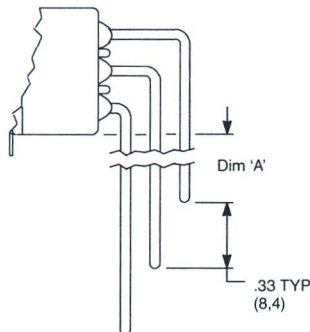
A

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.



Part No. Shown: E301J1ABE2

AW4-AW5 EXTENDED

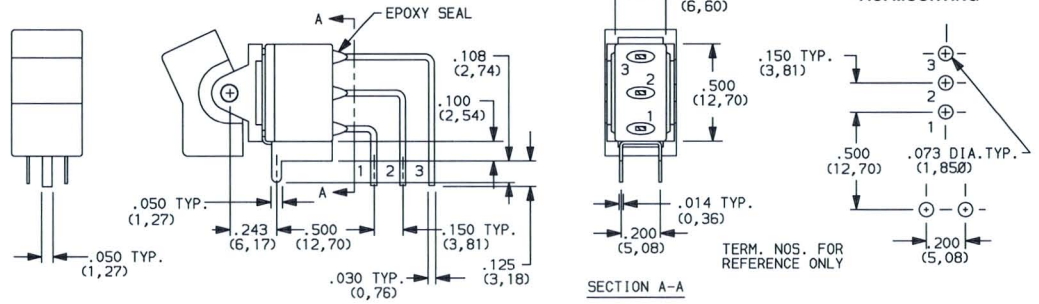


Option	DIM 'A'
AW4	.18 (4,6)
AW5	.42 (10,7)

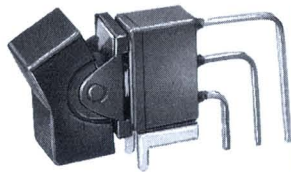
*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

AV2



Part No. Shown: E101J1AV2BE2

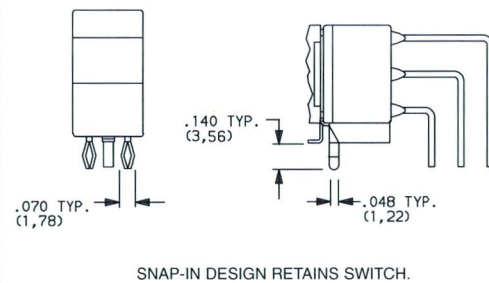


AV2

SPDT

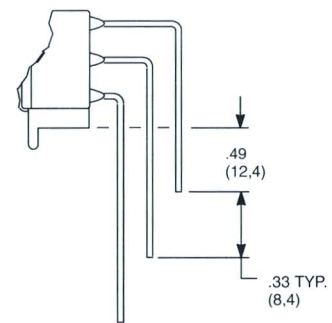
Term. bend radii and lead-in mfg. option. Actuator shown in pos.1. B contact material std. Available actuators, see pages C-16 and C-17.

AV3 SNAP-IN

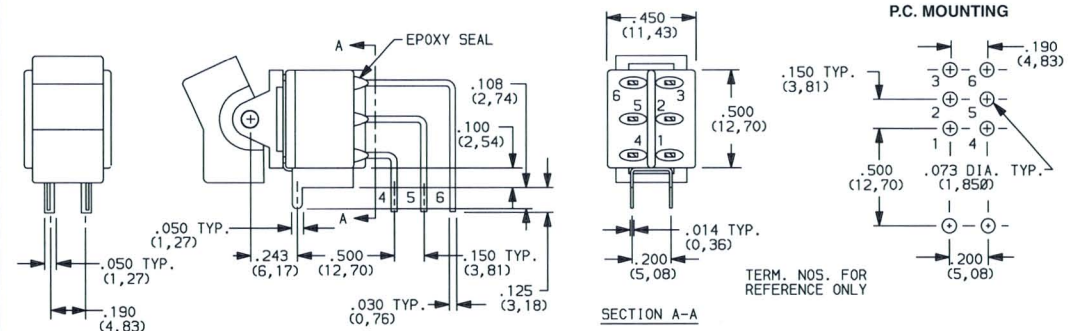


SNAP-IN DESIGN RETAINS SWITCH.

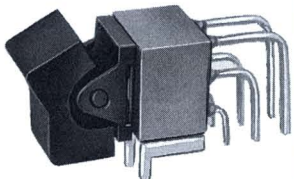
AV5 EXTENDED



AV2



Part No. Shown: E201J1AV2BE2

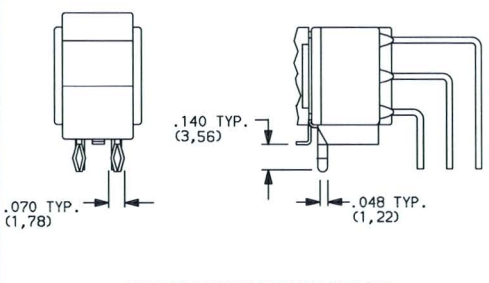


AV2

DPDT

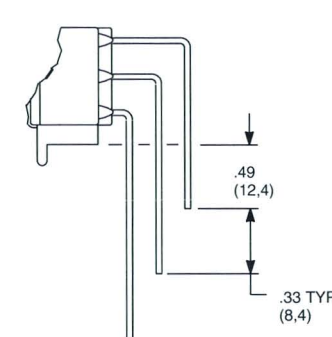
Term. bend radii and lead-in mfg. option. Actuator shown in pos.1. B contact material std. Available actuators, see pages C-16 and C-17.

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

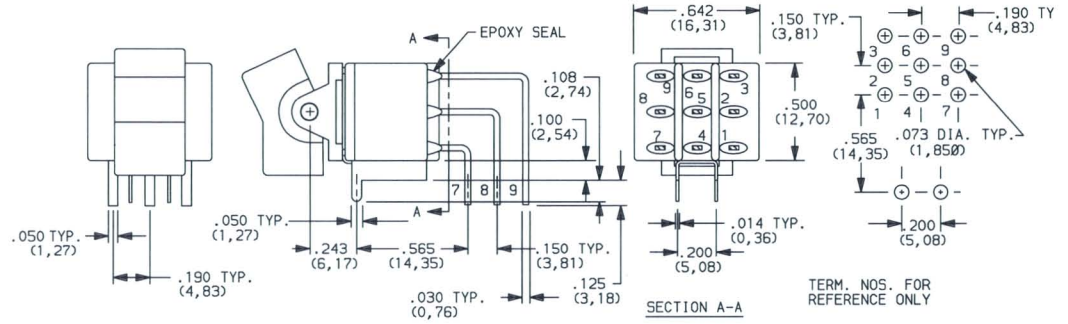
AV5 EXTENDED



*Process sealed—withstands soldering and cleaning processes.

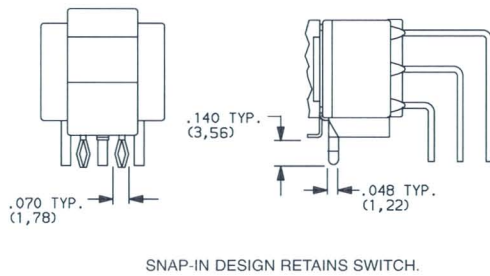
TERMINATIONS

AV2

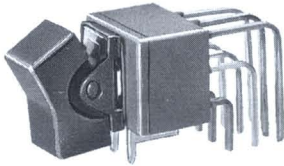
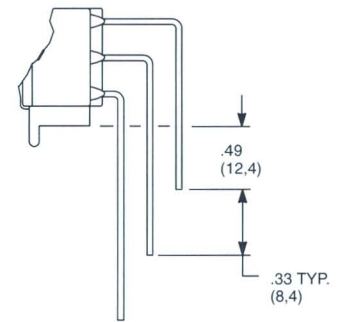


Part No. Shown: E301J1AV2BE2

AV3 SNAP-IN



AV5 EXTENDED

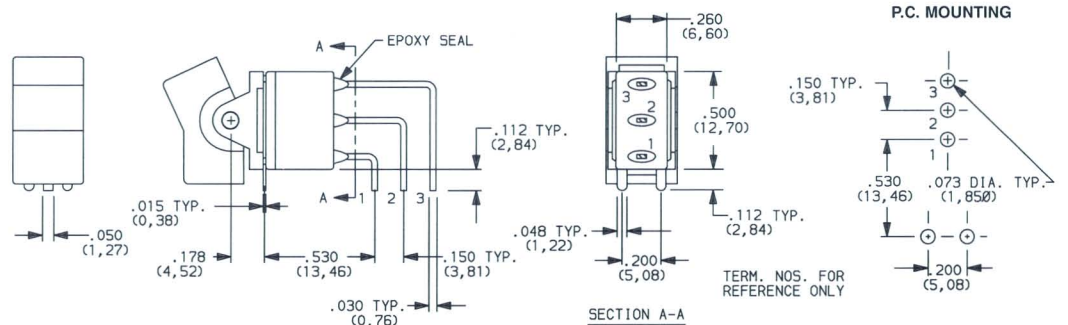


AV2

3PDT

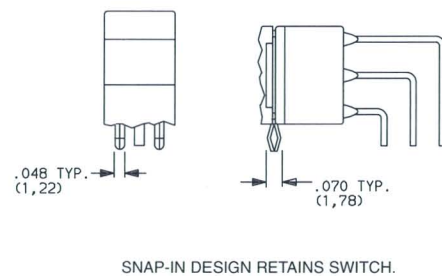
Term. bend radii and lead-in mfg. option. Actuator shown in pos. 1. B contact material std. Available actuators, see pages C-16 and C-17.

V5

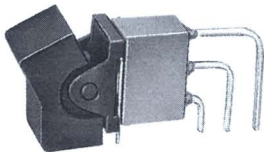
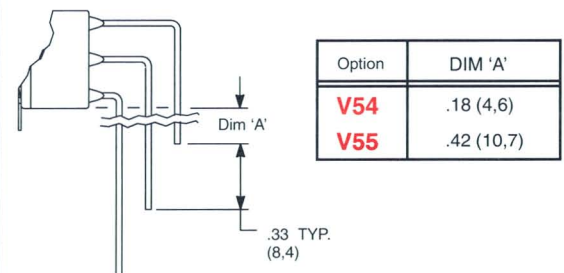


Part No. Shown: E101J1V5BE2

V51 SNAP-IN



V54-V55 EXTENDED



V5

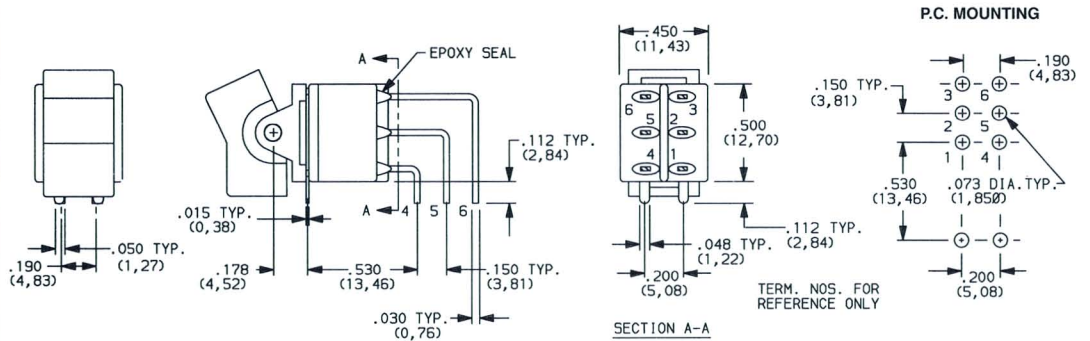
SPDT

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.

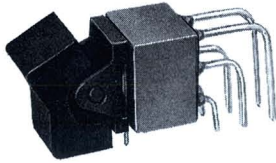
*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

V5



Part No. Shown: E201J1V5BE2

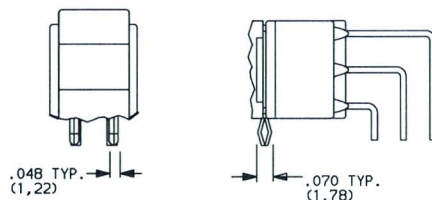


V5

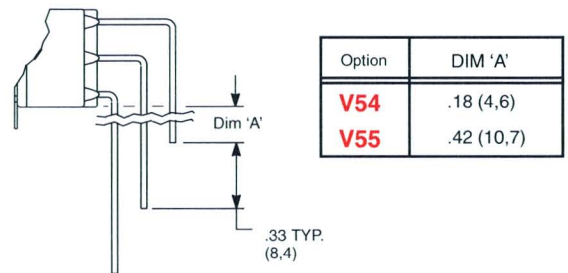
DPDT

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.

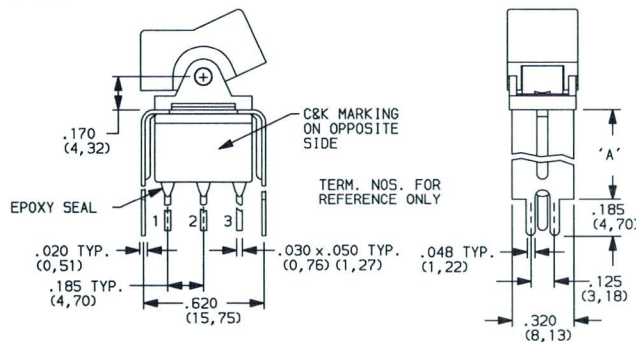
V51 SNAP-IN



V54-V55 EXTENDED

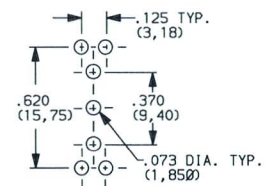


V3-V4-V9

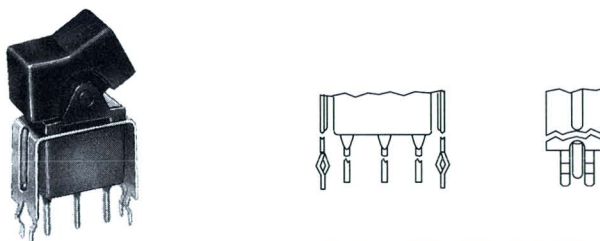


Part No. Shown: E101J1V_BE2

P.C. MOUNTING



V31-V41-V91 SNAP-IN



V31

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

SPDT

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

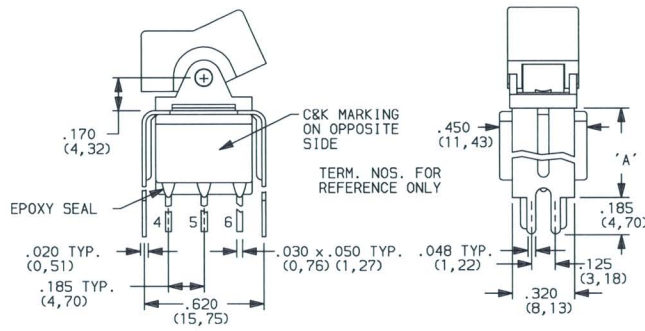


V3

DPDT

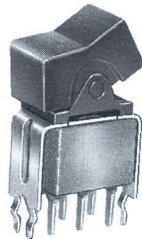
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16
and C-17.

V3-V4-V9

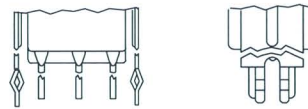


Part No. Shown: E201J1V_BE2

V31-V41-V91 SNAP-IN

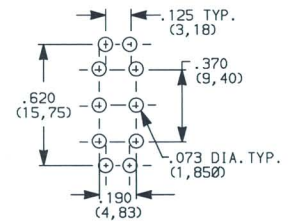


V31

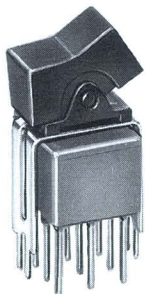


SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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

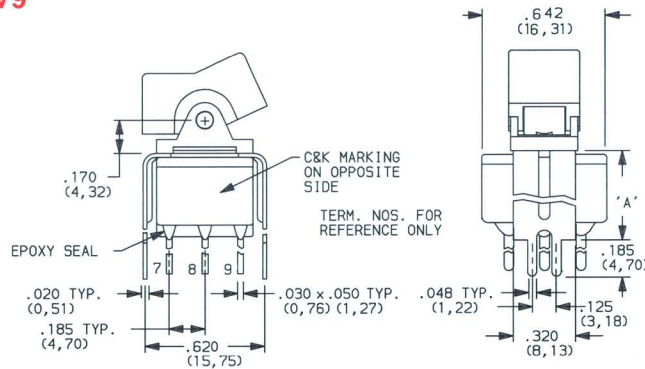


V4

3PDT

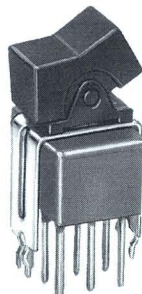
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16
and C-17.

V4-V9

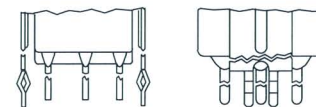


Part No. Shown: E301J1V_BE2

V41-V91 SNAP-IN

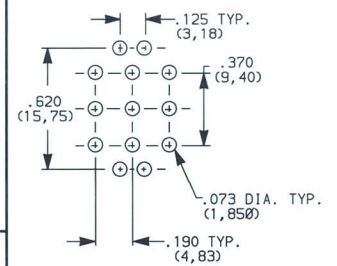


V41



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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



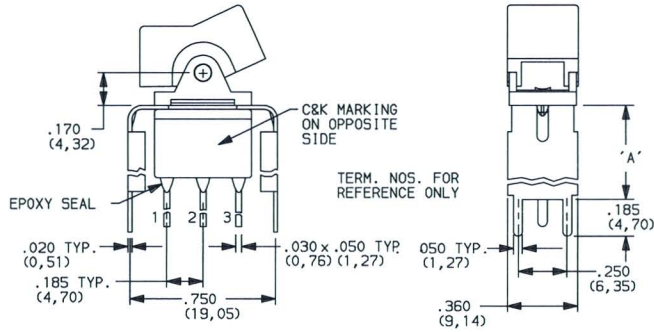
E Series

Sealed* Anti-Static Rocker and Lever Handle Switches

*Process sealed-withstands soldering and cleaning processes.

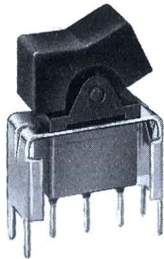
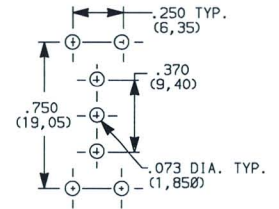
TERMINATIONS

V2-V6-V7-V8



Part No. Shown: E101J1V__BE2

P.C. MOUNTING

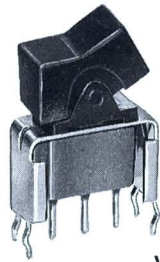


V6

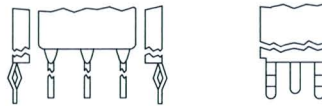
SPDT

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

V21-V61-V71-V81 SNAP-IN



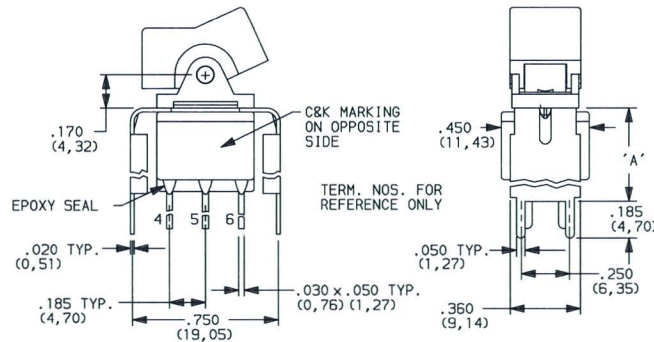
V61



SNAP-IN DESIGN RETAINS SWITCH.

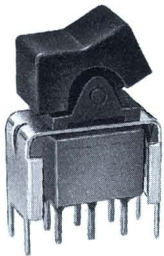
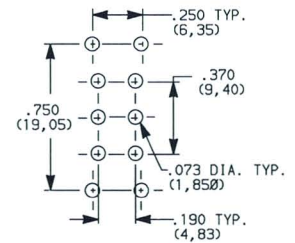
Option	DIM 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V2-V6-V7-V8



Part No. Shown: E201J1V__BE2

P.C. MOUNTING

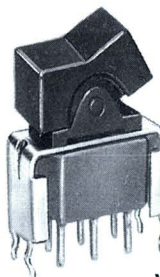


V6

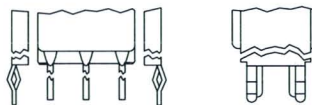
DPDT

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

V21-V61-V71-V81 SNAP-IN



V61



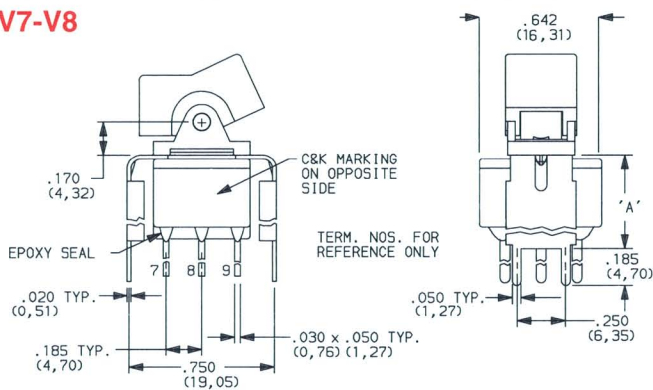
SNAP-IN DESIGN RETAINS SWITCH.

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.

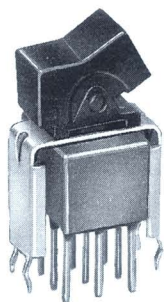
TERMINATIONS

V2-V7-V8

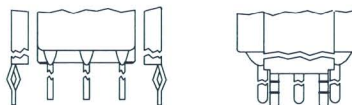


Part No. Shown: E301J1V_BE2

V21-V71-V81 SNAP-IN

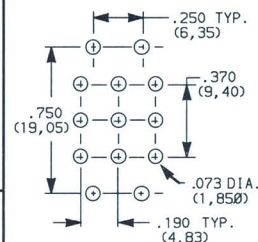


V71

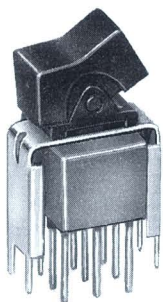


SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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



V7

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	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. 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.
L		TIN-LEAD ⁶		

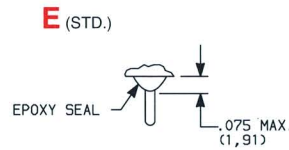
CONTACT MATERIAL / APPLICATION RECOMMENDATIONS — SEE CHART, PAGE X.

- 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.

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 



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.

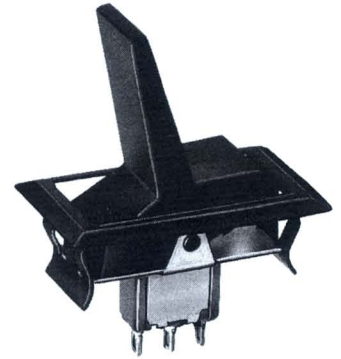
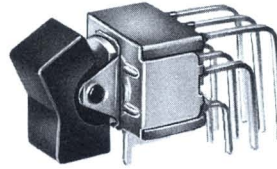
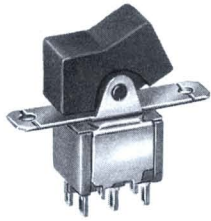
SPECIFICATIONS

- 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: 10⁹ 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.



models available, see page C-29.

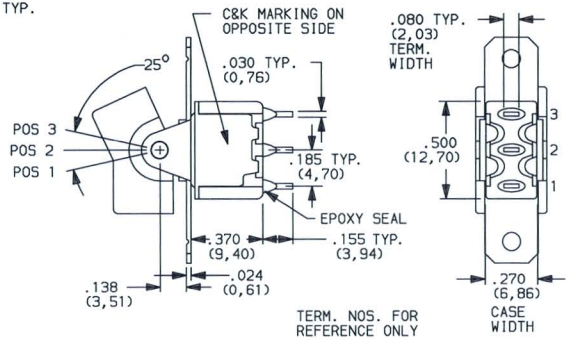
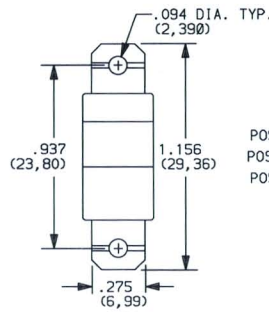
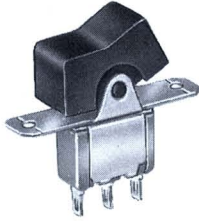
Easy Build-A-Switch:

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		
			Silver	Epoxy	Black	Black		
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						

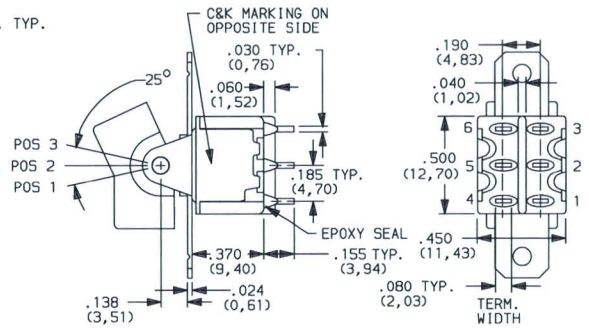
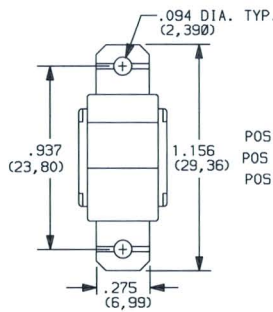
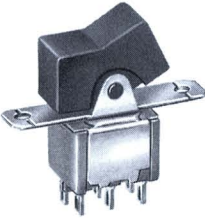


SWITCHES WITH STANDARD OPTIONS



Part No. Shown: 7101J1ZQE2

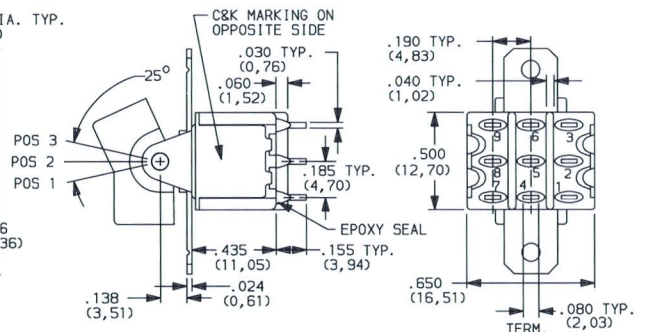
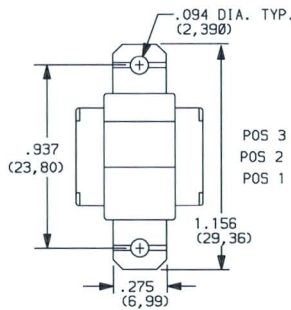
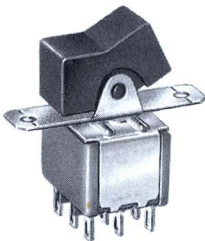
SPDT



Part No. Shown: 7201J1ZQE2

TERM. NOS. FOR REFERENCE ONLY

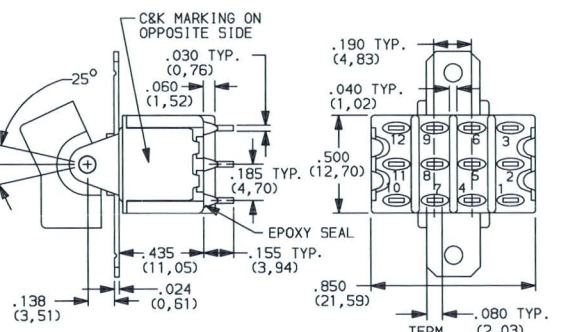
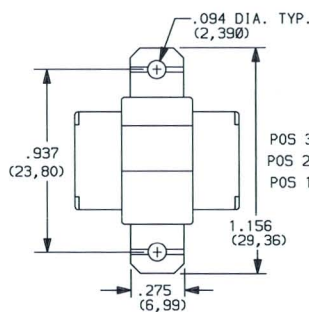
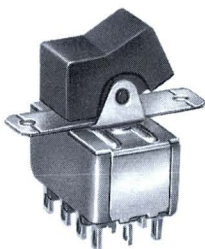
DPDT



Part No. Shown: 7301J1ZQE2

TERM. NOS. FOR REFERENCE ONLY

3PDT



Part No. Shown: 7401J1ZQE2

TERM. NOS. FOR REFERENCE ONLY

4PDT



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.								

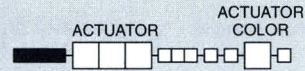
MOM. = MOMENTARY

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

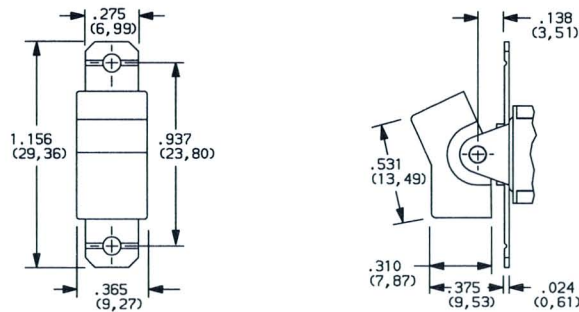
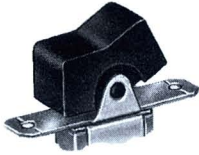
* Wiring for 3-way switch, see page X.



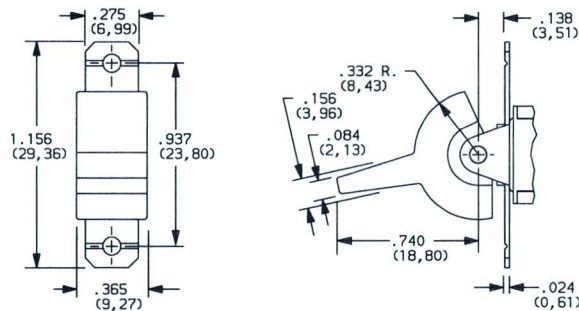
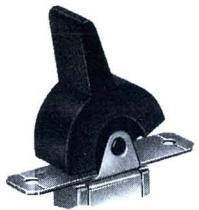
ACTUATORS—PANEL REAR MOUNT



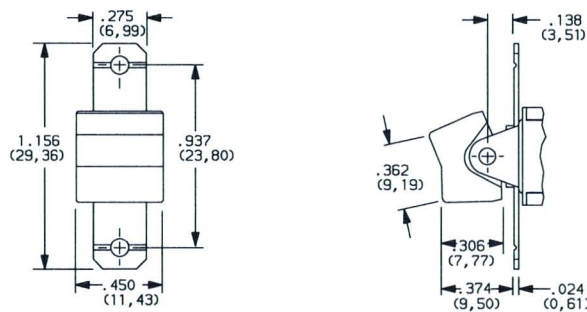
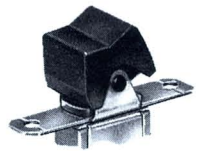
J1 (STD.)



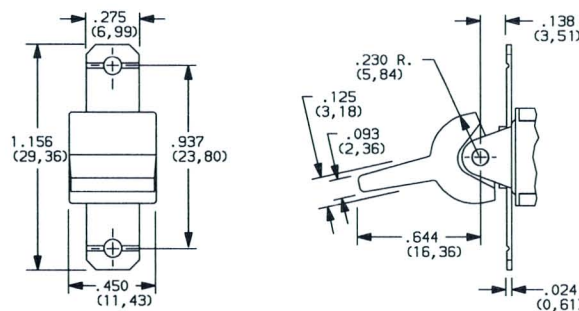
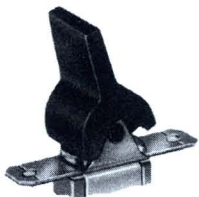
J2



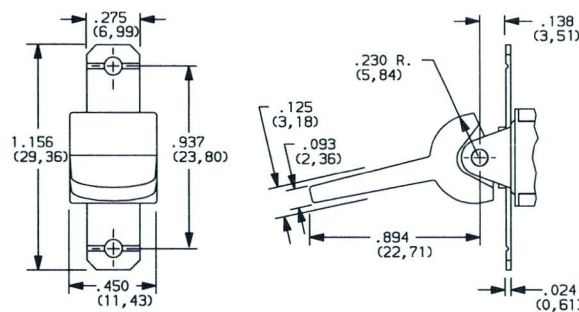
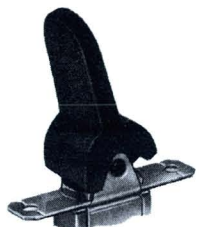
J54



J64



J94



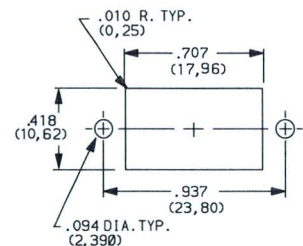
ACTUATOR COLOR

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

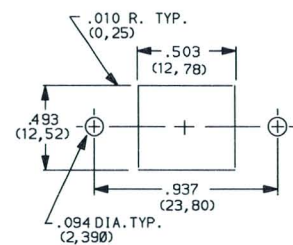
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

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

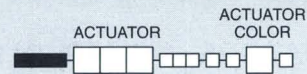
PANEL MOUNTING J1 – J2



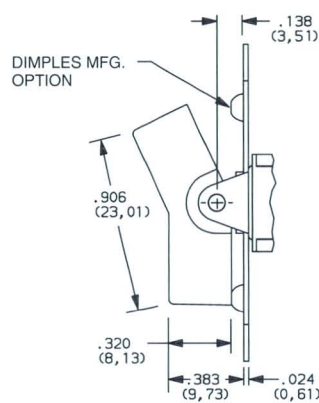
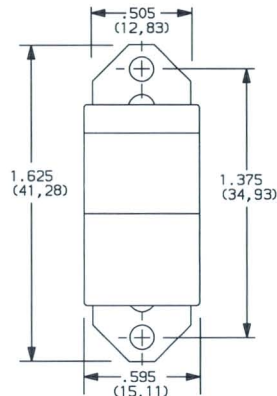
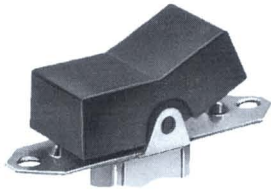
PANEL MOUNTING J54 – J64 – J94



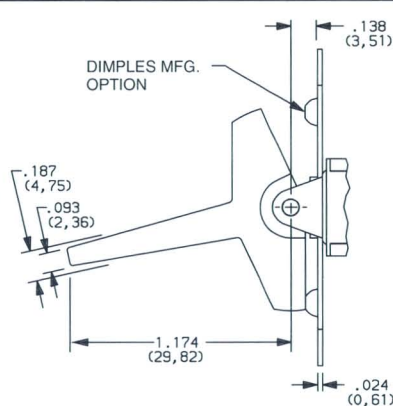
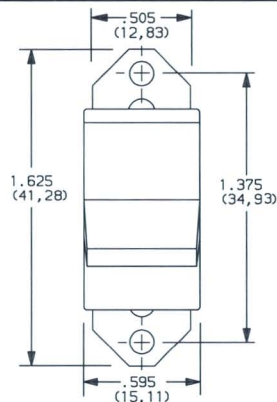
ACTUATORS—PANEL REAR MOUNT



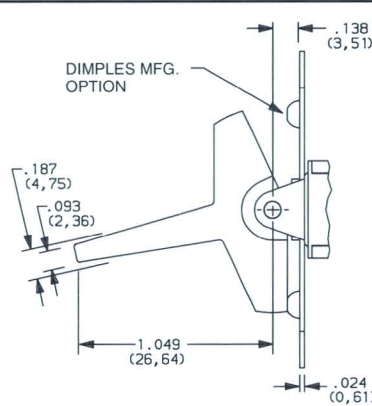
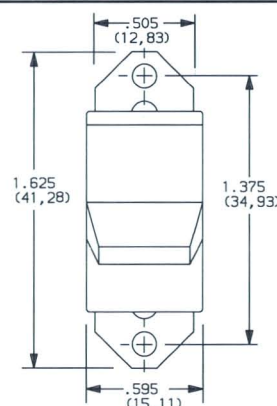
J3



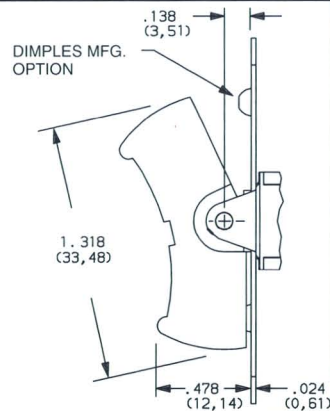
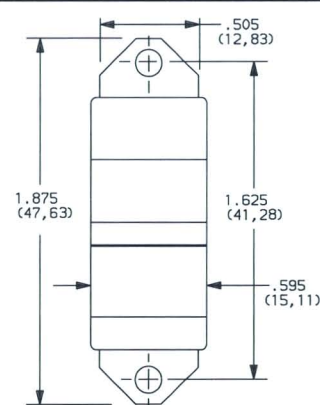
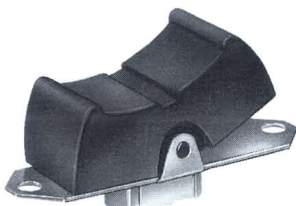
J4



J5



J10



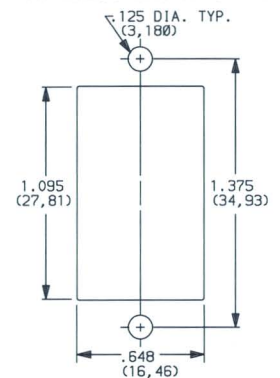
ACTUATOR COLOR

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

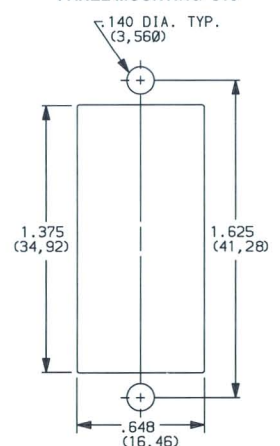
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

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

PANEL MOUNTING J3 – J4 – J5

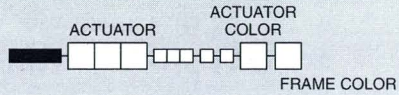


PANEL MOUNTING J10

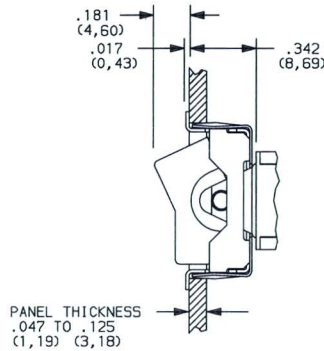
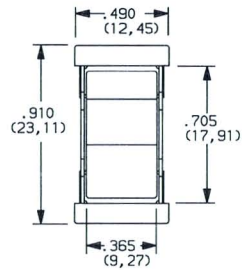
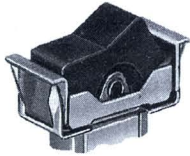




ACTUATORS — SNAP-IN FRONT MOUNT

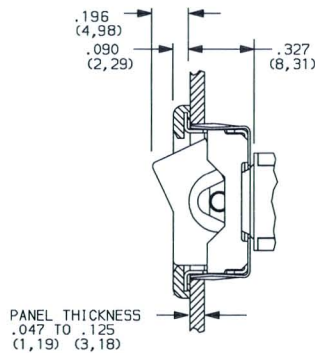
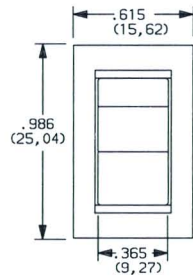
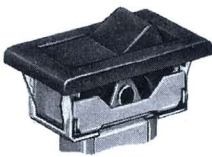


J15

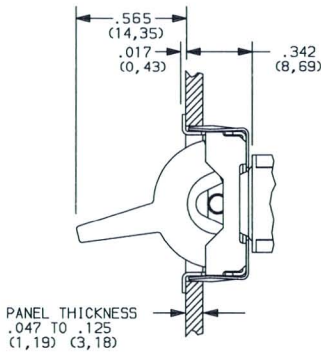
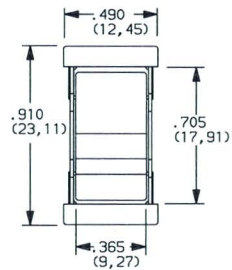
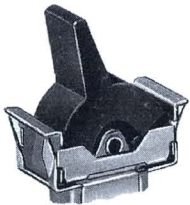


No frame color choice required.

J16

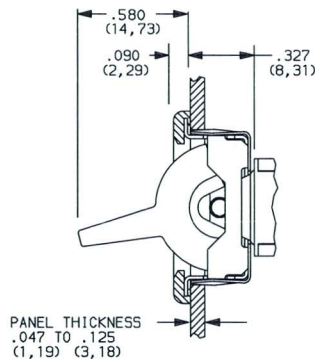
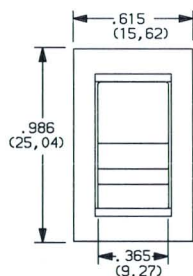


J25



No frame color choice required.

J26



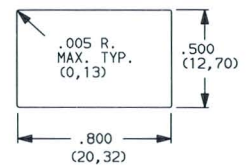
ACTUATOR AND FRAME COLORS

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

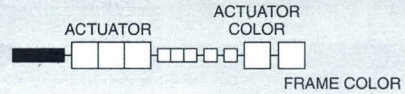
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

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

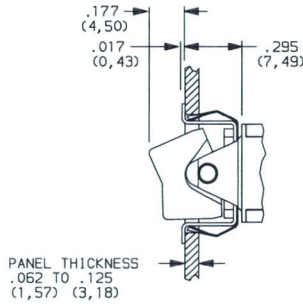
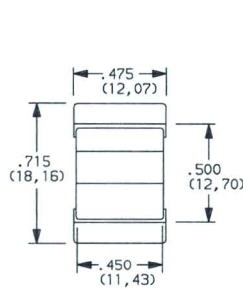
PANEL MOUNTING



ACTUATORS — SNAP-IN FRONT MOUNT



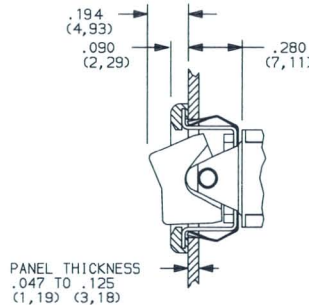
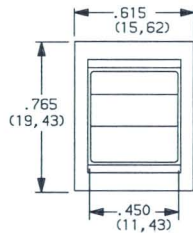
J50



PANEL THICKNESS
.062 TO .125
(1,57) (3,18)

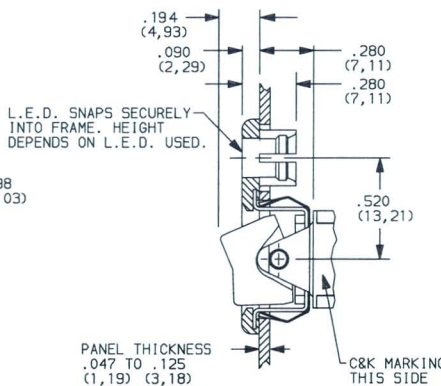
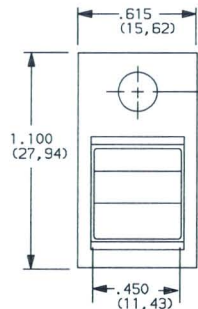
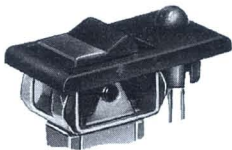
No frame color choice required.

J51



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

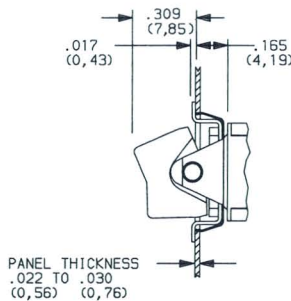
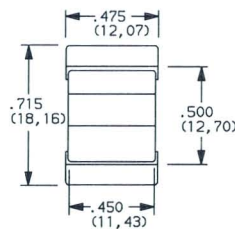
J52



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

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

J53



PANEL THICKNESS
.022 TO .030
(0,56) (0,76)

No frame color choice required.

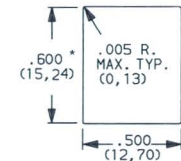
ACTUATOR AND FRAME COLORS

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

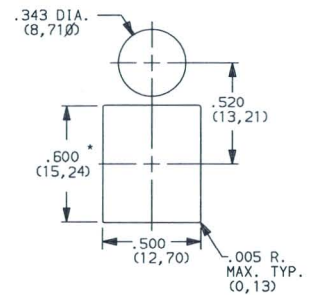
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available. Frames are available separately, see catalog section H.

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

PANEL MOUNTING — J50, J51, J53



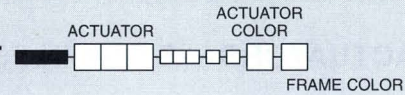
PANEL MOUNTING — J52



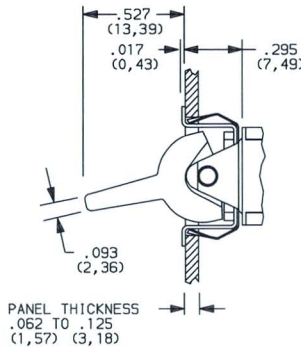
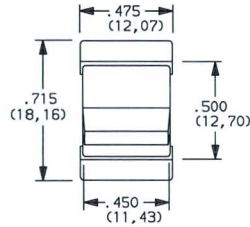
* For J50: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J51, J52: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.



ACTUATORS — SNAP-IN FRONT MOUNT

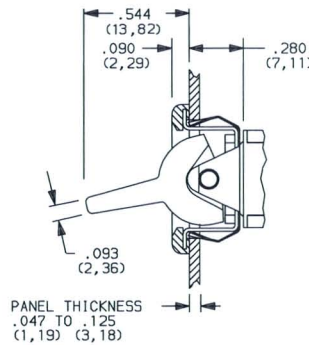
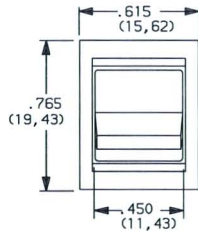


J60

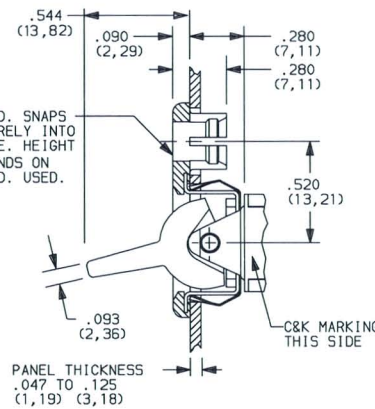
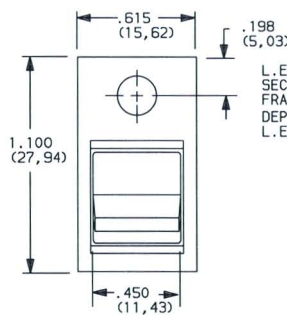


No frame color choice required.

J61

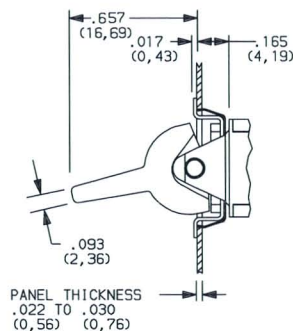
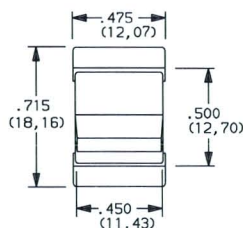
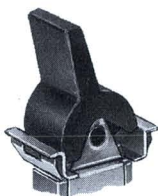


J62



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

J63



No frame color choice required.

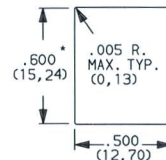
ACTUATOR AND FRAME COLORS

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

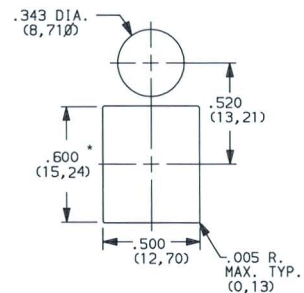
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

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

PANEL MOUNTING — J60, J61, J63

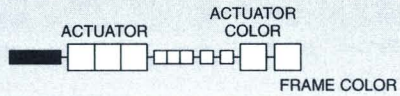


PANEL MOUNTING — J62

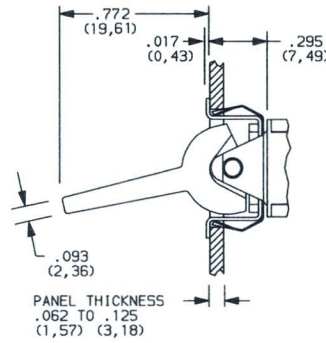
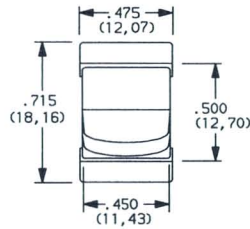
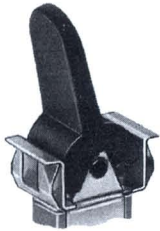


* For J60: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J61, J62: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.

ACTUATORS — SNAP-IN FRONT MOUNT

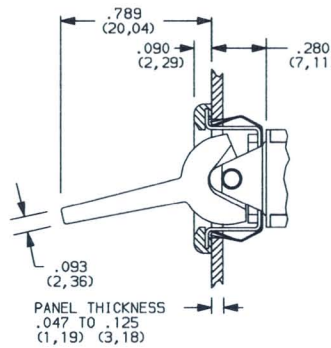
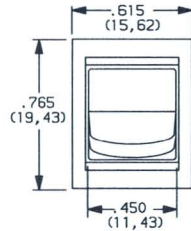


J90

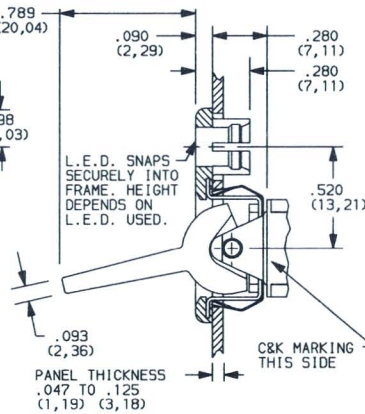
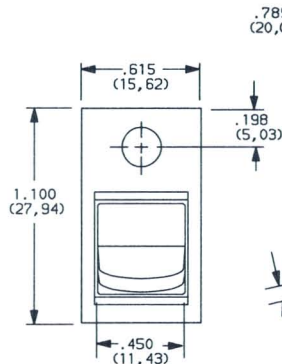


No frame color choice required.

J91

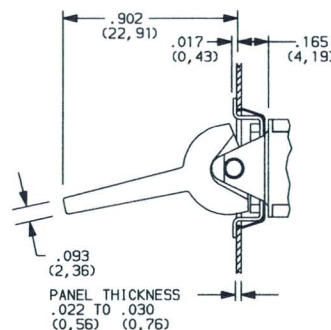
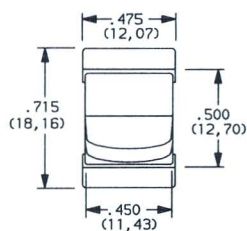


J92



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

J93



No frame color choice required.

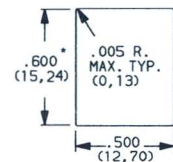
ACTUATOR AND FRAME COLORS

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

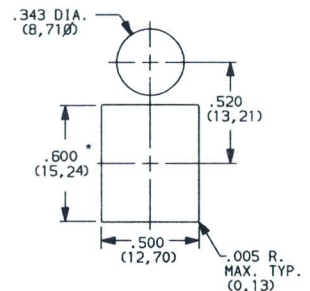
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

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

PANEL MOUNTING — J90, J91, J93



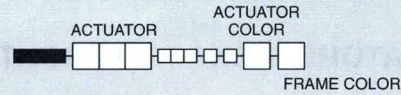
PANEL MOUNTING — J92



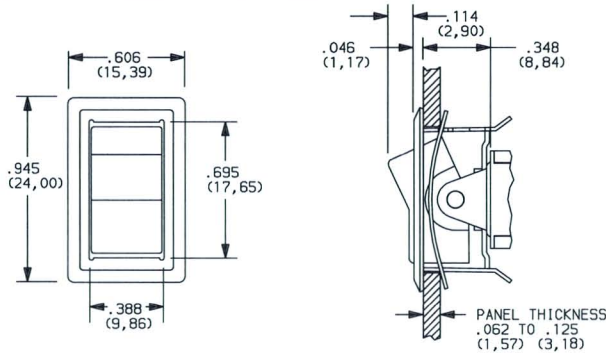
* For J90: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J91, J92: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.



ACTUATORS—REAR MOUNT



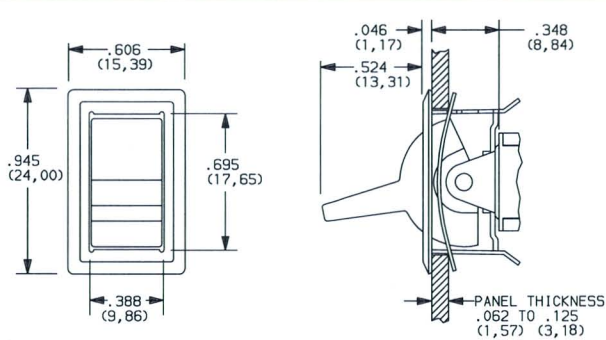
J11



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

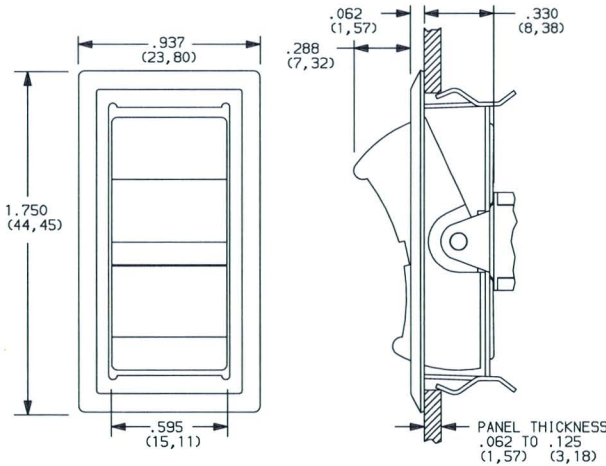
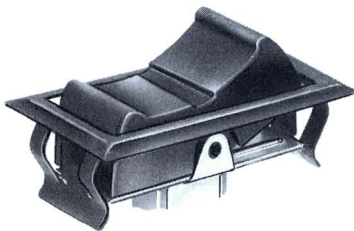
J21



FRAME COLOR

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

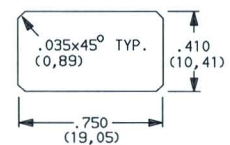
J19



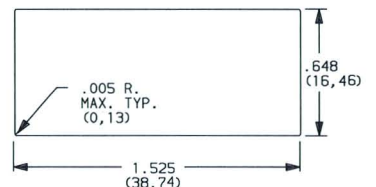
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte. Frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

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

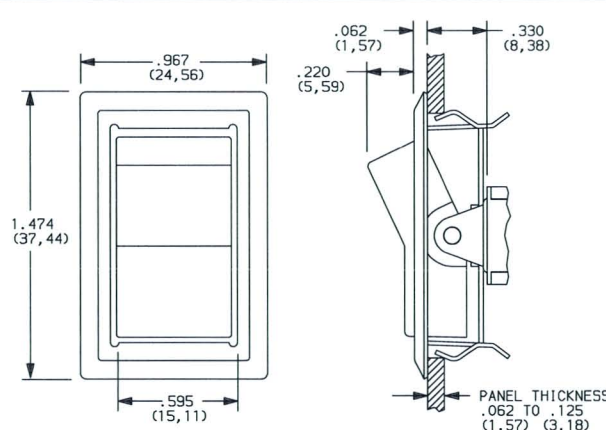
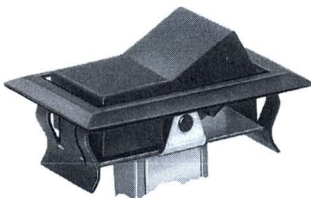
PANEL MOUNTING—J11, J21



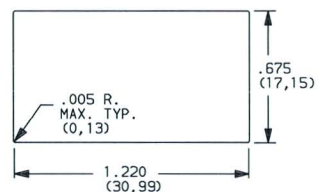
PANEL MOUNTING—J19



J37

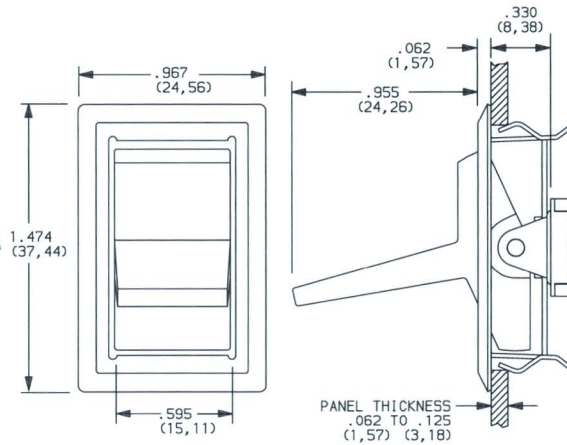


PANEL MOUNTING—J37



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

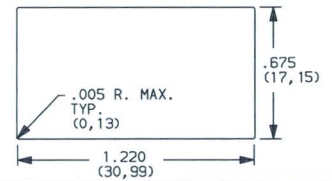
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

FRAME COLOR

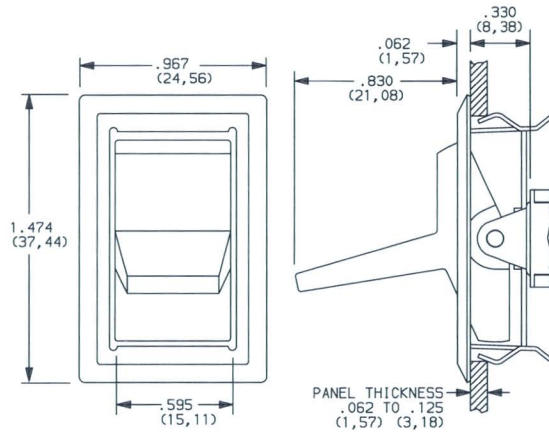
OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

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

PANEL MOUNTING J47 - J57

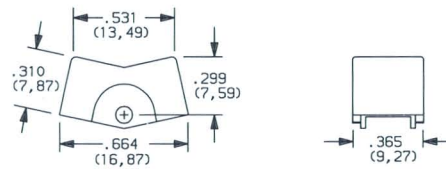
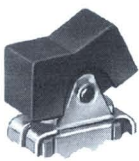


J57



ACTUATORS—P.C. MOUNT

J1

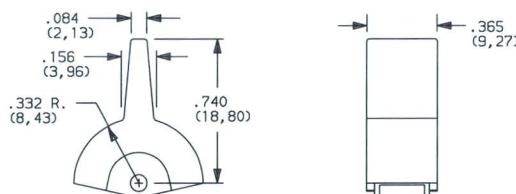


ACTUATOR COLOR

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: Custom. Custom actuator markings and legends available, consult factory. Actuators available separately, see catalog section H.

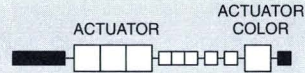
J2



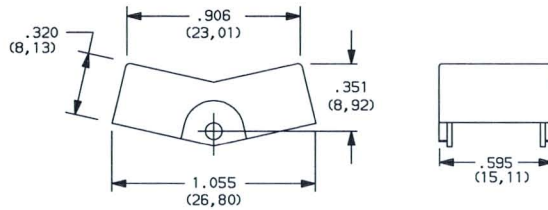
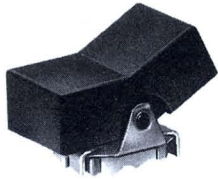
J1, J2 actuators available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between act. and P.C. board, and care must be exercised to accommodate this condition.



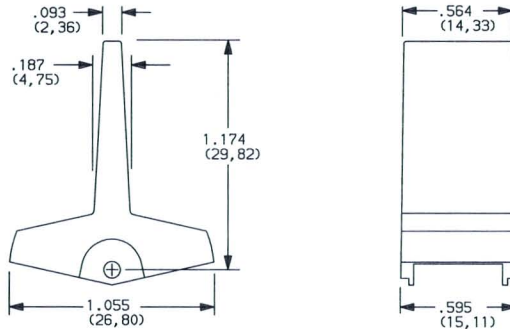
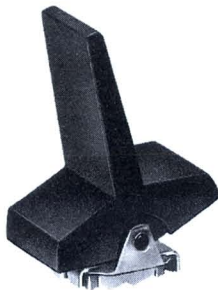
ACTUATORS—P.C. MOUNT



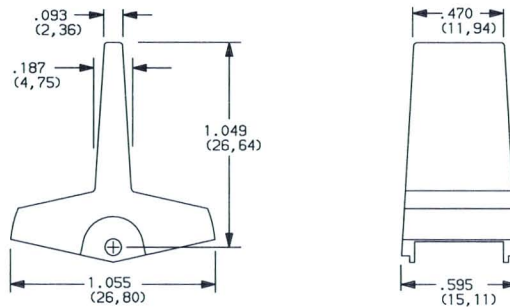
J3



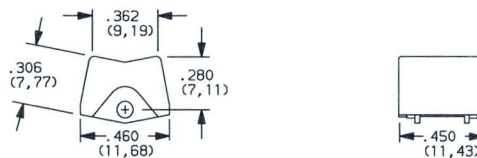
J4



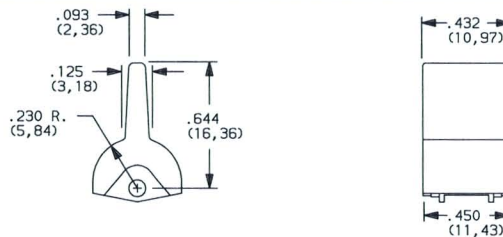
J5



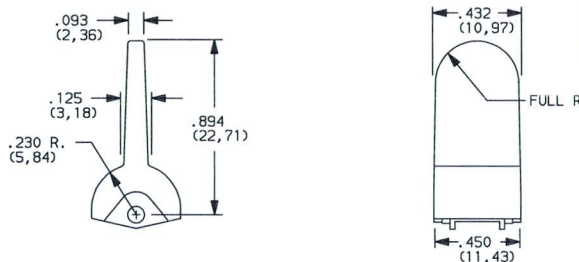
J50



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

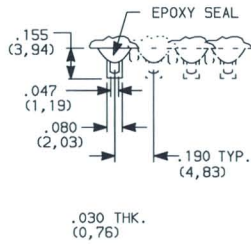
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Actuators are available separately, see catalog section H.

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

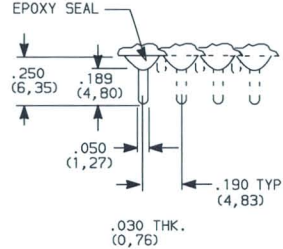
Z (STD.)



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.

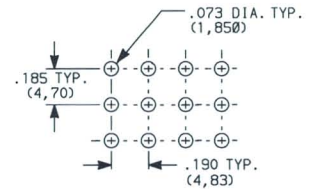
C



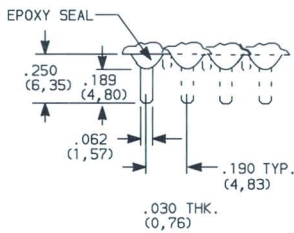
SPDT thru
4PDT

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

P.C. MOUNTING



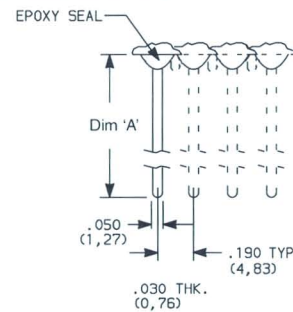
Z3 QUICK CONNECT



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

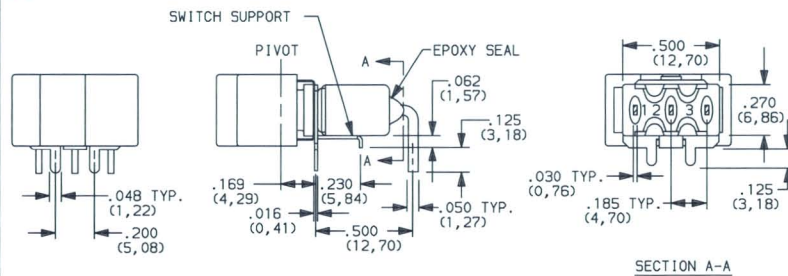


SPDT thru
4PDT

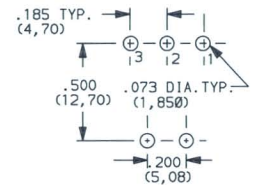
B contact material std.
Available actuators, see pages C-30 thru C-37.

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

A



P.C. MOUNTING



TERM. NOS. FOR
REFERENCE ONLY

Part No. Shown: 7101J1ABE2

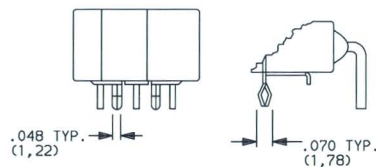


A

SPDT

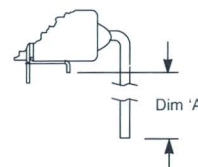
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option
Note: P.C. pattern must clear switch
support leg. Available actuators, see
pages C-37 and C-38.

A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED

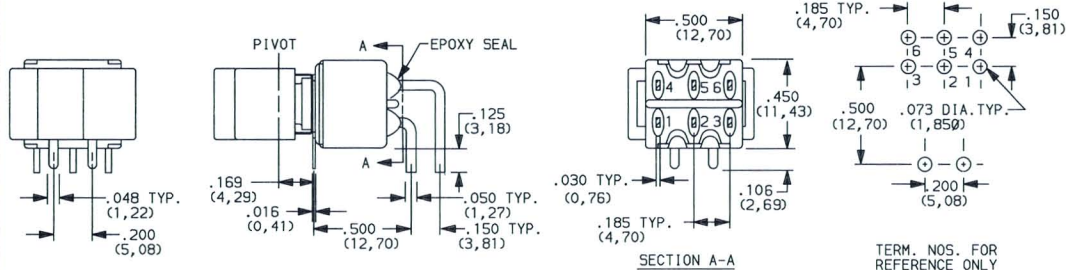


Option	Dim 'A'
AW	.44 (11,2)
AW1	.66 (16,8)
AW3	.14 (3,6)
AW4	.77 (19,6)
AW5	1.02 (25,9)

TERMINATIONS

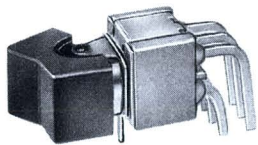
A

P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

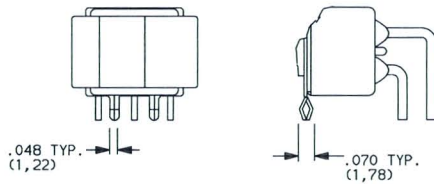
Part No. Shown: 7201J1ABE2



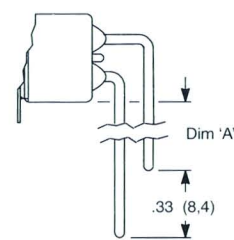
A

A3 SNAP-IN

AW-AW1-AW4-AW5 EXTENDED



SNAP-IN DESIGN RETAINS SWITCH.



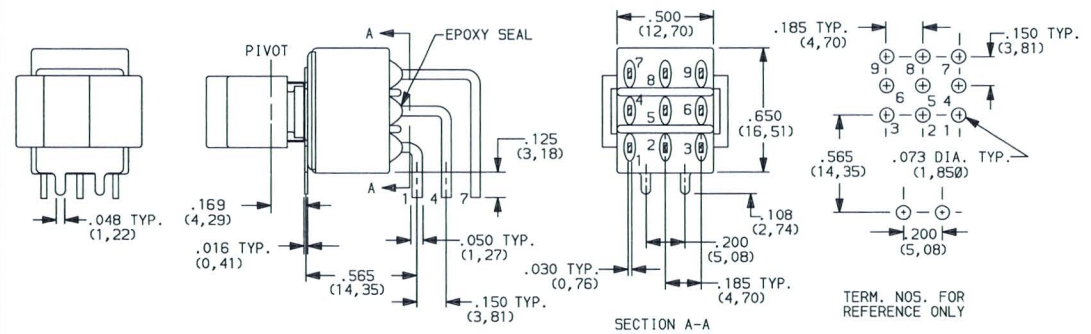
Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

DPDT

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

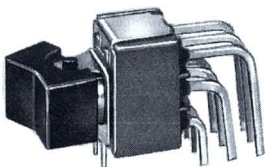
A

P.C. MOUNTING



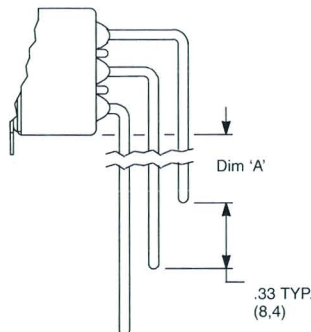
TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 7301J1ABE2



A

AW4-AW5 EXTENDED



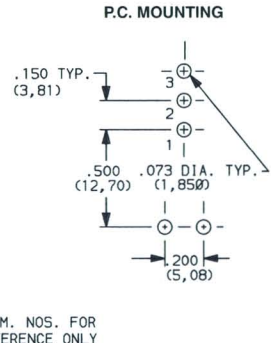
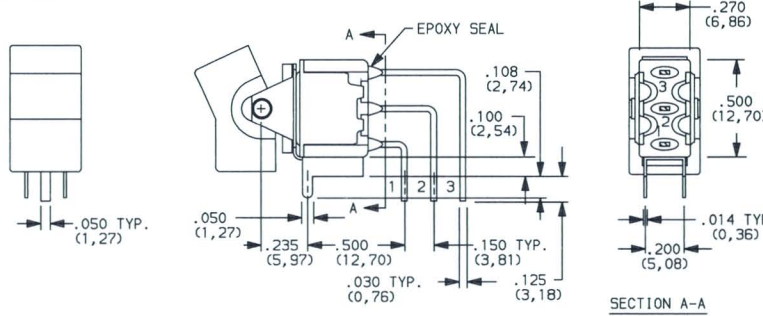
Option	Dim 'A'
AW4	.37 (9,4)
AW5	.40 (10,16)

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.

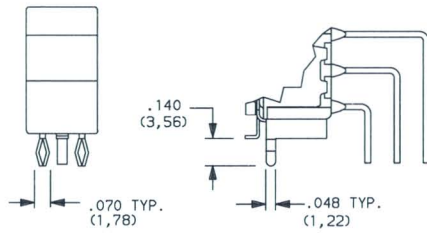
TERMINATIONS

AV2



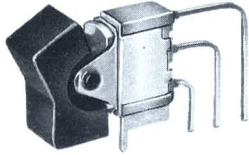
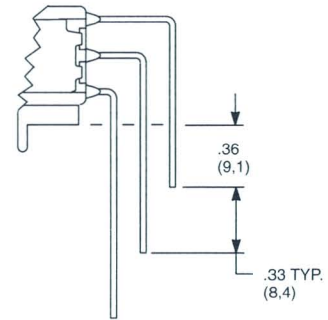
Part No. Shown: 7101J1AV2BE2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

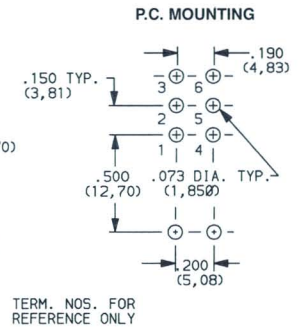
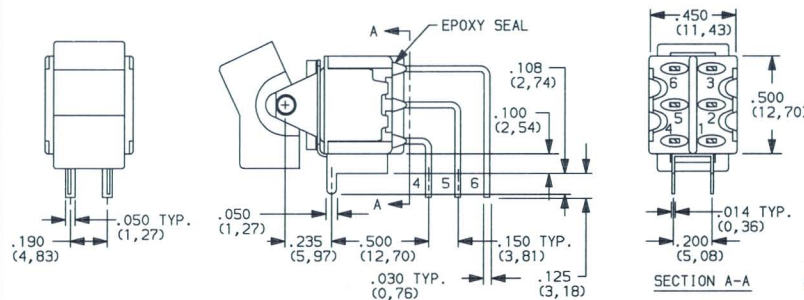


AV2

SPDT

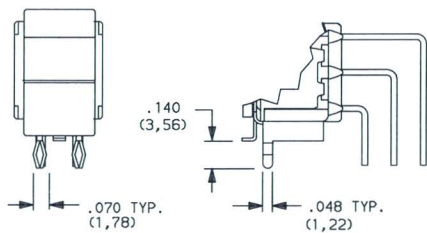
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37
and C-38.

AV2



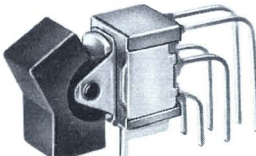
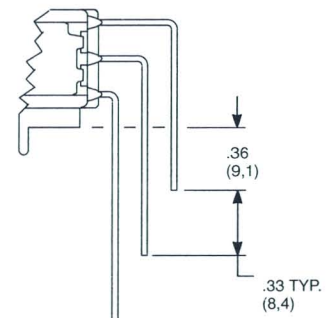
Part No. Shown: 7201J1AV2BE2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED



AV2

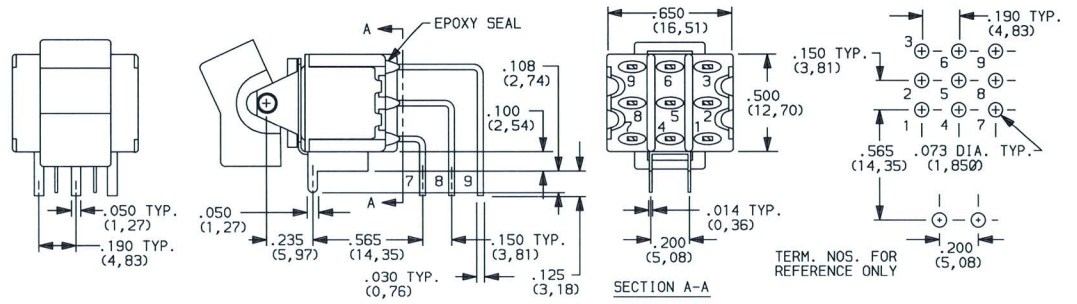
DPDT

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



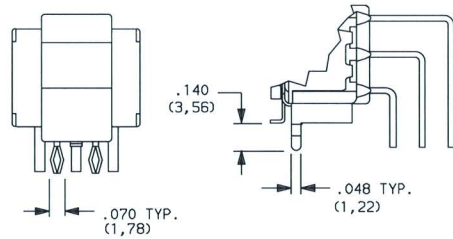
TERMINATIONS

AV2



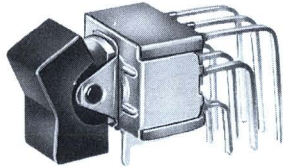
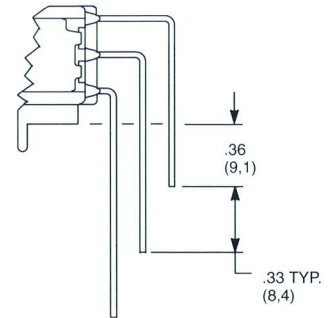
Part No. Shown: 7301J1AV2BE2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

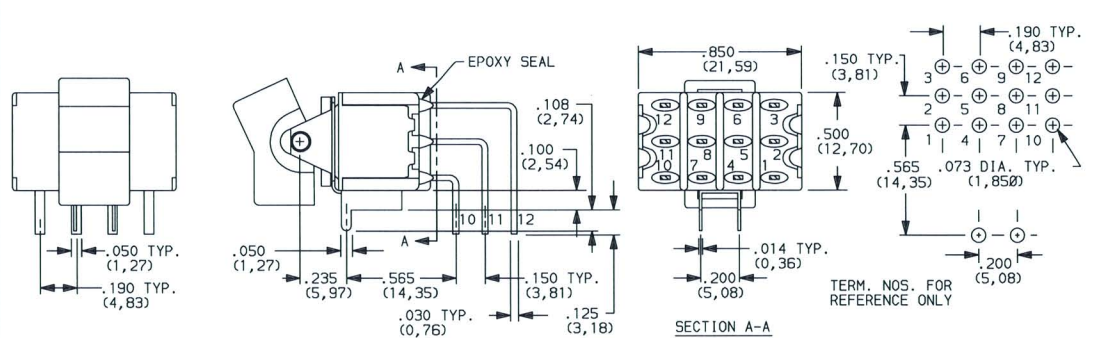


AV2

3PDT

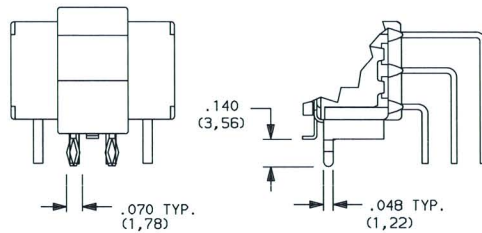
Term. bend radii and lead-in mfg. option. Actuator shown in pos.1. B contact material std. Not available with I seal option. Available actuators, see pages C-37 and C-38.

AV2



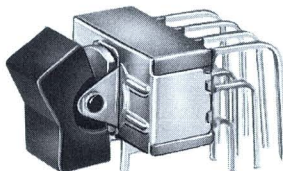
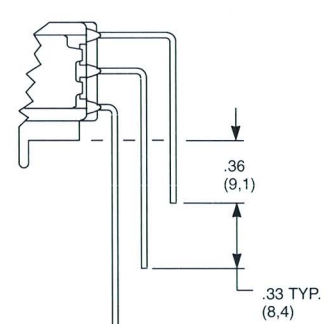
Part No. Shown: 7401J1AV2BE2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED



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

V51 SNAP-IN

V54-V55 EXTENDED

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

.33 TYP. (8,4)

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.

V5

V51 SNAP-IN

V54-V55 EXTENDED

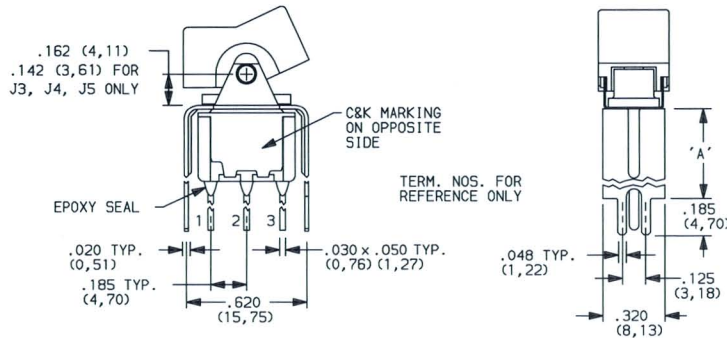
Option	Dim 'A'
V54	.24 (6,1)
V55	.48 (12,2)

.33 TYP. (8,4)

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

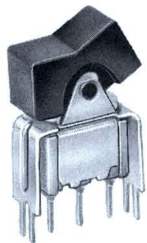
V3-V4-V9



Part No. Shown: 7101J1V__BE2

P.C. MOUNTING

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

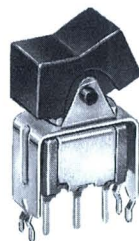


V3

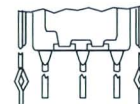
SPDT

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

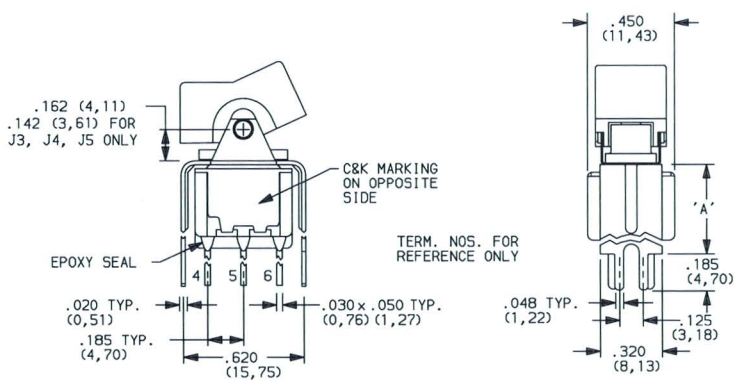


V31



SNAP-IN DESIGN RETAINS SWITCH.

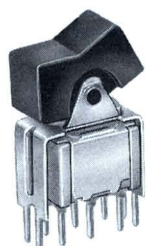
V3-V4-V9



Part No. Shown: 7201J1V__BE2

P.C. MOUNTING

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

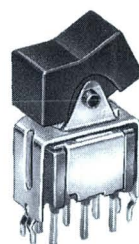


V3

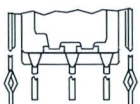
DPDT

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



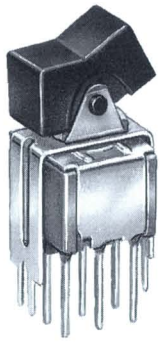
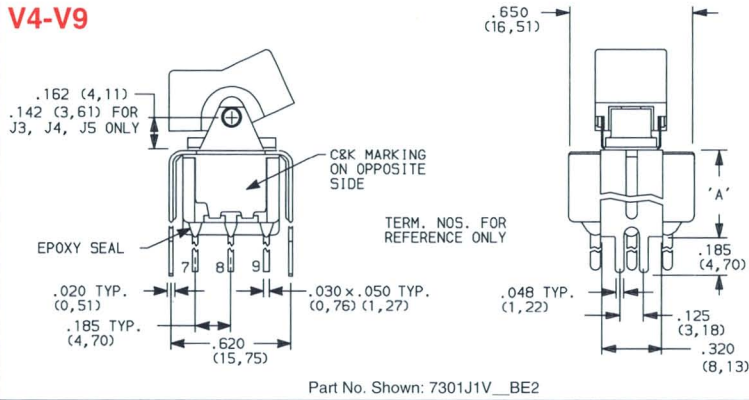
V31



SNAP-IN DESIGN RETAINS SWITCH.

TERMINATIONS

V4-V9

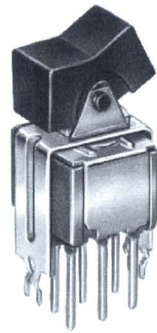


V4

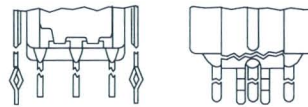
3PDT

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

V41-V91 SNAP-IN

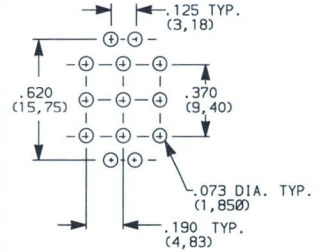


V41



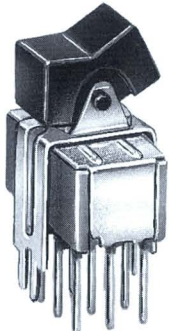
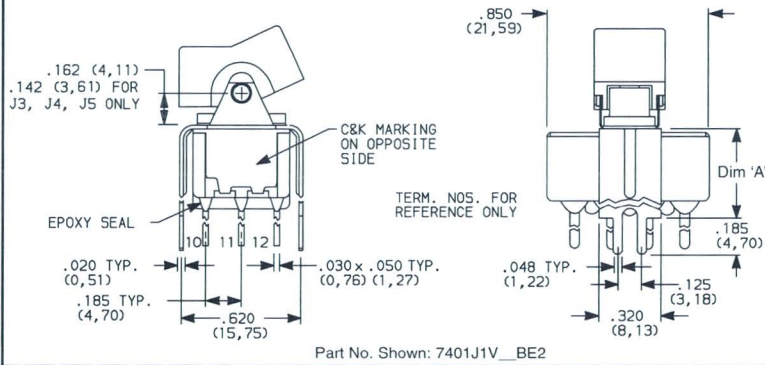
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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

V4-V9

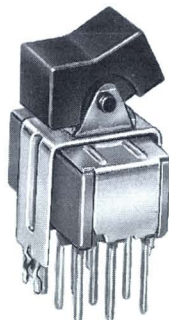


V4

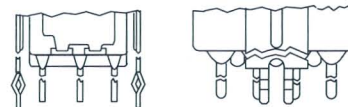
4PDT

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

V41-V91 SNAP-IN

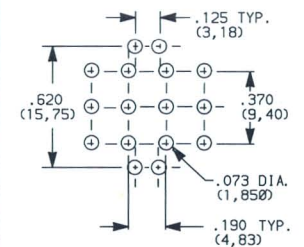


V41



SNAP-IN DESIGN RETAINS SWITCH.

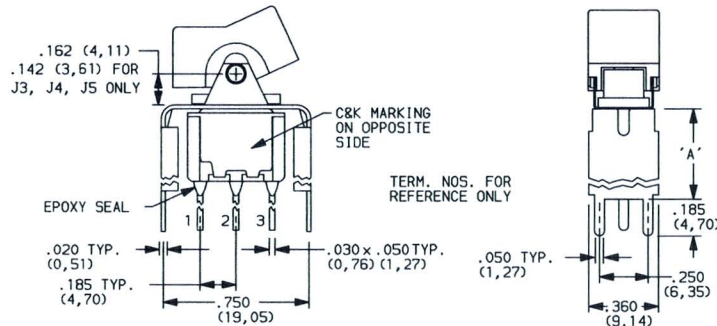
P.C. MOUNTING



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

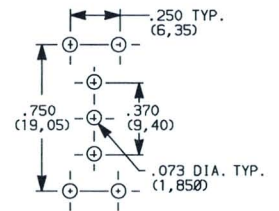
TERMINATIONS

V2-V6-V7-V8

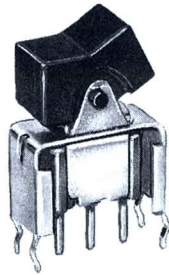


Part No. Shown: 7101J1V_BE2

P.C. MOUNTING



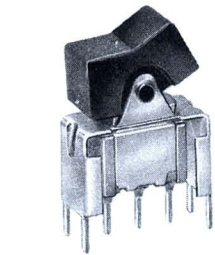
V21-V61-V71-V81 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

V61

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

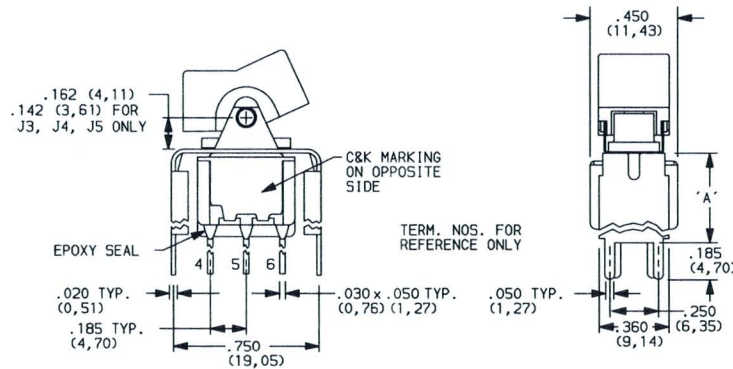


V6

SPDT

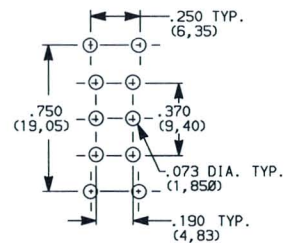
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

V2-V6-V7-V8

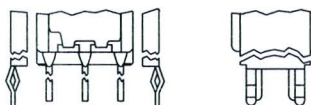
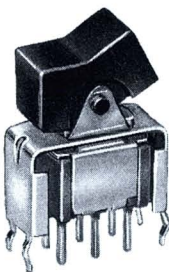


Part No. Shown: 7201J1V_BE2

P.C. MOUNTING



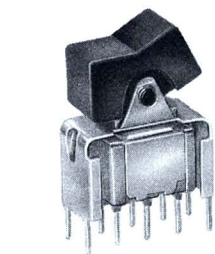
V21-V61-V71-V81 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

V61

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



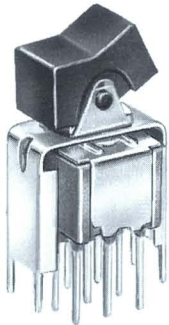
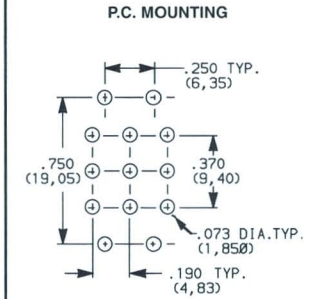
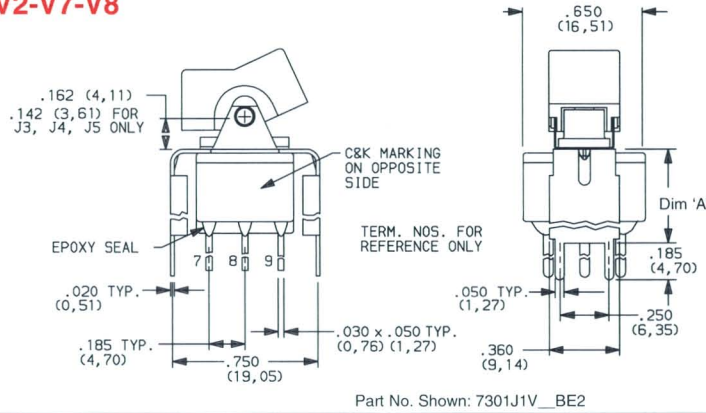
V6

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

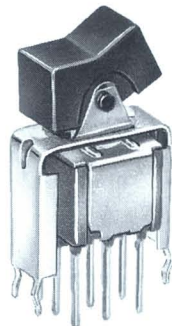


V7

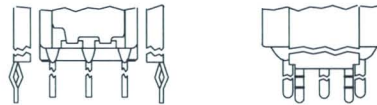
3PDT

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

V21-V71-V81 SNAP-IN



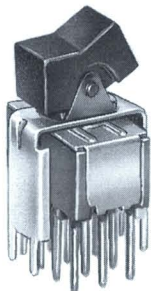
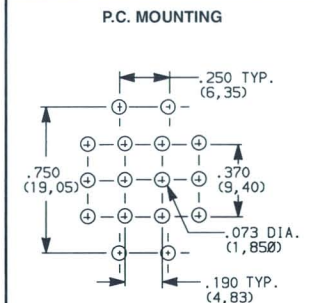
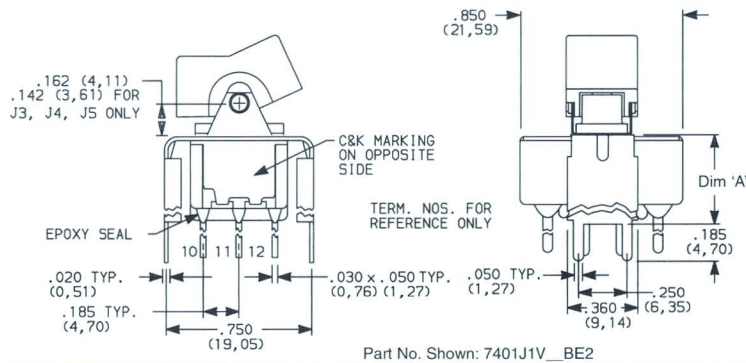
V71



SNAP-IN DESIGN RETAINS SWITCH.

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

V2-V7-V8

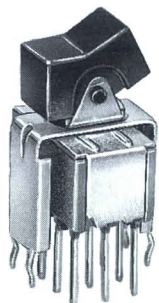


V7

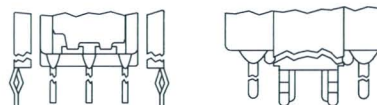
3PDT

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

V21-V71-V81 SNAP-IN



V71



SNAP-IN DESIGN RETAINS SWITCH.

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
L		TIN-LEAD ⁶		

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.

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

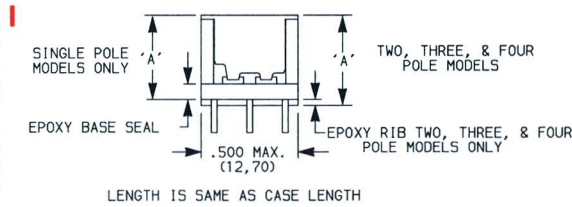
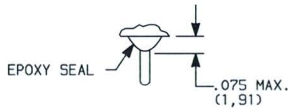
B contact material standard with all terminations except Z, C, Z3.

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: 10⁹ 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

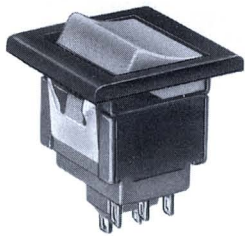
HARDWARE: Nut, Screw, & Lockwasher — Stainless steel.

Standoff — Nylon standard. Aluminum available, consult factory.



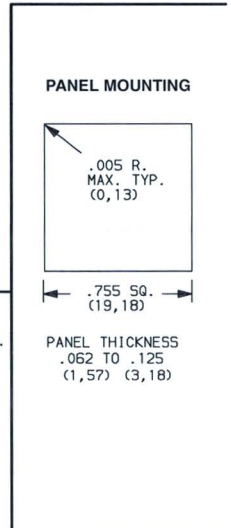
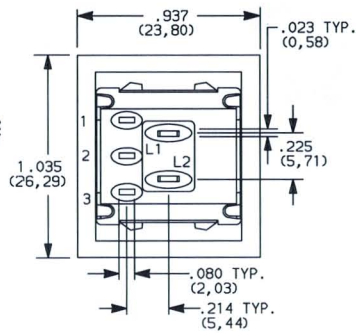
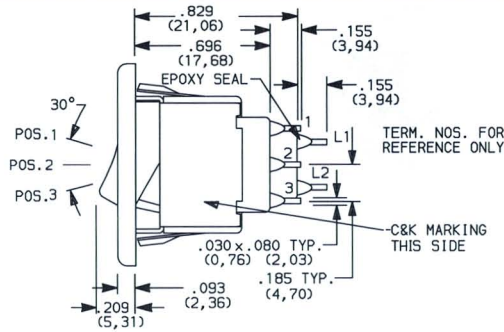


SWITCHES WITH STANDARD OPTIONS

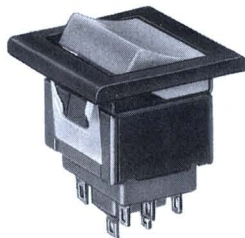


SPDT

Actuator and frame supplied not installed.

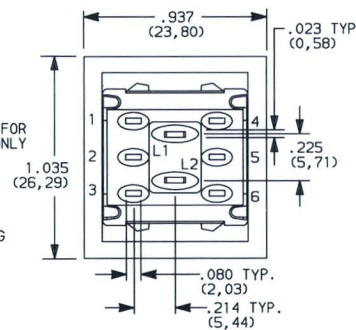
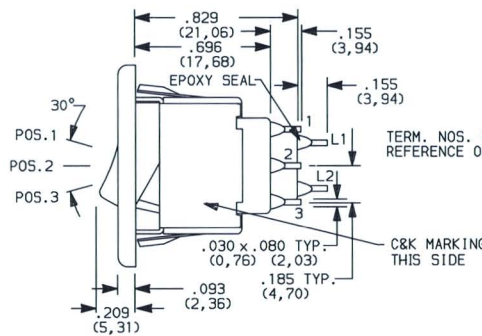


Part No. Shown: 5101ZQE12



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.					

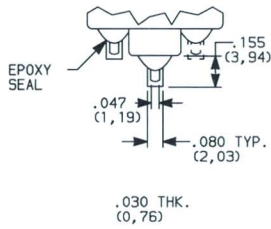
MOM. = MOMENTARY

* 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

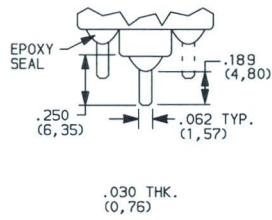
Z (STD.)



SPDT and DPDT

Q contact material std.

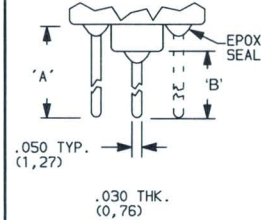
Z3 QUICK CONNECT



SPDT and DPDT

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

W-W1-W3-W4 WIRE-WRAP



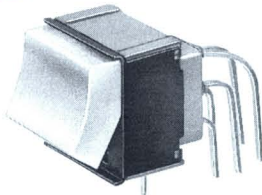
SPDT and DPDT

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

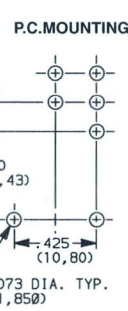
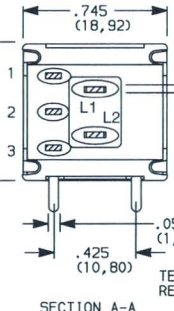
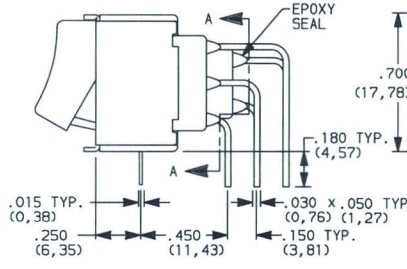
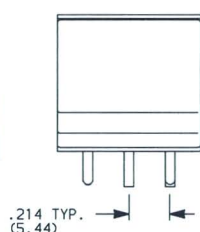
NOTE: W3 replaces C1.

B contact material std.

AV2



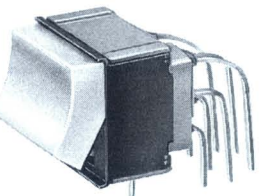
SPDT



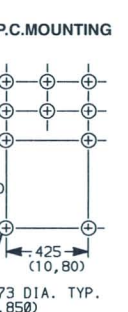
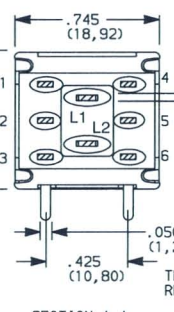
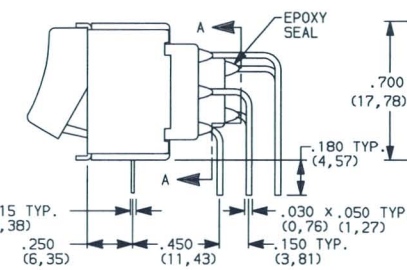
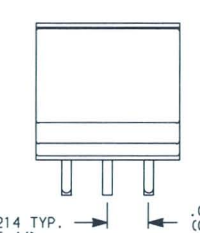
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1, actuator supplied not installed.
B contact material std.

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	SILVER ^{4,5}	SILVER ⁵	POWER	5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.

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.

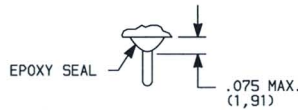
L11-L28, 5211-5215 model numbers with all options when ordered with G or Q contact material. See pages C-50 and VIII.

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
1	WHITE (std.)	5	YELLOW
3	RED	6	GREEN
4	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
(NONE)	WITH AV2 TERM.	5	YELLOW
1	WHITE	6	GREEN
2	BLACK (std.)	7	BLUE
3	RED	8	BROWN
4	ORANGE	9	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: 10⁹ 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).

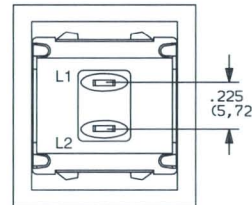
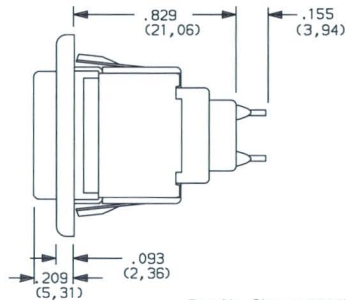
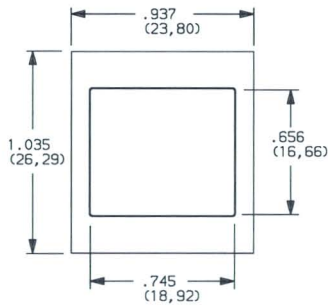
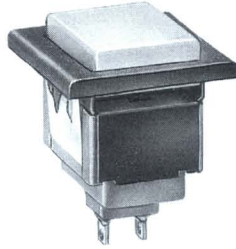
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

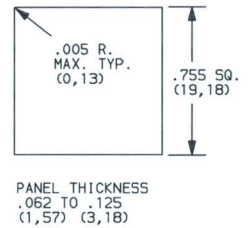
- CASE: Diallyl phthalate (DAP) (UL 94V-0).
- ACTUATOR: Translucent polycarbonate, white standard.
- FRAME: Nylon, black standard.
- HOUSING: Stainless steel, black passivate.
- MOUNTING SPRING: Spring steel, nickel plated.
- END CONTACTS: Coin silver, silver plated. (Q contact material).
- CENTER CONTACTS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

LAMP INFORMATION

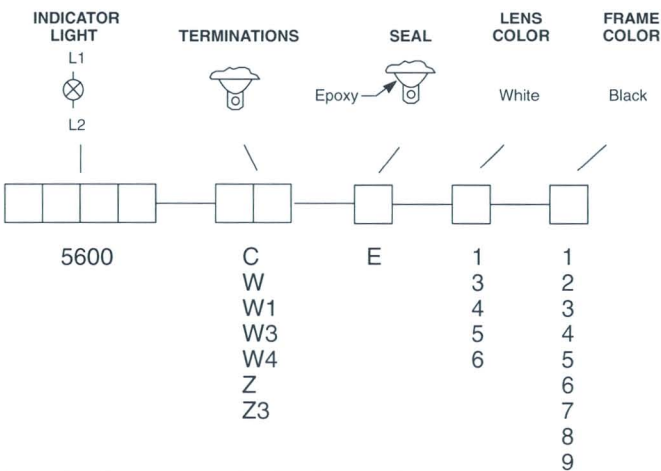
Lamps are not supplied. Midget screw base lamps sizes T 1 1/2 and T 1 3/4 are recommended. Suggested spherical candlepower range is .34-.75 M.S.C.P. Instrument grade lamps are recommended for dimensional consistency. Max. overall length = .635 (16,13), max. OD = .230 (5,84). Lamps are easily replaceable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



PANEL MOUNTING



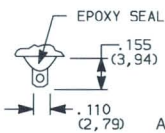
Part No. Shown: 5600ZE12



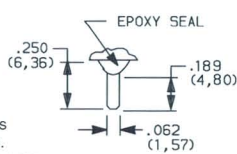
Shown is a complete listing of available options for 5600 SERIES INDICATOR LIGHTS. Build-A-Switch allows you to mix and match options to create the indicator you need— simply select desired termination, lens color and frame color below. When building a part number, some ordering format boxes may not 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

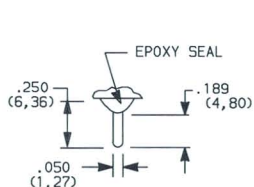


Z3 QUICK CONNECT

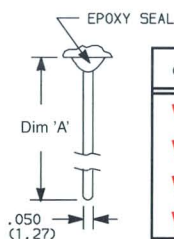


All terminations .030 (0,76) thk. All terminals copper alloy, tin plated.

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)

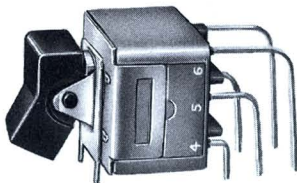
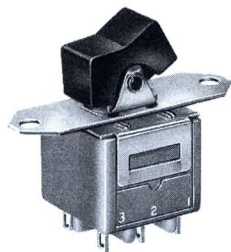
LENS COLOR

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		

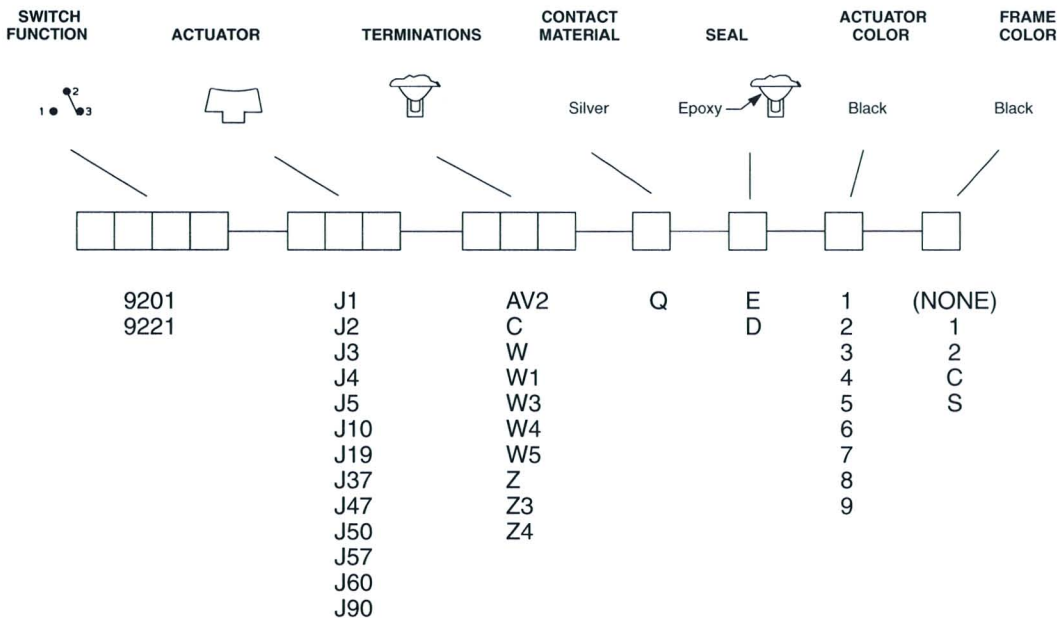
Lens and frame supplied not installed.



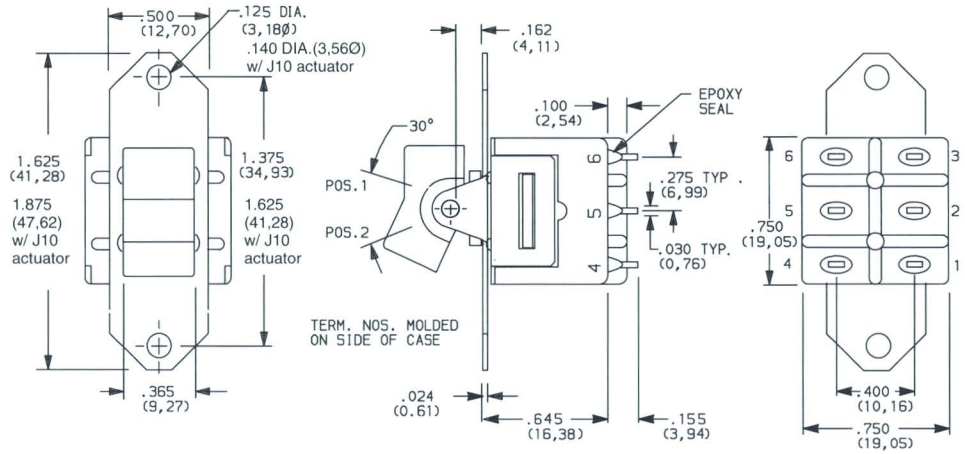
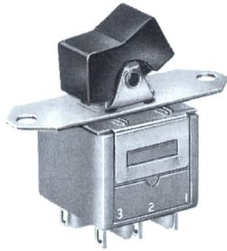
All 9000 Series models meet international dimensional and electrical requirements.

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.

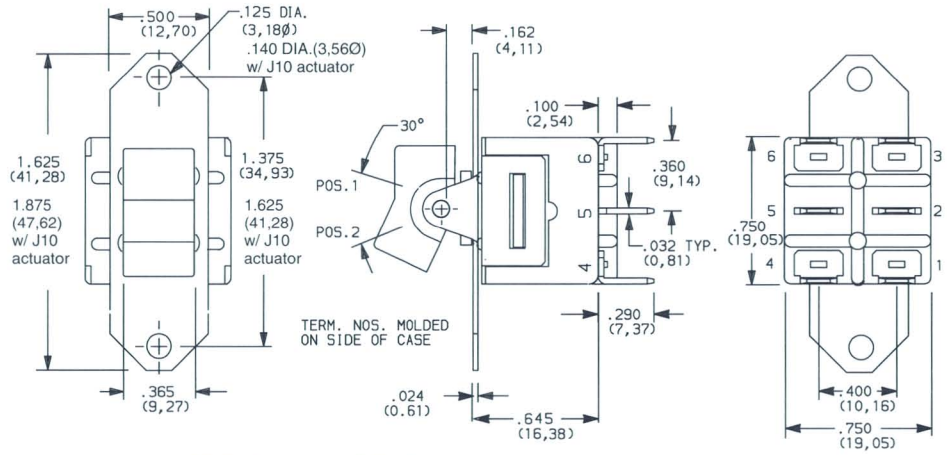
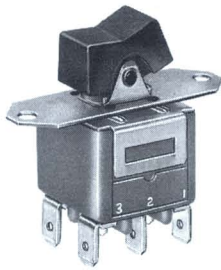


SWITCHES WITH STANDARD OPTIONS



**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					 DPDT
	9221	10 AMPS	ON	ON	2-3,5-6	2-1,5-4	



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.

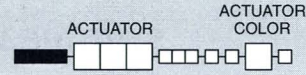
* See CONTACT MATERIAL, page C-60, for complete ratings.



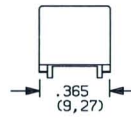
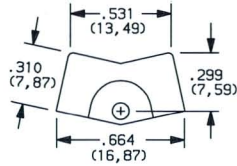
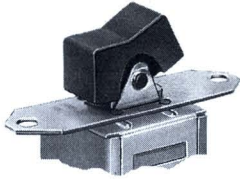
9000 Series

Power Rocker and Lever Handle Switches

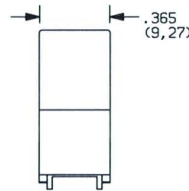
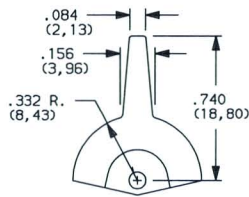
ACTUATORS—PANEL MOUNT



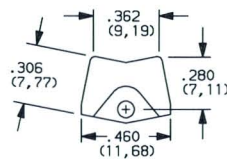
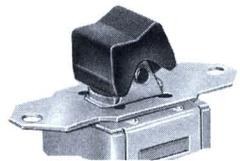
J1 (STD.)



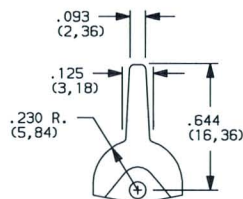
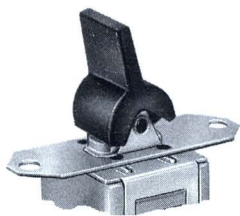
J2



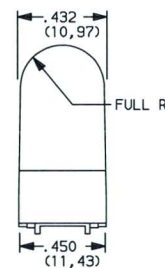
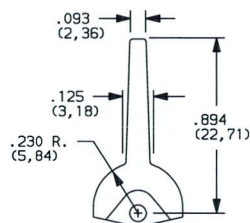
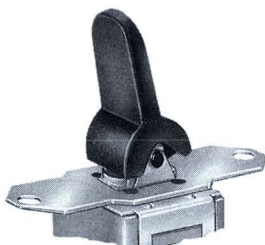
J50



J60



J90

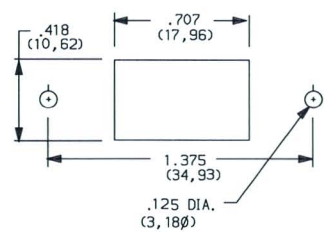


ACTUATOR COLOR

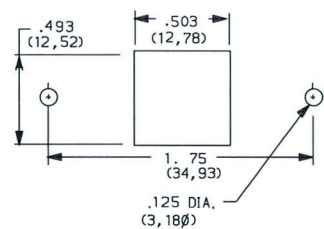
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

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

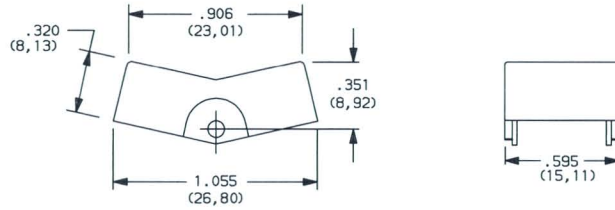
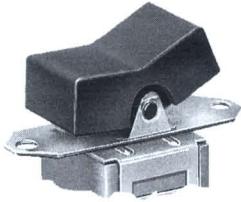


PANEL MOUNTING J50 – J60 – J90

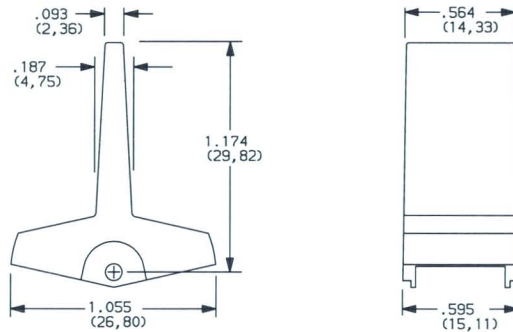
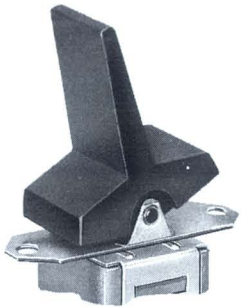


ACTUATORS—PANEL MOUNT

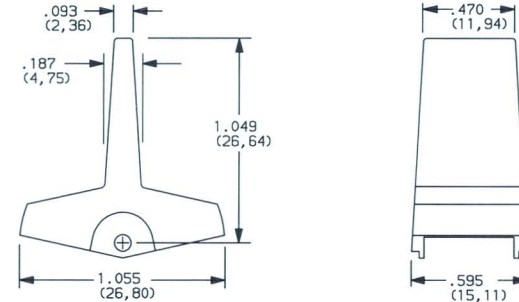
J3



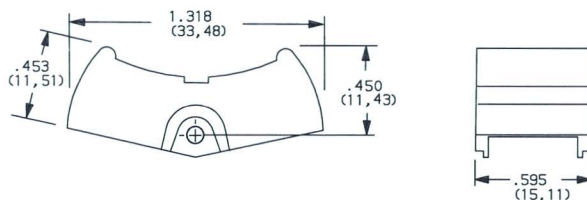
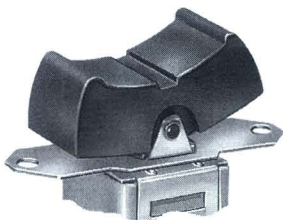
J4



J5



J10

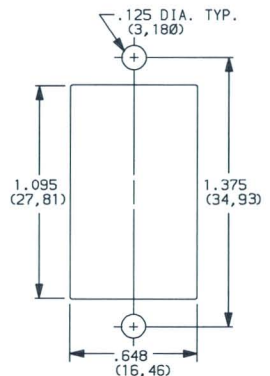


ACTUATOR COLOR

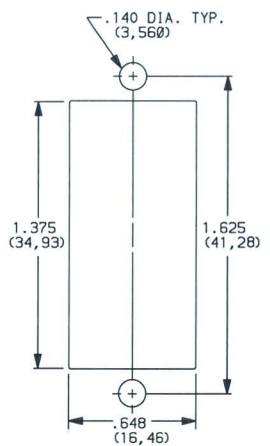
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

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.

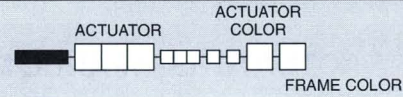
PANEL MOUNTING J3 - J4 - J5



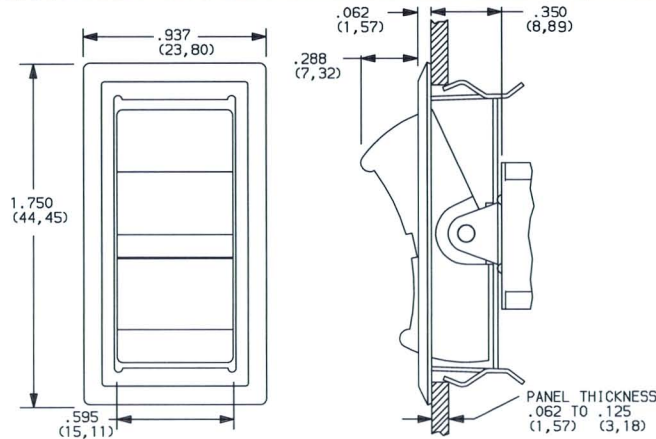
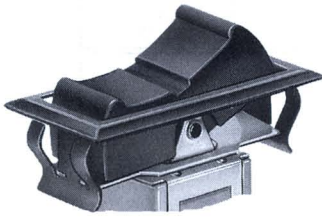
PANEL MOUNTING J10



ACTUATORS—REAR MOUNT



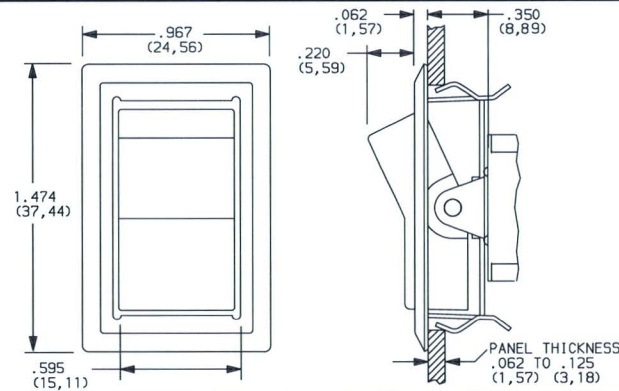
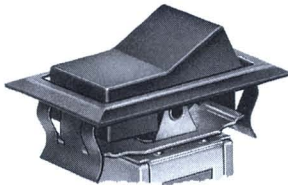
J19



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

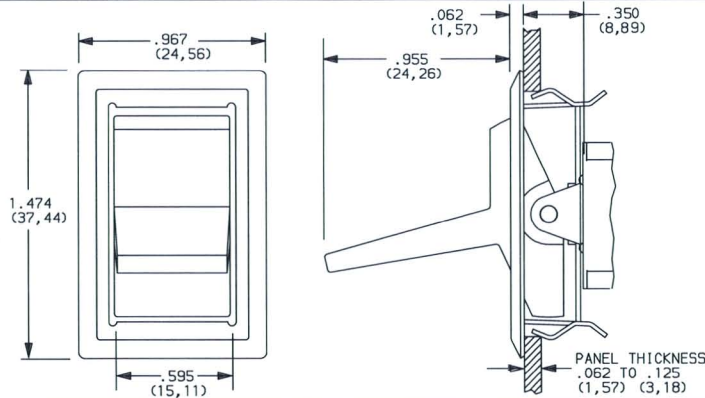


FRAME COLOR

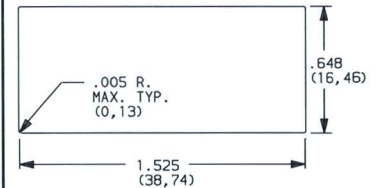
OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

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.

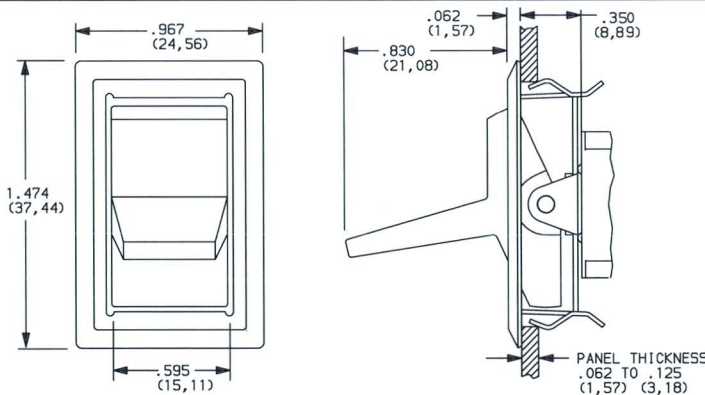
J47



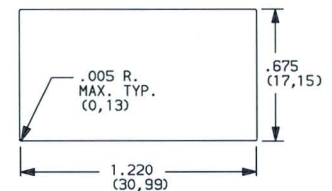
PANEL MOUNTING—J19



J57

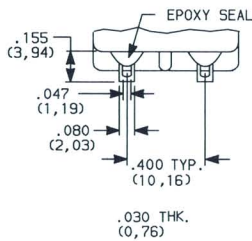


PANEL MOUNTING—J37—J47—J57



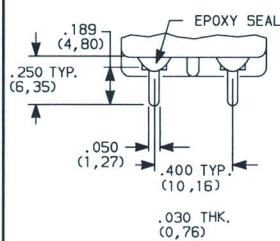
TERMINATIONS

Z (STD.)



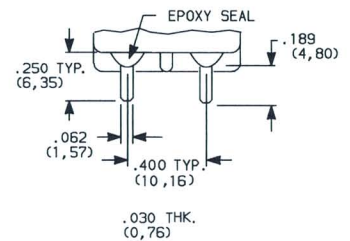
9201 MODEL ONLY

C



9201 MODEL ONLY

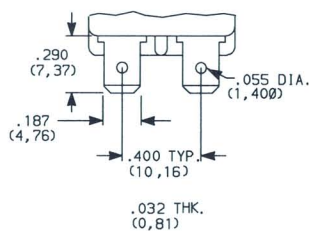
Z3 QUICK CONNECT



9201 MODEL ONLY

Mating quick connector available; order part no. 530100000.

Z4 QUICK CONNECT



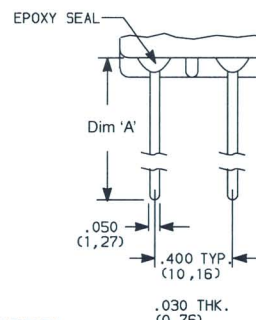
Only termination available with 9221 model. Must be ordered with D seal option.

Mating quick connector available from:

Hollingsworth Solderless Terminals, Phoenixville, PA 19460 or AMP Special Industries, Harrisburg, PA 17105

9201 and 9221

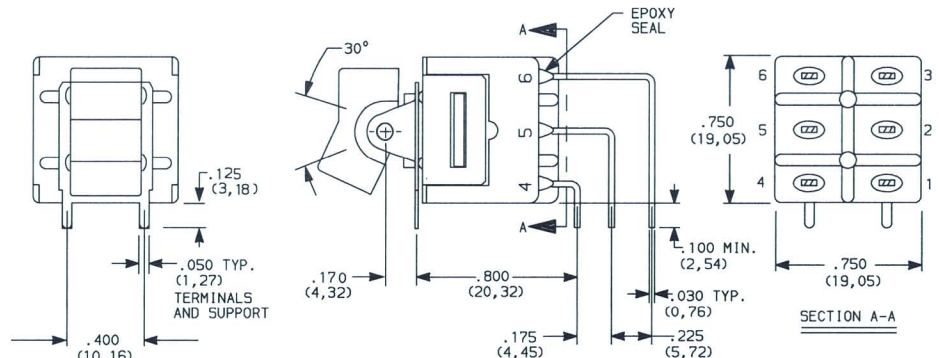
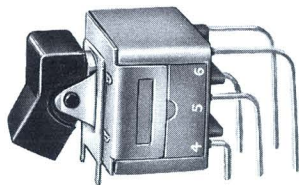
W-W1-W3-W4-W5 WIRE WRAP



9201 MODEL ONLY

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

AV2

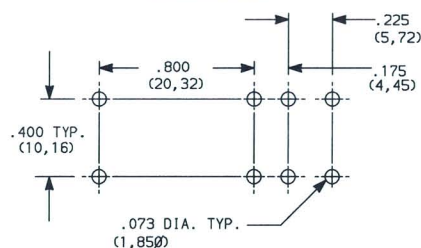


TERM. NOS. MOLDED ON SIDE OF CASE

9201 MODEL ONLY

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

P.C. MOUNTING



Part No. Shown: 9201J1AV2QE2



CONTACT MATERIAL

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

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

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

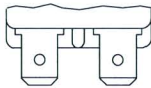


All 9000 Series models meet international dimensional and electrical requirements. See pages C-55 and VIII.

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

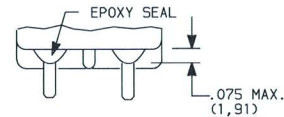
SEAL

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: 10⁹ 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).

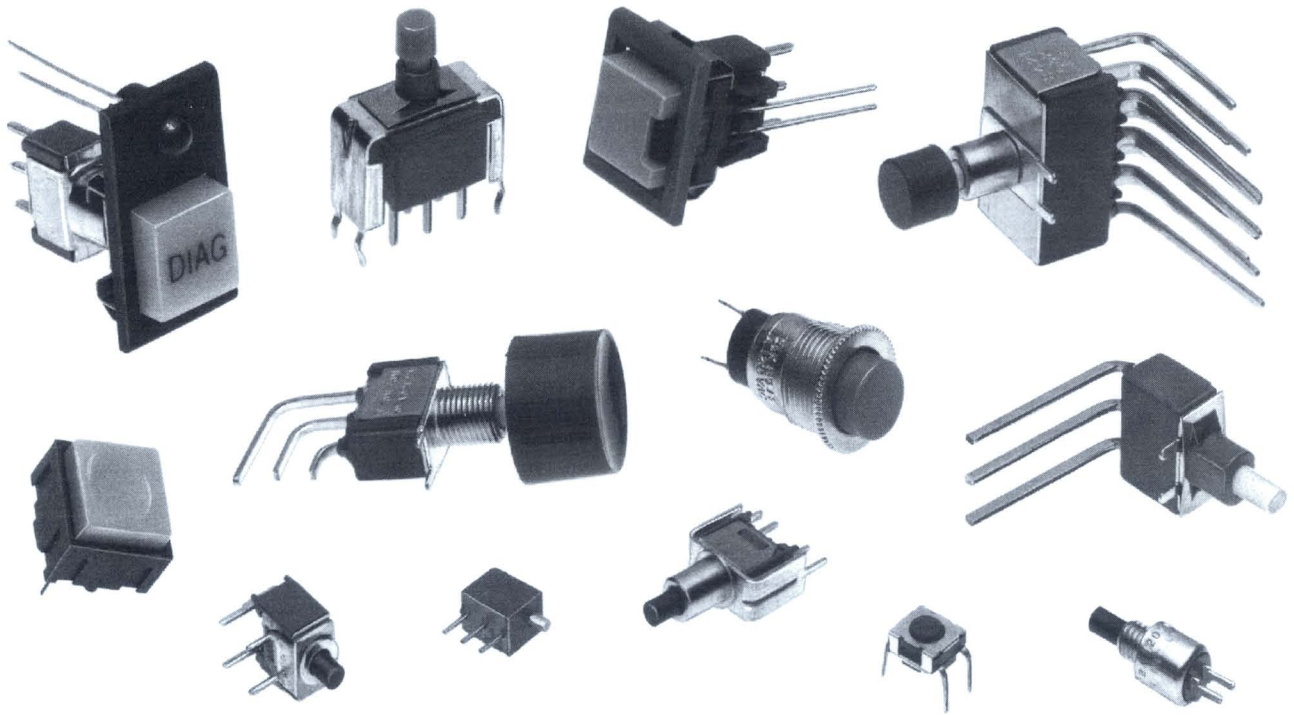
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

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**

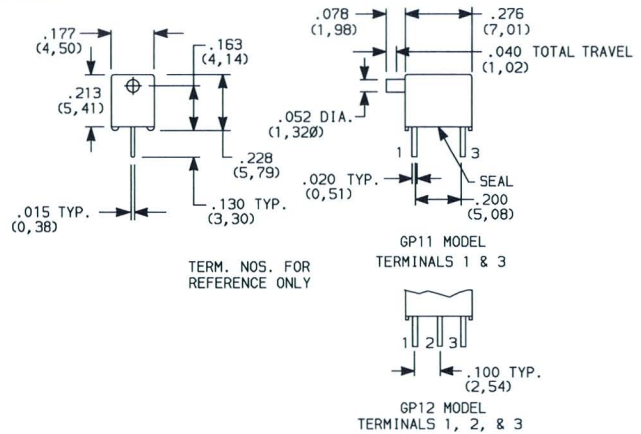
SP MODELS WITH C TERMINALS

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

MOM.=MOMENTARY



SPST and SPDT



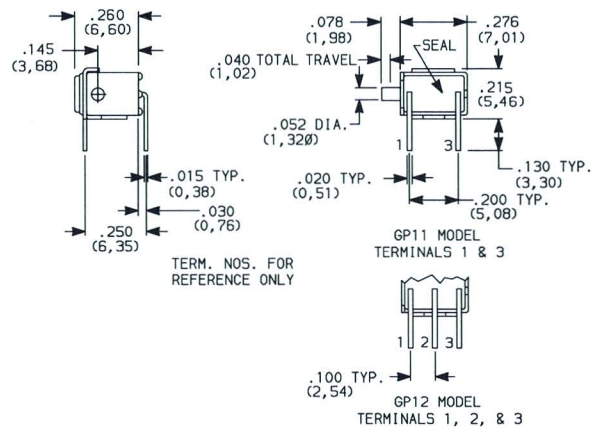
SP MODELS WITH A TERMINALS

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

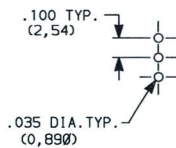
MOM.=MOMENTARY



SPST and SPDT



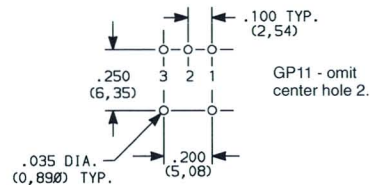
C TERMINAL STYLE



GP11 - omit center hole.

P.C. MOUNTING

A TERMINAL STYLE



GP11 - omit center hole 2.

*Process sealed—withstands soldering and cleaning processes.

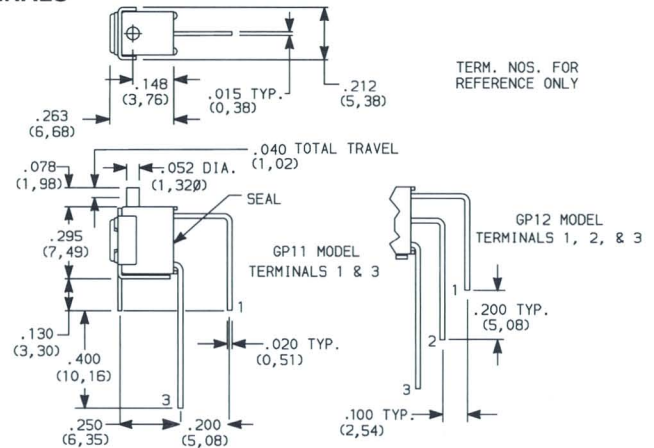
SP MODELS WITH AV TERMINALS

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

MOM.=MOMENTARY



SPST and SPDT



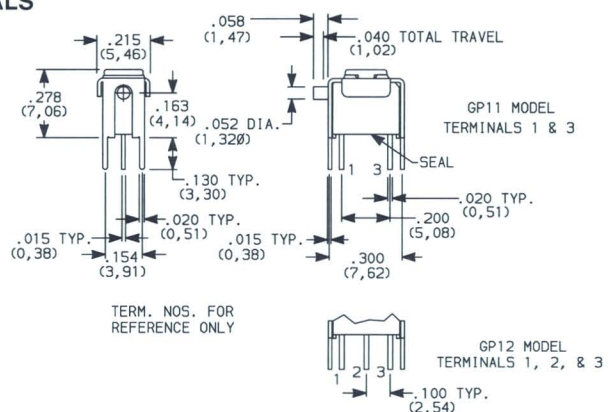
SP MODELS WITH V3 TERMINALS

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

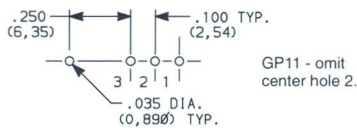
MOM.=MOMENTARY



SPST and SPDT

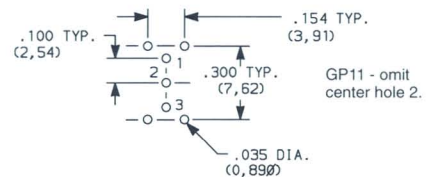


AV TERMINAL STYLE



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: 10⁹ 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.

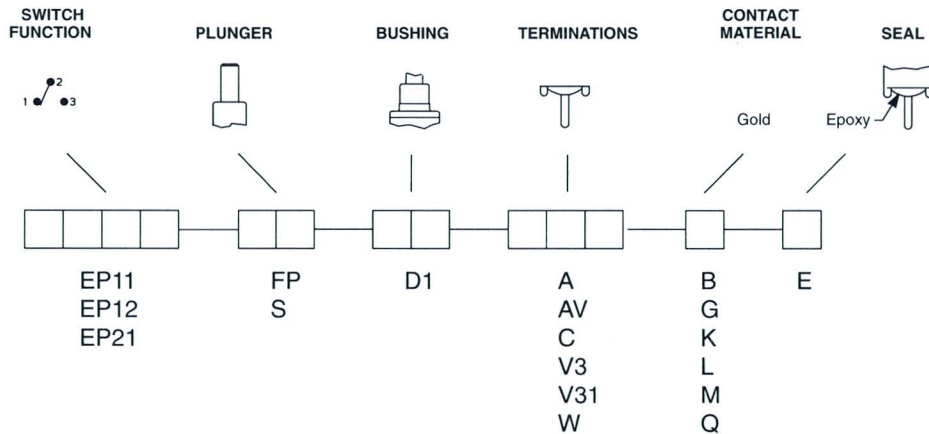


models available, see page D-5.

Easy Build-A-Switch:

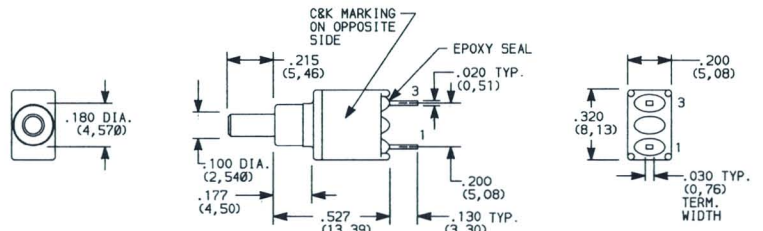
Below is a complete listing of available options for EP SERIES SEALED TINY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. Switches with standard options are shown on page D-5; all available options 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





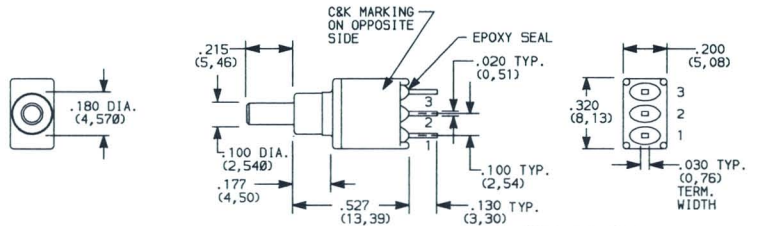
SWITCHES WITH STANDARD OPTIONS



TERM. NOS. FOR REFERENCE ONLY

SPST

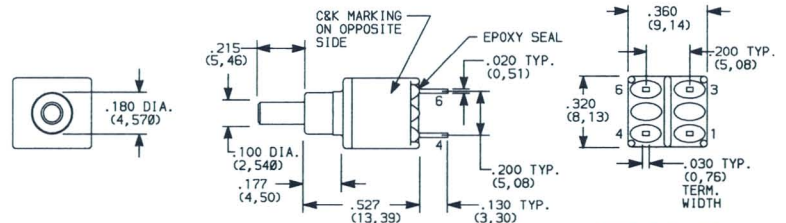
Part No. Shown: EP11SD1CBE



TERM. NOS. FOR REFERENCE ONLY

SPDT

Part No. Shown: EP12SD1CBE



TERM. NOS. FOR REFERENCE ONLY

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).

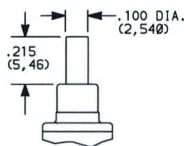
EP21 model not available with FP plunger option.



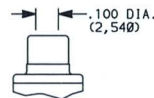
*Process sealed—withstands soldering and cleaning processes.

PLUNGER

S (STD.)



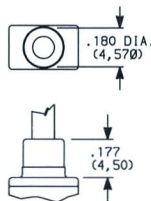
FP FLUSH PLUNGER



Not available on EP21 model.

BUSHING

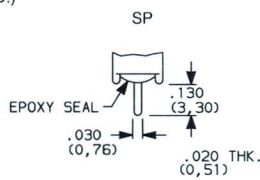
D1 (STD.)



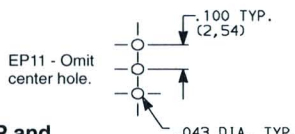
Internal actuator o-ring std.

TERMINATIONS

C (STD.)



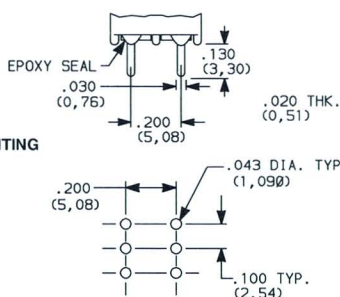
P.C. MOUNTING



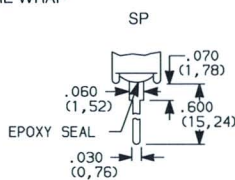
SP and DP

B contact material std.

DP



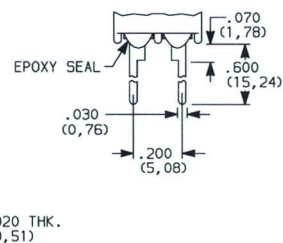
W WIRE WRAP



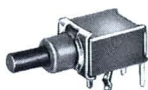
SP and DP

B contact material std.

DP

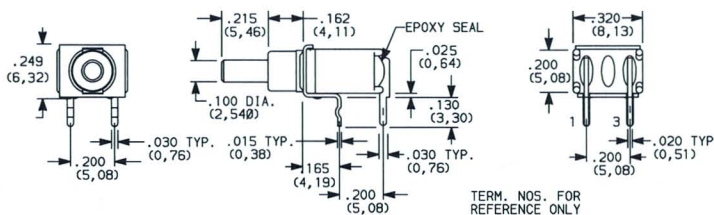


A



**SPST
EP11 MODEL ONLY**

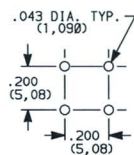
B contact material std.



TERM. NOS. FOR REFERENCE ONLY

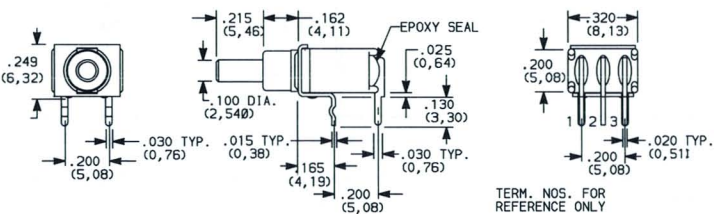
Part No. Shown: EP11SD1ABE

P.C. MOUNTING



**SPDT
EP12 MODEL ONLY**

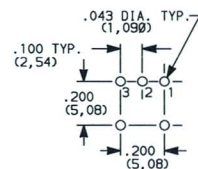
B contact material std.



TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: EP12SD1ABE

P.C. MOUNTING

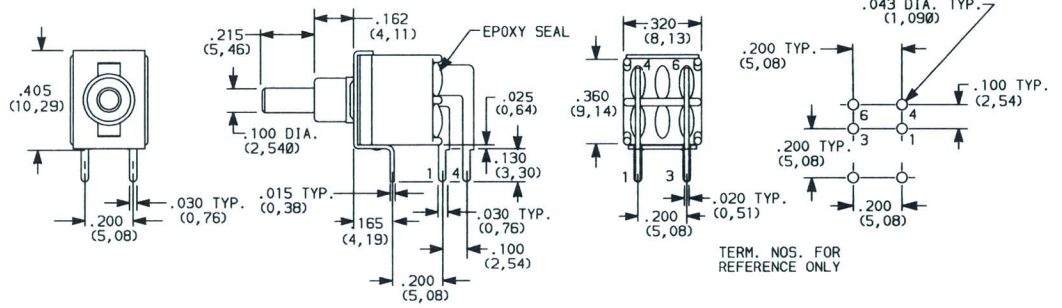
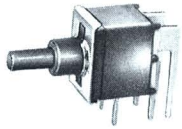




*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

A

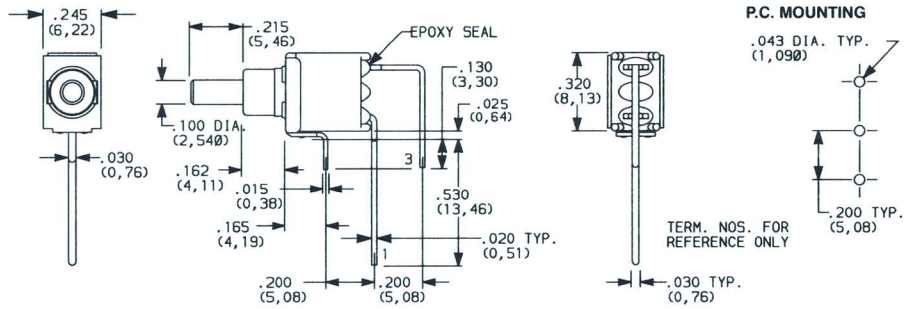
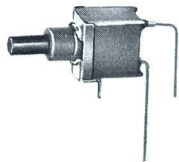


DPST

B contact material std.

Part No. Shown: EP21SD1ABE

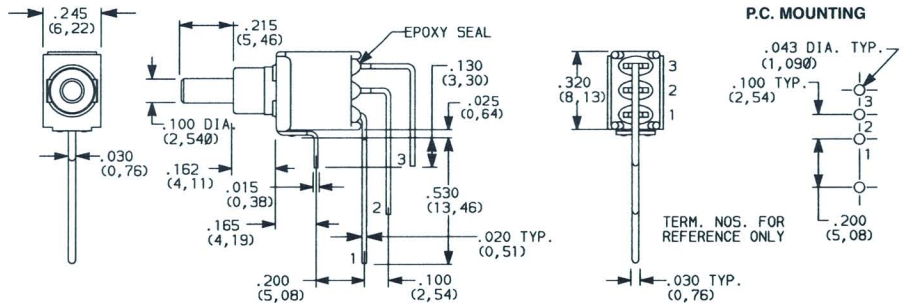
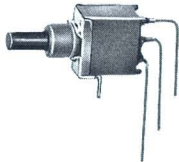
AV



SPST EP11 MODEL ONLY

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

Part No. Shown: EP11SD1AVBE

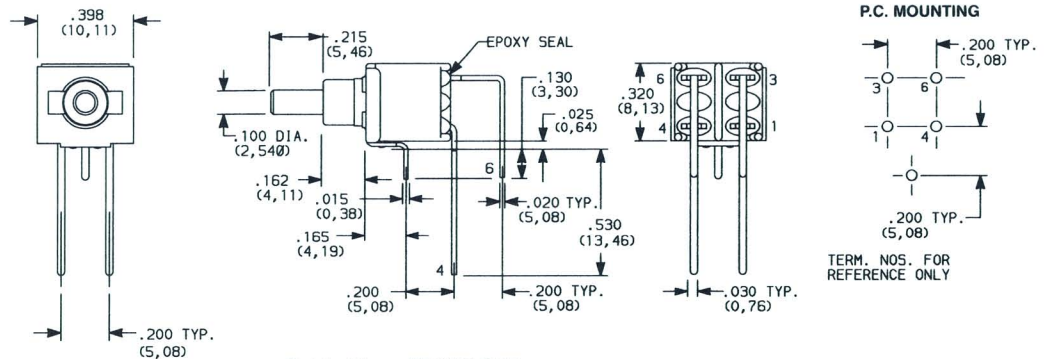
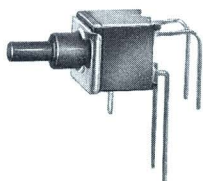


SPDT EP12 MODEL ONLY

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



*Process sealed—withstands soldering and cleaning processes.

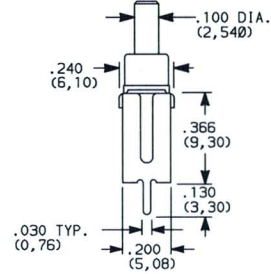
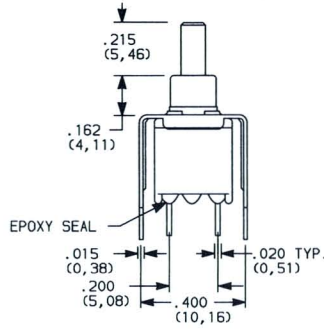
TERMINATIONS

V3

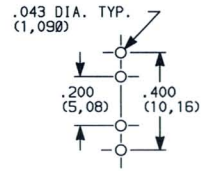
V31 SNAP-IN **NEW**



SPST
EP11 MODELS ONLY



P.C. MOUNTING



V31 SNAP-IN

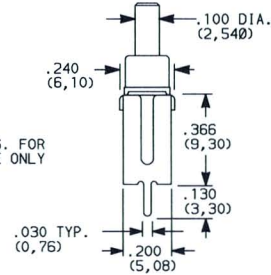
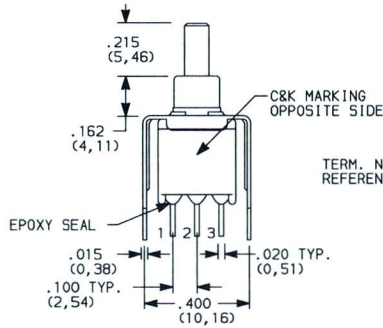
B contact material std.

Part No. Shown: EP11SD1V3BE

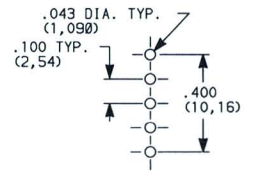
D



SPDT
EP12 MODELS ONLY



P.C. MOUNTING



V31 SNAP-IN

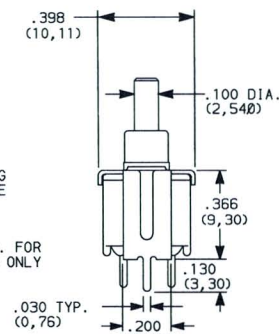
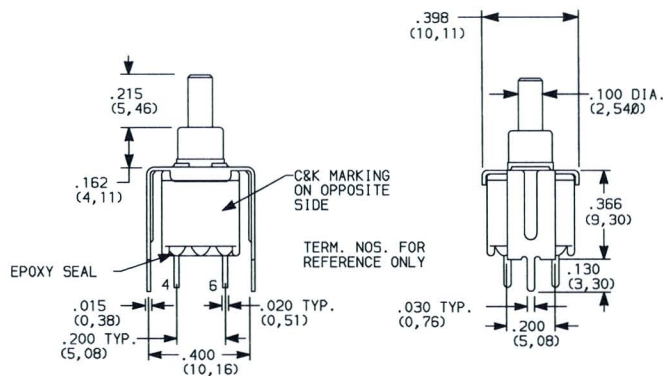
B contact material std.

Part No. Shown: EP12SD1V3BE

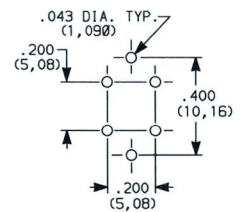
V3



DPST



P.C. MOUNTING



B contact material std.

Part No. Shown: EP21SD1V3BE

CONTACT MATERIAL

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

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.

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.

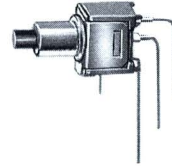
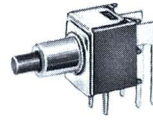
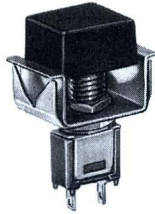
SPECIFICATIONS

- 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: 10⁹ 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.

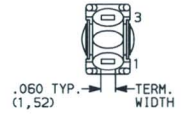
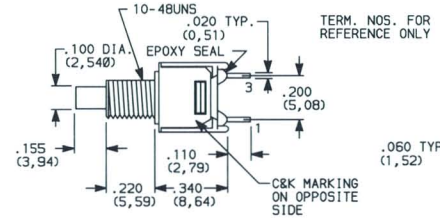
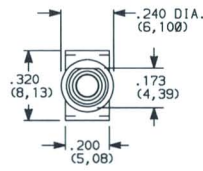
Easy Build-A-Switch:

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

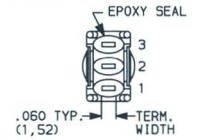
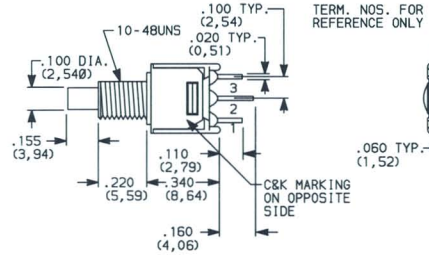
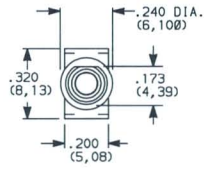
SWITCH FUNCTION	ACTUATOR OR BUSHING	TERMINATIONS	CONTACT MATERIAL	SEAL	CAP COLOR	FRAME COLOR
			Silver	Epoxy 	Black	Black
TP11 TP12 TP21	J80 J81 J82 SH SH8 SH9 LT LT9 MS9	A AV C V3 W Z	B G K L M Q	E	(NONE) 1 2 3 4 5 6 7 8 9	(NONE) 1 2 3 4 5 6 7 8 9

SWITCHES WITH STANDARD OPTIONS



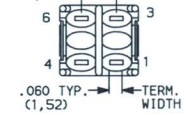
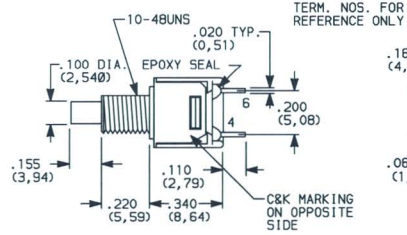
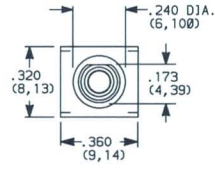
SPST

Part No. Shown: TP11SHZQE



SPDT

Part No. Shown: TP12SHZQE



DPST

Part No. Shown: TP21SHZQE

SWITCH FUNCTION

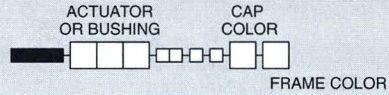
NO. POLES	MODEL* NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	TP11	OFF	MOM.	OPEN	1-3	SPST
	TP12	ON	MOM.	2-1	2-3	SPDT
DP	TP21	OFF	MOM.	OPEN	1-3,4-6	DPST

MOM. = MOMENTARY

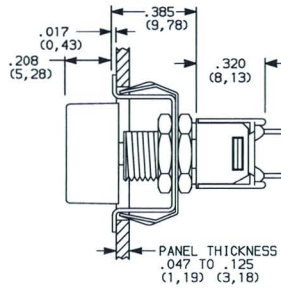
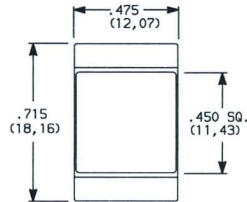
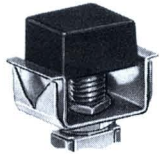
* All models when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.



ACTUATORS — SNAP-IN FRONT MOUNT

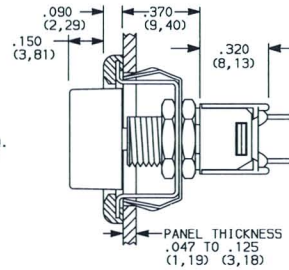
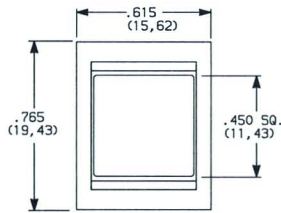
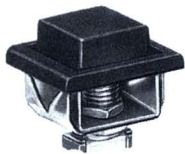


J80

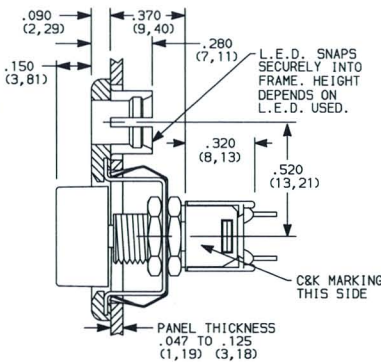
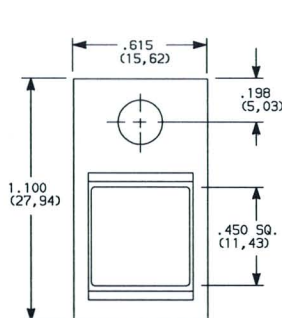
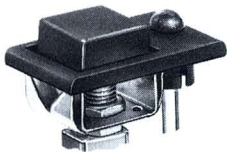


No frame color choice required.

J81



J82



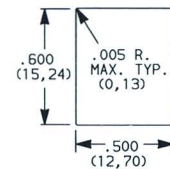
CAP AND FRAME COLORS

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

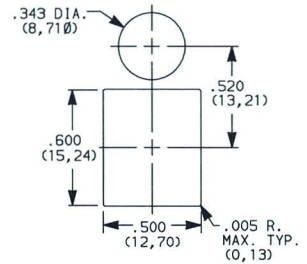
Select cap color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

Available with Z, C, or W terminations.

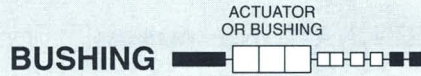
PANEL MOUNTING — J80, J81



PANEL MOUNTING — J82



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



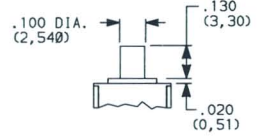
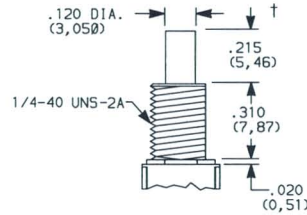
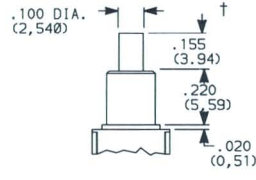
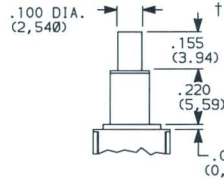
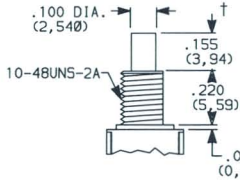
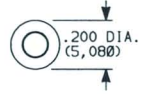
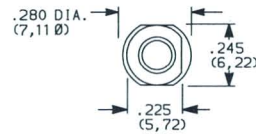
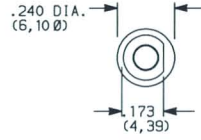
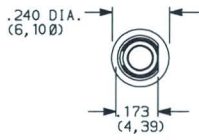
SH

SH9 UNTHREADED

SH8 UNTHREADED

LT LT9 UNTHREADED

MS9



Standard with Z, C, W terminations.

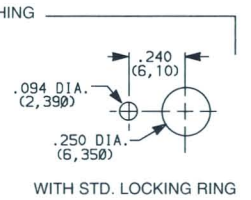
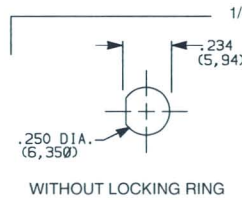
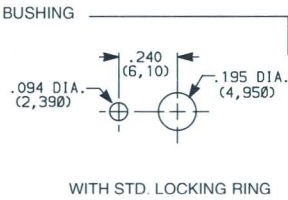
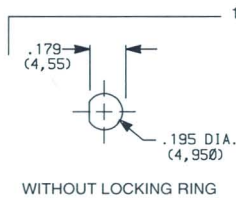
Standard with A, AV, V3 terminations.

Not available with Z terminations.

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

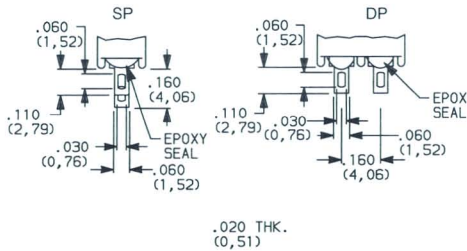
PANEL MOUNTING

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.



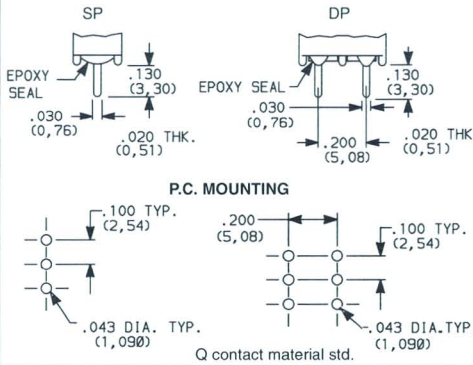
TERMINATIONS

Z (STD.)



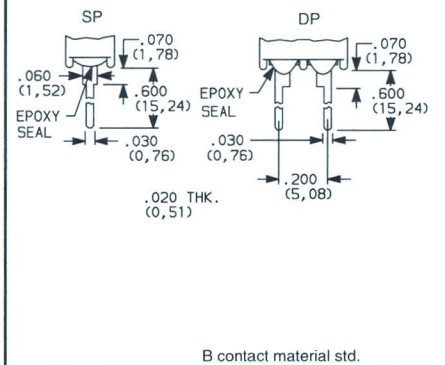
Q contact material std.
Not avail. with MS9 bushing or K, L, or M contact mat'l.

C



P.C. MOUNTING

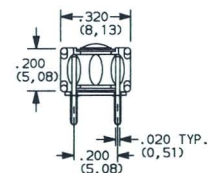
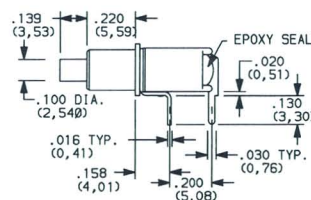
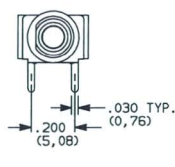
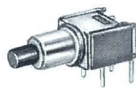
W WIRE WRAP



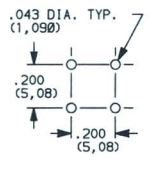
B contact material std.

A

SPST TP11 MODEL ONLY



P.C. MOUNTING



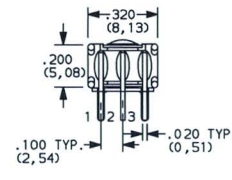
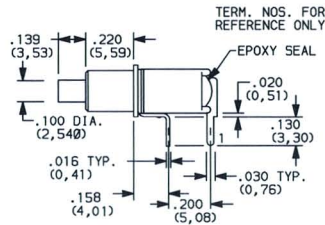
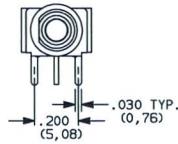
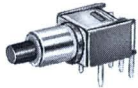
B contact material std.

Part No. Shown: TP11SH9ABE

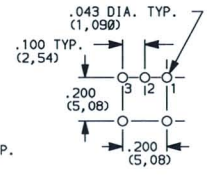


TERMINATIONS

A



P.C. MOUNTING

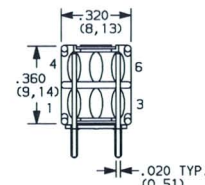
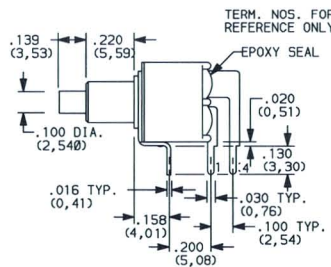
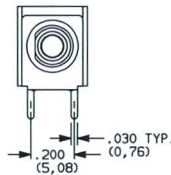
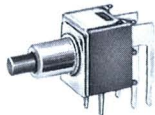


SPDT
TP12 MODEL ONLY

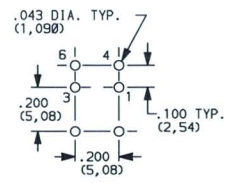
B contact material std.

Part No. Shown: TP12SH9ABE

A



P.C. MOUNTING

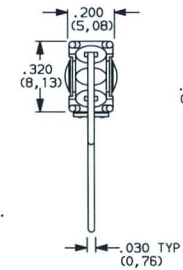
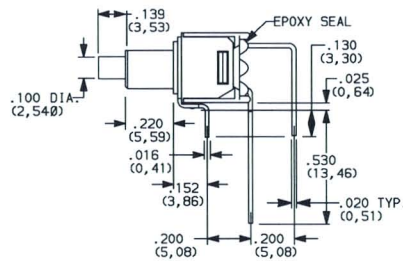
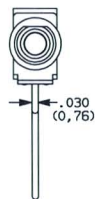


DPST

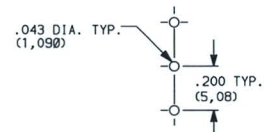
B contact material std.

Part No. Shown: TP21SH9ABE

AV



P.C. MOUNTING

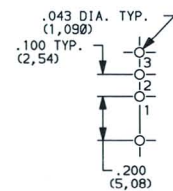
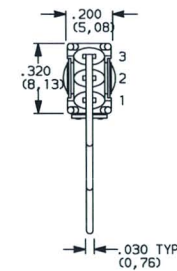
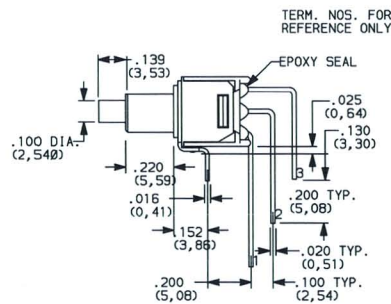
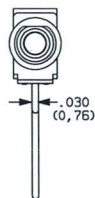


SPST
TP11 MODEL ONLY

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

Part No. Shown: TP11SH9AVBE

P.C. MOUNTING



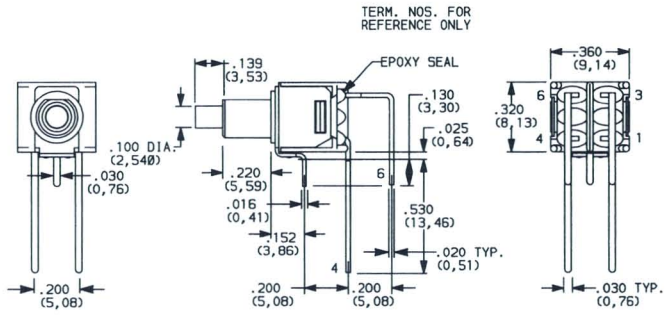
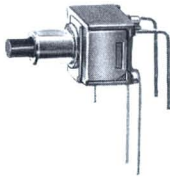
SPDT
TP12 MODEL ONLY

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

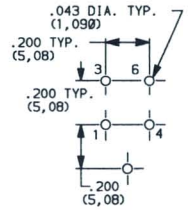
Part No. Shown: TP12SH9AVBE

TERMINATIONS

AV



P.C. MOUNTING

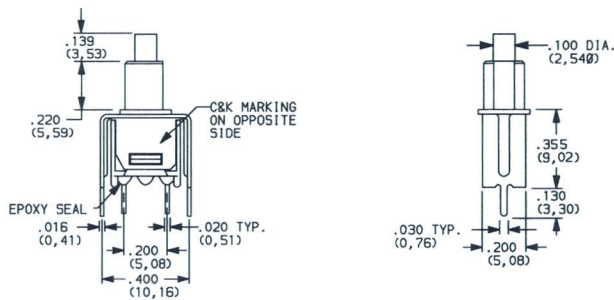


DPST

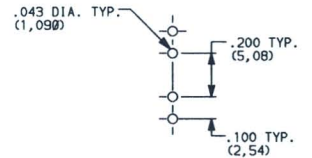
Term. bend radii and lead-in mfg. option.
B contact material std.

Part No. Shown: TP21SH9AVBE

V3



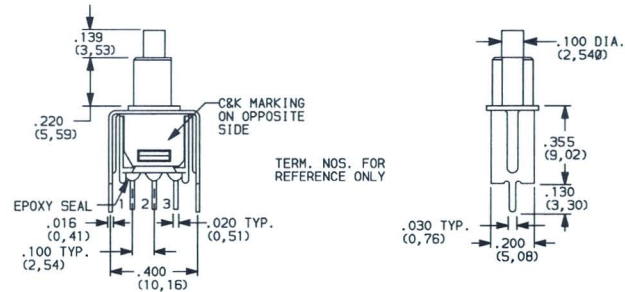
P.C. MOUNTING



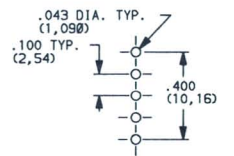
SPST
TP11 MODEL ONLY

B contact material std.

Part No. Shown: TP11SH9V3BE



P.C. MOUNTING

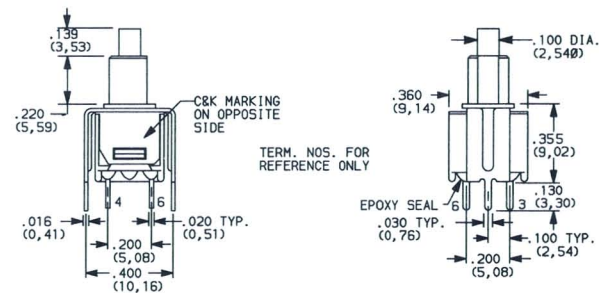


SPDT
TP12 MODEL ONLY

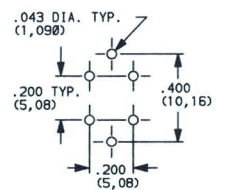
B contact material std.

Part No. Shown: TP12SH9V3BE

V3



P.C. MOUNTING



DPST

B contact material std.

Part No. Shown: TP21SH9V3BE



CONTACT MATERIAL

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

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 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.

D

SEAL



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

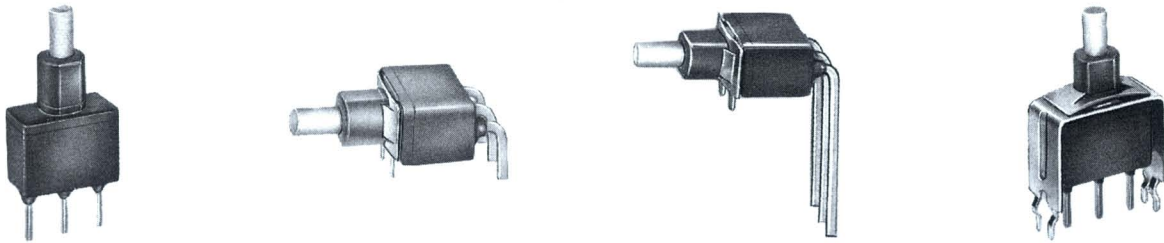
- CONTACT RATING: 1 AMP @ 120 V AC or 28 V DC (Q contact material).
- ELECTRICAL LIFE: TP11, TP21 MODELS: 60,000 make-and-break cycles at full load.
TP12 MODELS: 30,000 cycles.
- CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
- INSULATION RESISTANCE: 10⁹ 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).
- 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.

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

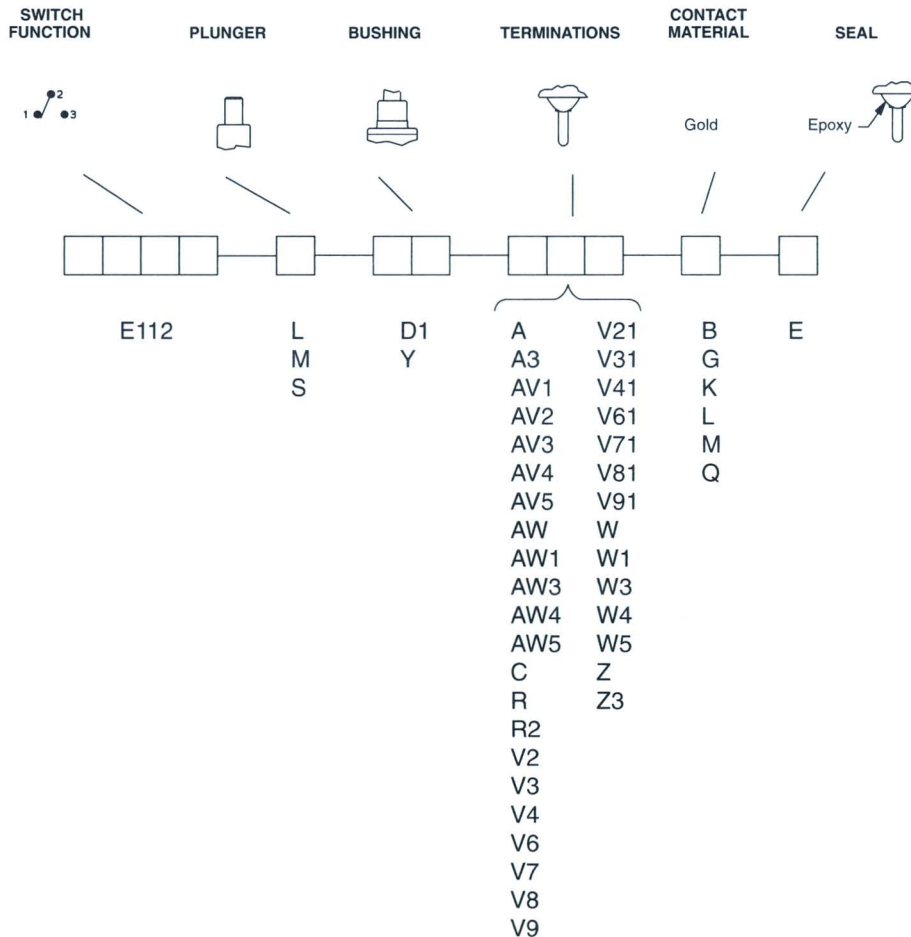
*Process sealed—withstands soldering and cleaning processes.



models available, see page D-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.



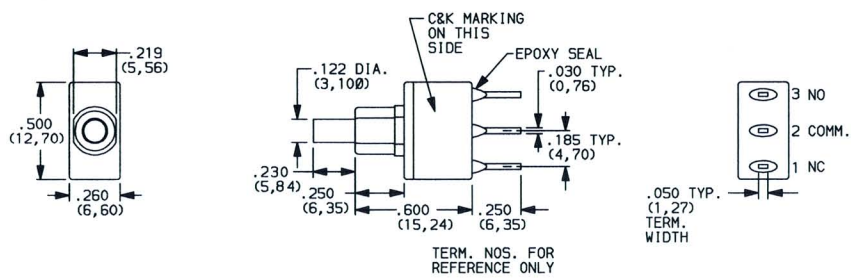


E010 Series

Sealed* Momentary Pushbutton Switches

*Process sealed—withstands soldering and cleaning processes.

SWITCH WITH STANDARD OPTIONS



SPDT

Part No. Shown: E112SD1CQE

SWITCH FUNCTION

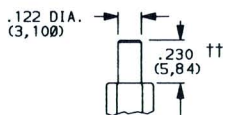
NO. POLES	MODEL† NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	E112	ON	MOM.	2-1	2-3	SPDT

MOM. = MOMENTARY

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

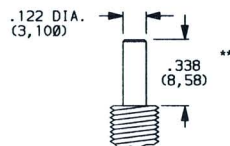
PLUNGER

S (STD.)



Standard with D1 bushing (as shown).
†† Subtract .100 (2,54) from plunger length when ordered with Y bushing.

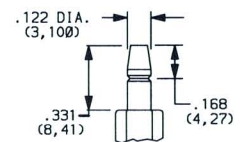
L



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



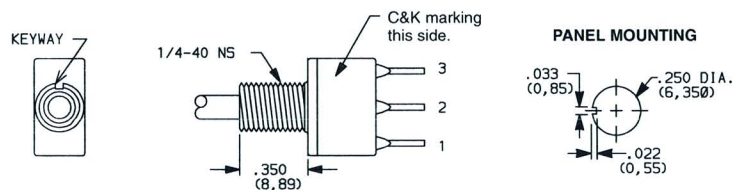
BUSHING

D1 (STD.)



S plunger standard with D1 bushing.

Y



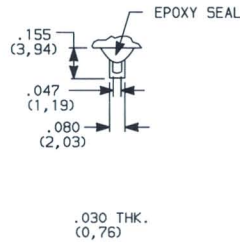
L plunger standard with Y bushing.
Available only with Z, C, Z3, W-W5 terminations.
Hardware: One dress nut P/N 780701201, one hex nut and lockwasher supplied standard.

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

*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

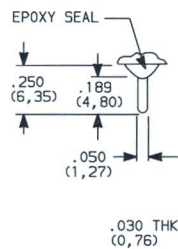
Z



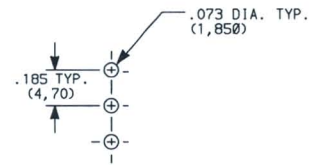
Q contact material std.
Not avail. with K, L, or M contact material.

SPDT

C (STD.)



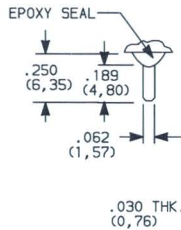
P.C. MOUNTING



SPDT

Q contact material std.

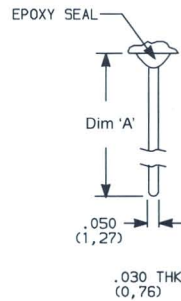
Z3 QUICK CONNECT



Q contact material std.
Mating quick connect available, order P/N 53010000.

SPDT

W-W1-W3-W4-W5 WIRE WRAP

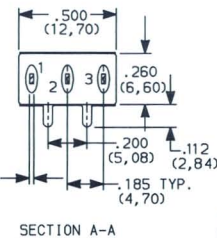
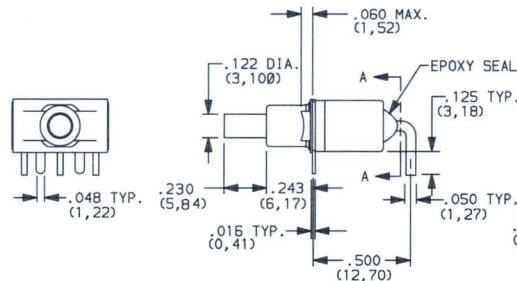


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

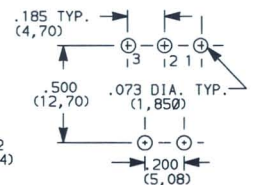
SPDT

B contact material std.

A



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

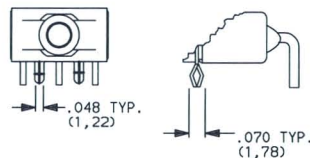
Part No. Shown: E112SD1ABE



A

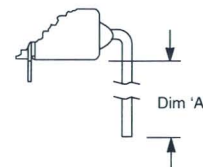
SPDT

A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED



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

Term. bend radii and lead-in mfg. option.
B contact material std.
Available with D1 bushing only.



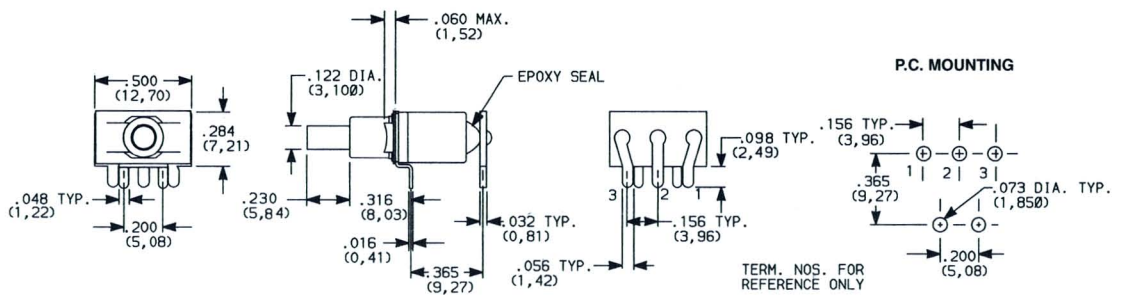
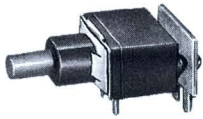
E010 Series

Sealed* Momentary Pushbutton Switches

*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

R

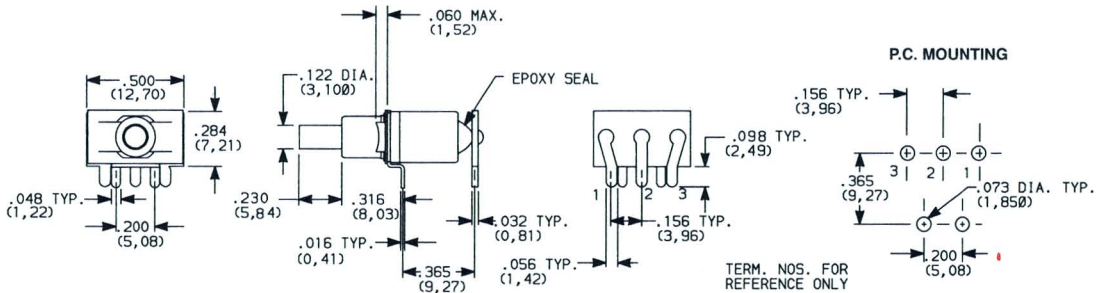
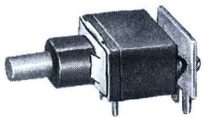


SPDT

Available with D1 bushing and B contact mat'l only.

Part No. Shown: E112SD1RBE

R2

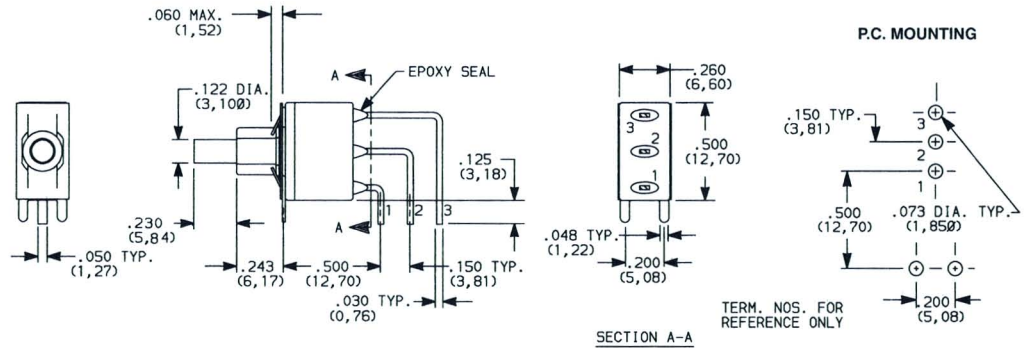


SPDT

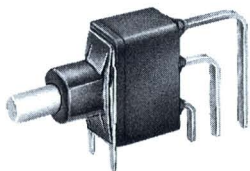
Available with D1 bushing and B contact mat'l only.

Part No. Shown: E112SD1R2BE

AV2



Part No. Shown: E112SD1AV2BE

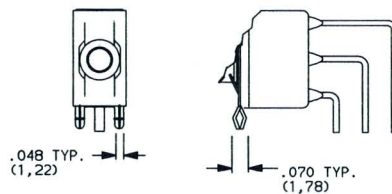


AV2

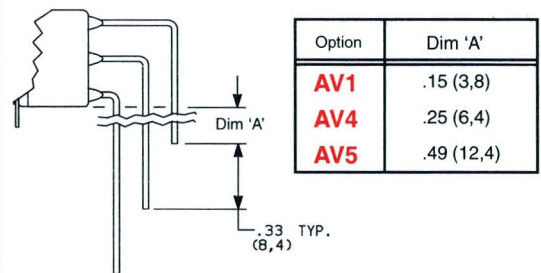
SPDT

Term. bend radii and lead-in mfg. option. B contact material std. Available with D1 bushing only.

AV3 SNAP-IN



AV1-AV4-AV5 EXTENDED





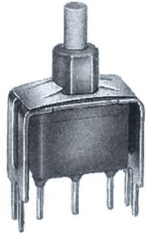
E010 Series

Sealed* Momentary Pushbutton Switches

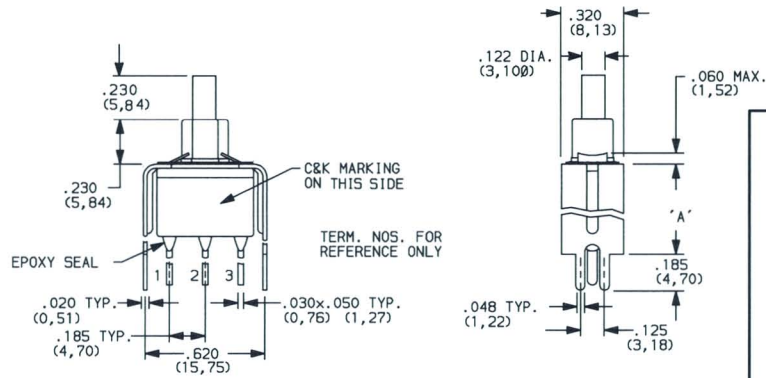
*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS

V3-V4-V9 REPLACES V30-V40-V90

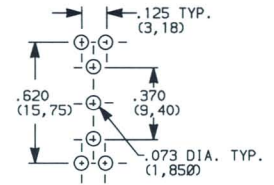


V3



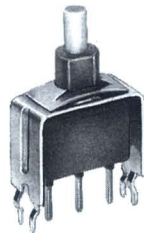
Part No. Shown: E112SD1V_BE

P.C. MOUNTING

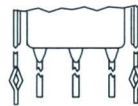


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN



V31

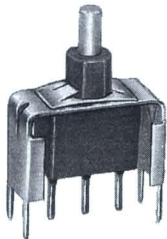


SNAP-IN DESIGN RETAINS SWITCH.

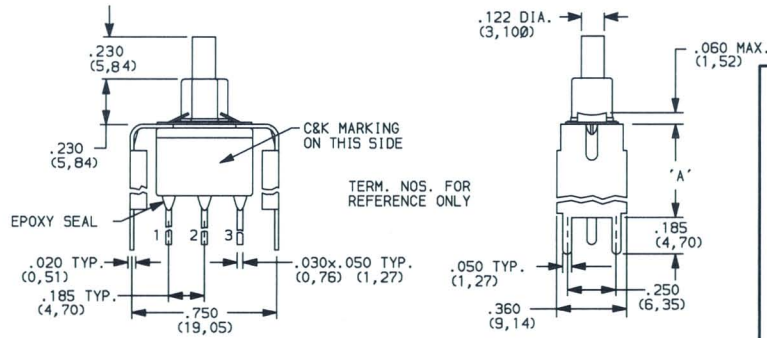
SPDT

B contact material std. Available with D1 bushing only.

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

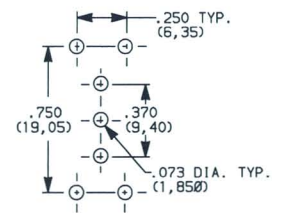


V6



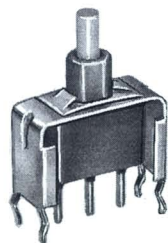
Part No. Shown: E112SD1V_BE

P.C. MOUNTING

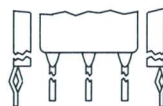


Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	4 AMPS @ 125 V AC OR 28 V DC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 4 AMPS @ 125 V AC OR 28 V DC.
L		TIN-LEAD ⁶		

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.

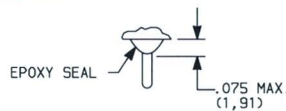
B contact material standard with all terminations except Z, C, Z3.
 B contact material must be ordered with R, R2 terminations.
 Q contact materials standard with Z, C, Z3 terminations.
 K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material.
 See pages D-18 and VIII.

D

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: 10⁹ 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

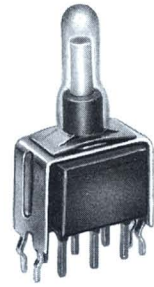
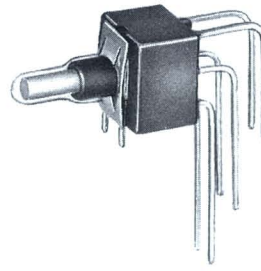
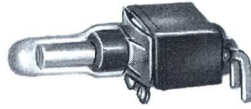
- CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
- PLUNGER: Glass filled nylon or glass filled polyester (UL 94V-0), with internal o-ring seal standard.
- SWITCH SUPPORT: Brass or steel, tin plated.
- SWITCH SUPPORT RETAINER: Stainless steel.
- END CONTACTS: Coin 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.





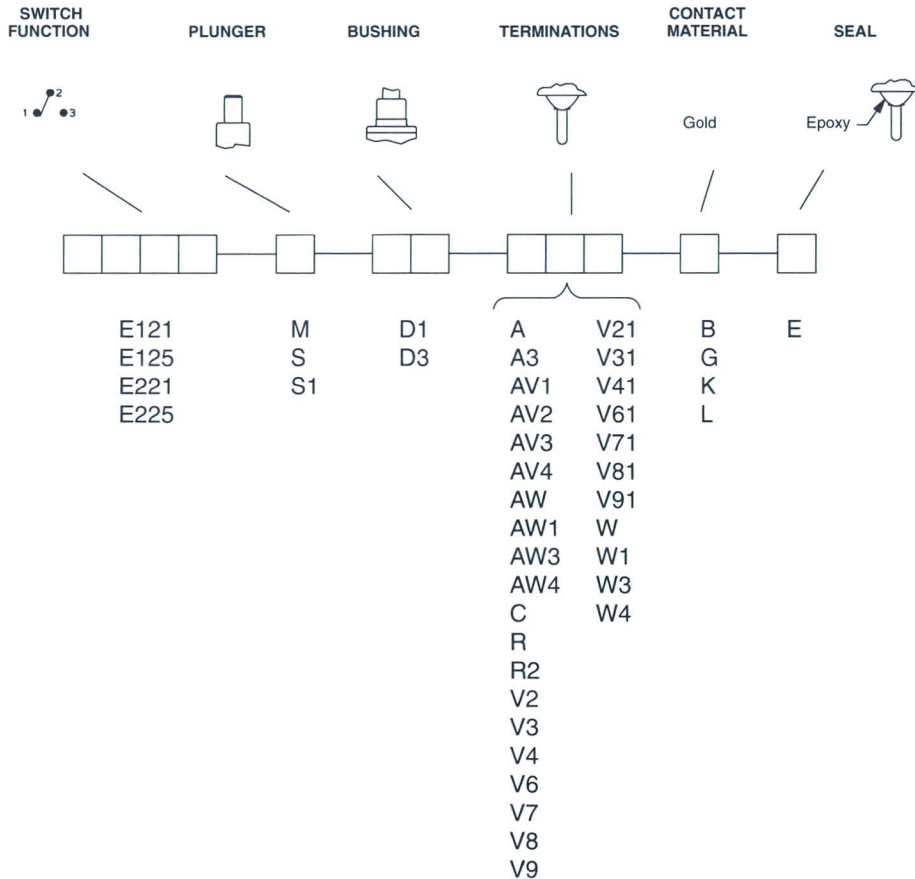
*Process sealed—withstands soldering and cleaning processes.



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.



D

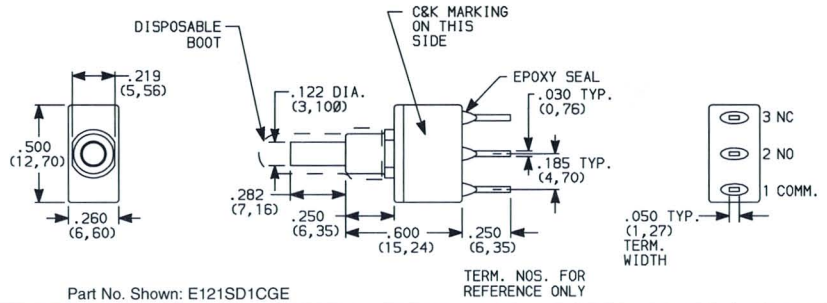


E020 Series

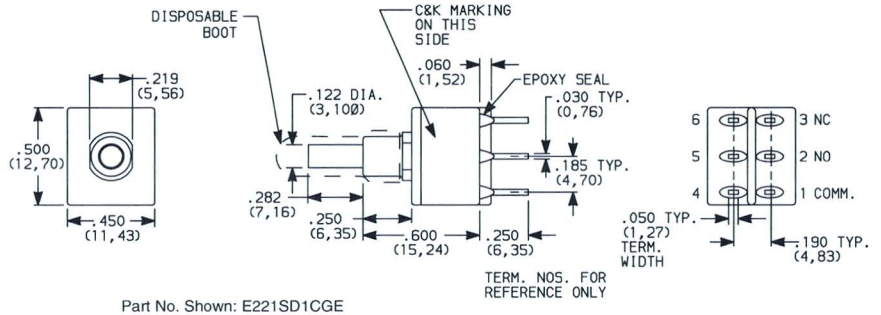
Sealed* Snap-Acting Momentary Pushbutton Switches

*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.			

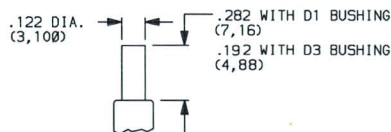
MOM. = MOMENTARY

† E121, E221 models with all options (except R, R2) when ordered with G or L contact material. See AGENCY APPROVALS, page VIII.

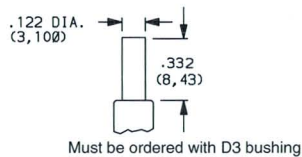
EX25 models must be ordered with B or K contact material. EX21 models must be ordered with G or L contact material.

PLUNGER

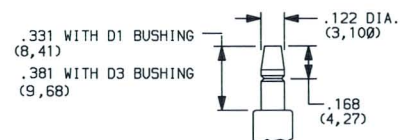
S (STD.)



S1



M SNAP-FITTING



Caps available for all plunger options, see catalog section H.



COMPONENTS, INC.

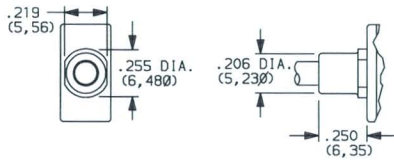
15 Riverdale Ave. Newton, MA 02158-1082

Tel: (617) 964-6400, Telex: 92-2544, Fax: (617) 527-3062

*Process sealed—withstands soldering and cleaning processes.

BUSHING

D1 (STD.)



Not available with S1 actuator.

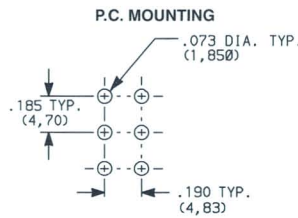
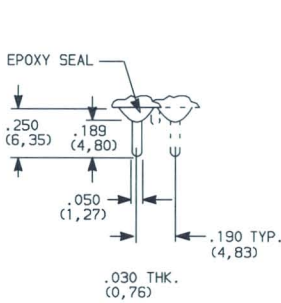
D3



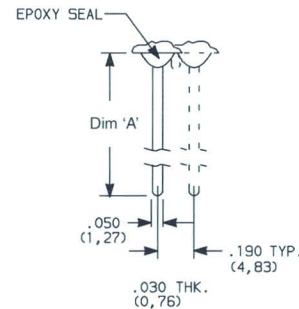
Disposable splashproof vinyl boot over actuator and bushing supplied std., see page D-30.

TERMINATIONS

C (STD.)



W-W1-W3-W4 WIRE WRAP

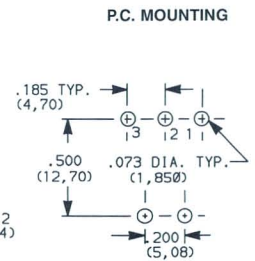
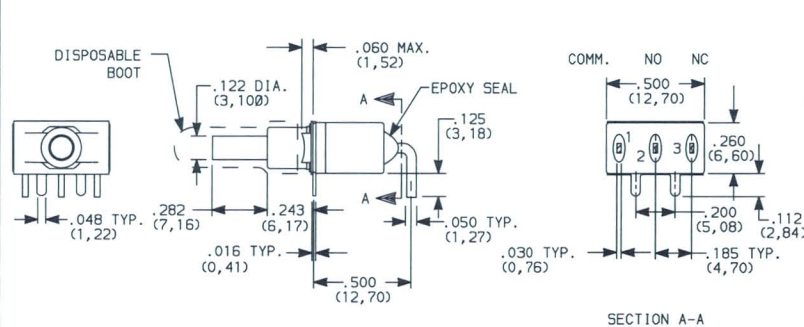


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)

SPDT and DPDT

SPDT and DPDT

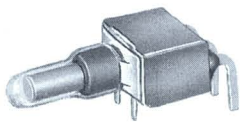
A



TERM. NOS. FOR REFERENCE ONLY

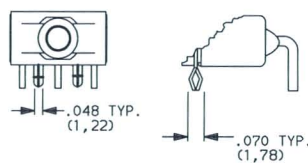
SECTION A-A

Part No. Shown: E121SD1AGE



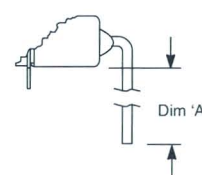
A

A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4 EXTENDED



Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)

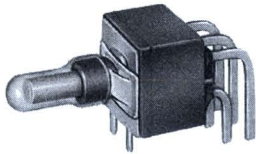
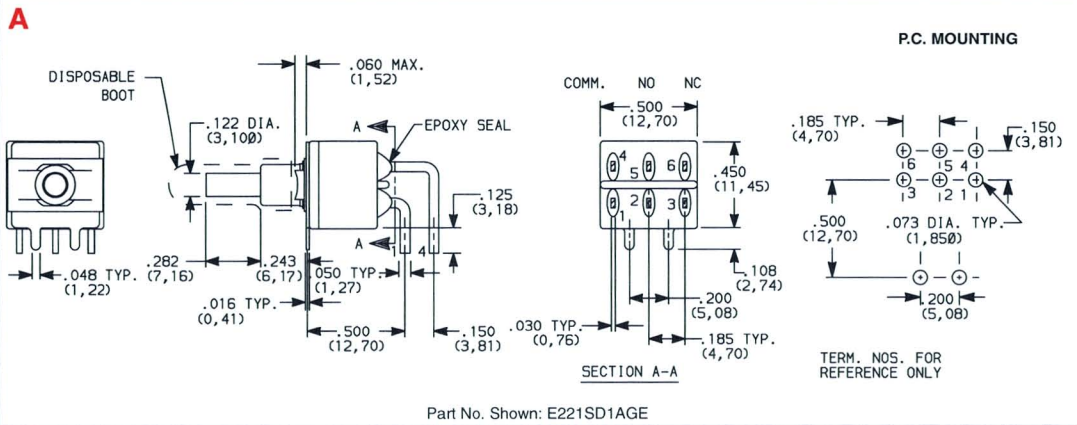
SPDT

Term. bend radii and lead-in mfg. option.

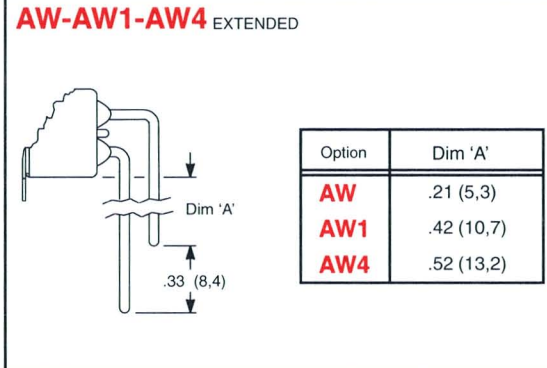
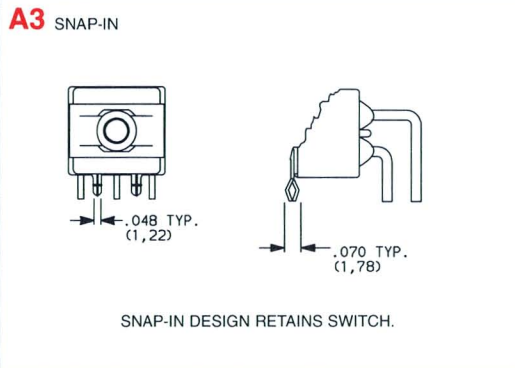


*Process sealed—withstands soldering and cleaning processes.

TERMINATIONS



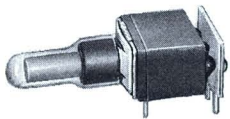
A



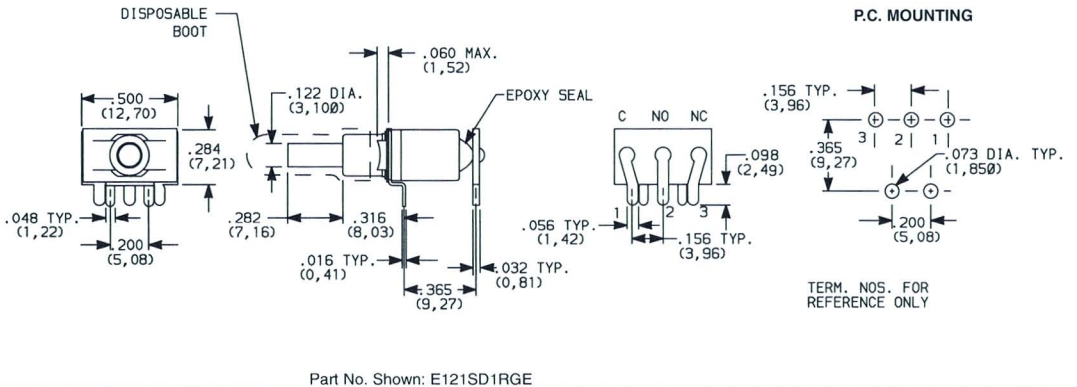
DPDT

Term. bend radii and lead-in mfg. option.

R

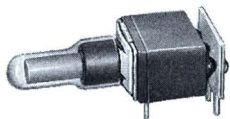


SPDT

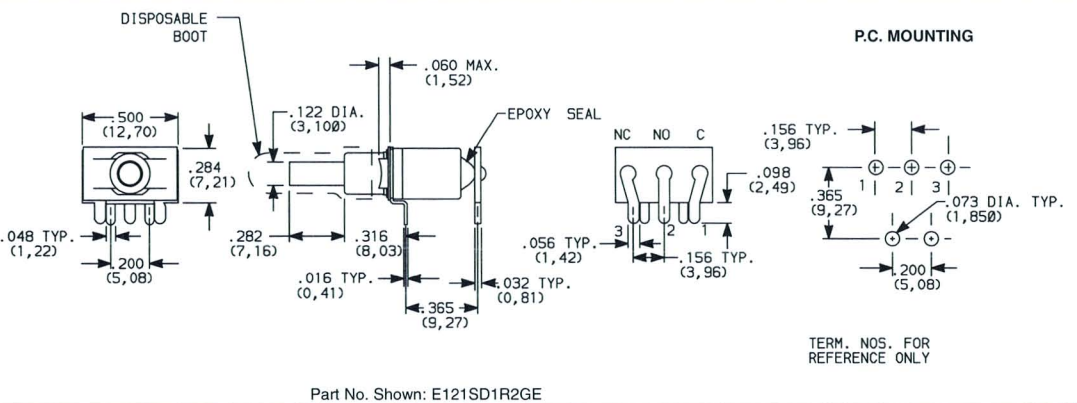


R terminations not UL, CSA approved.

R2



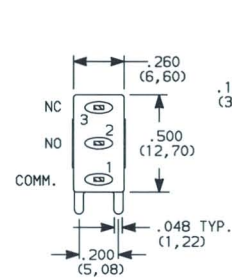
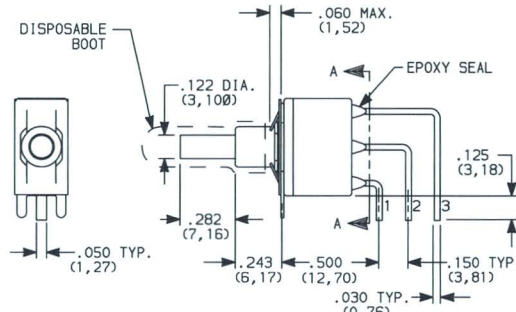
SPDT



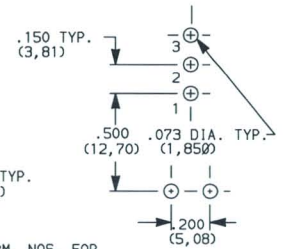
R2 terminations not UL, CSA approved.

TERMINATIONS

AV2

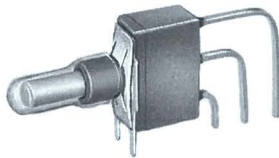


P.C. MOUNTING



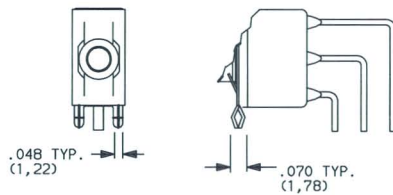
TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: E121SD1AV2GE



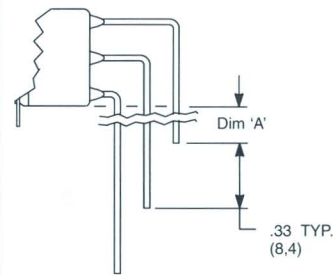
AV2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

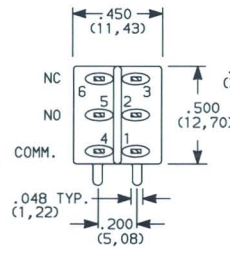
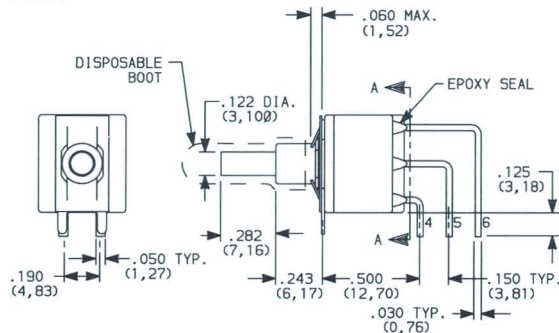


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)

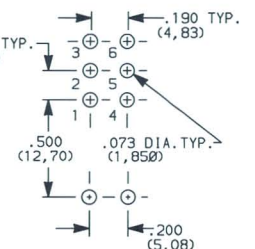
SPDT

Term. bend radii and lead-in mfg. option.

AV2

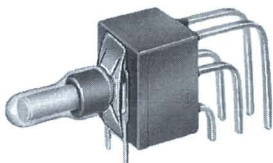


P.C. MOUNTING



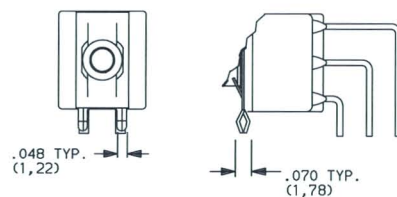
TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: E221SD1AV2GE



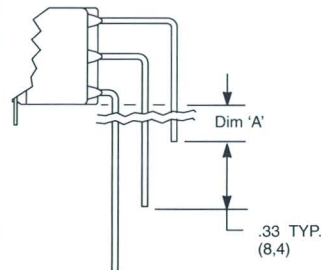
AV2

AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)

DPDT

Term. bend radii and lead-in mfg. option.



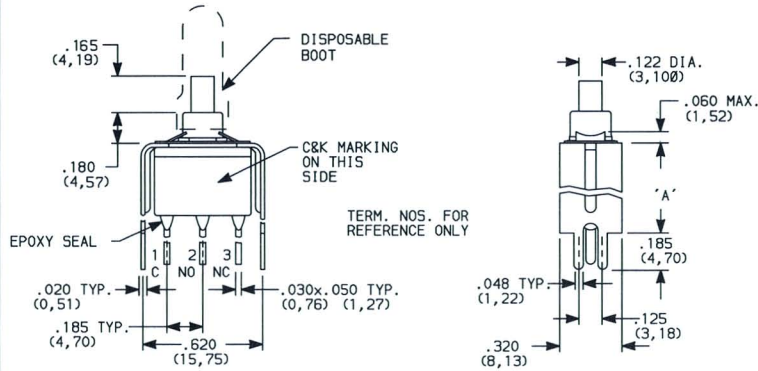
E020 Series

Sealed* Snap-Acting Momentary Pushbutton Switches

*Process sealed—withstands soldering and cleaning processes.

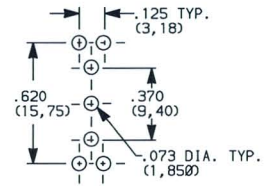
TERMINATIONS

V3-V4-V9

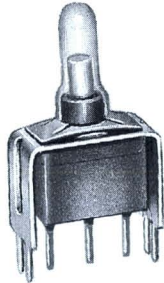


Part No. Shown: E121SD3V__GE

P.C. MOUNTING

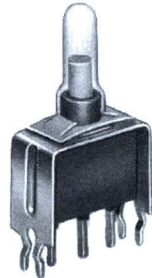


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

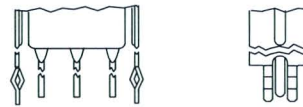


V3

V31-V41-V91 SNAP-IN



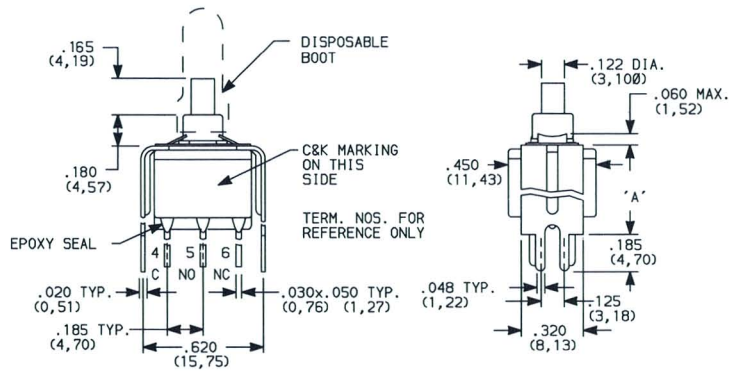
V31



SNAP-IN DESIGN RETAINS SWITCH.

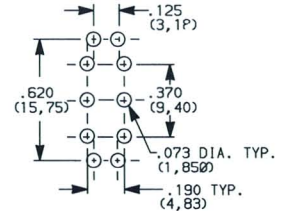
SPDT

V3-V4-V9



Part No. Shown: E221SD3V__GE

P.C. MOUNTING

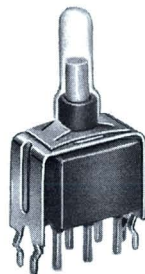


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

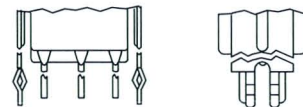


V3

V31-V41-V91 SNAP-IN



V31

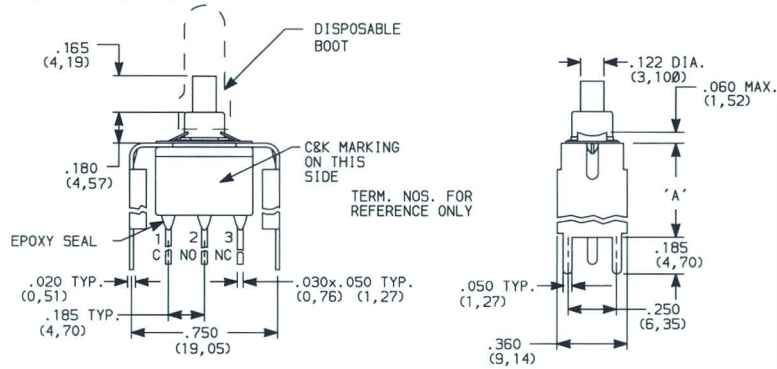


SNAP-IN DESIGN RETAINS SWITCH.

DPDT

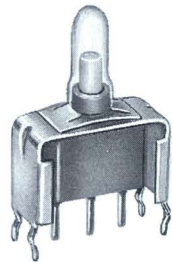
TERMINATIONS

V2-V6-V7-V8

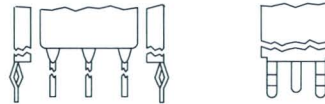


Part No. Shown: E121SD3V__GE

V21-V61-V71-V81 SNAP-IN

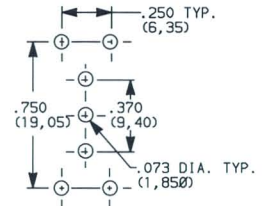


V61



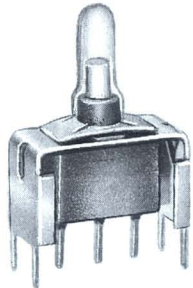
SNAP-IN DESIGN RETAINS SWITCH.

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)

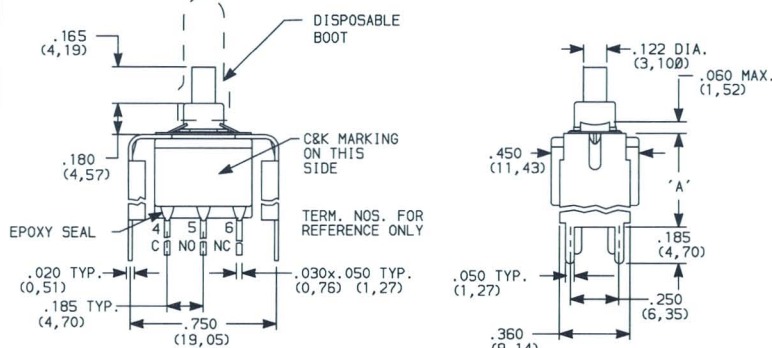
D



V6

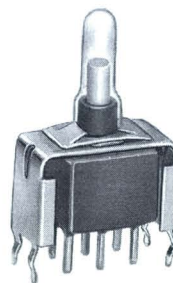
SPDT

V2-V6-V7-V8

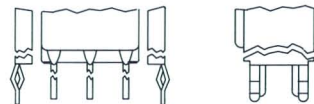


Part No. Shown: E221SD3V__GE

V21-V61-V71-V81 SNAP-IN

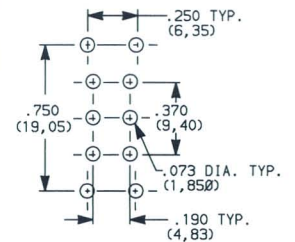


V61

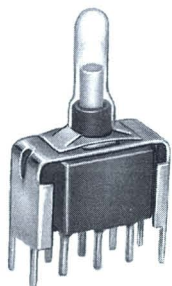


SNAP-IN DESIGN RETAINS SWITCH.

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

DPDT



*Process sealed—withstands soldering and cleaning processes.



CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	EX25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁴		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	EX21 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
L		TIN-LEAD ⁴		

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

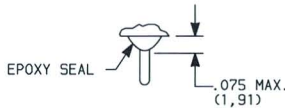
- ¹ ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ TERMINALS: Copper alloy, with tin-lead alloy over nickel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

B or K contact material must be ordered with EX25 models.
G or L contact material must be ordered with EX21 models.

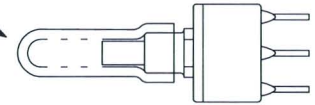
E121, E221 model numbers   with all options when ordered with mandatory G or L contact material. See pages D-24 and VIII.

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.

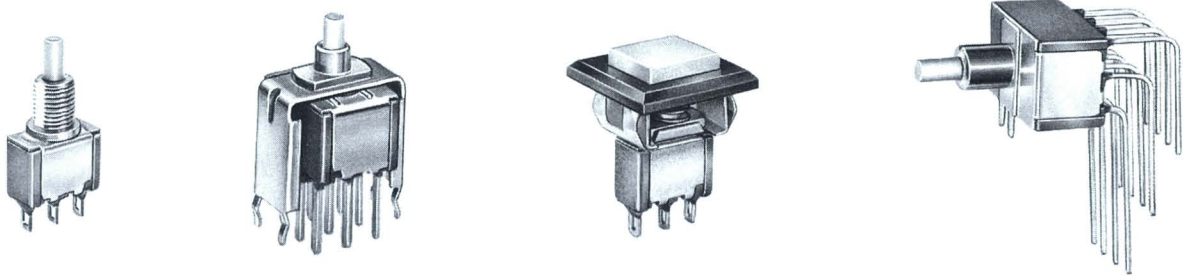
SPECIFICATIONS

- 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: 10⁹ 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.



UL **CS**® models available, see page D-33.

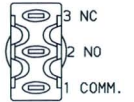
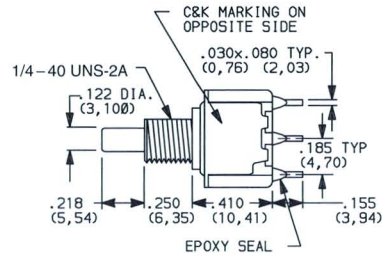
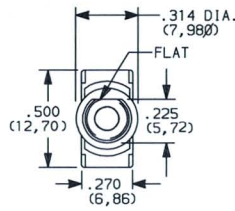
Easy Build-A-Switch:

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		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					



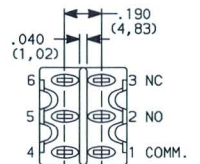
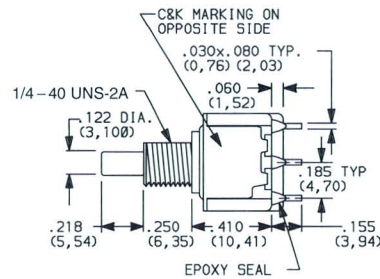
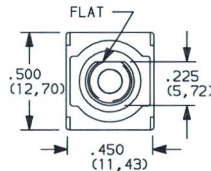
SWITCHES WITH STANDARD OPTIONS



TERM. NOS. FOR REFERENCE ONLY

SPDT

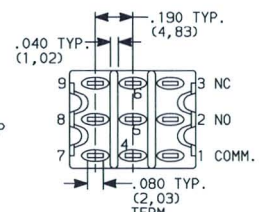
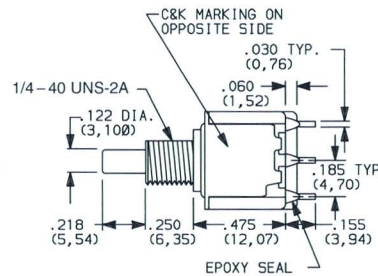
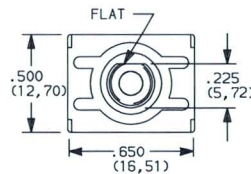
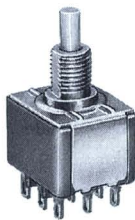
Part No. Shown: 8121SHZGE



TERM. NOS. FOR REFERENCE ONLY

DPDT

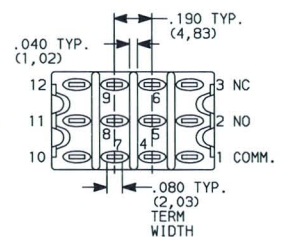
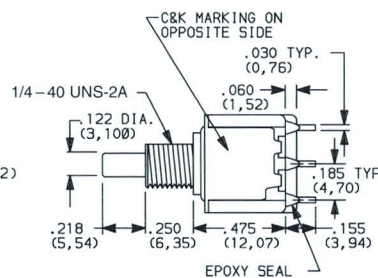
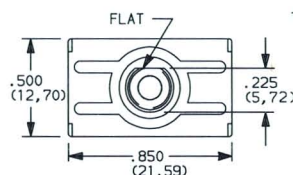
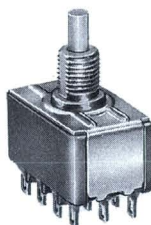
Part No. Shown: 8221SHZGE



TERM. NOS. FOR REFERENCE ONLY

3PDT

Part No. Shown: 8321SHZGE



TERM. NOS. FOR REFERENCE ONLY

4PDT

Part No. Shown: 8421SHZGE

SWITCH FUNCTION

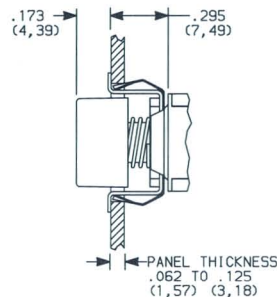
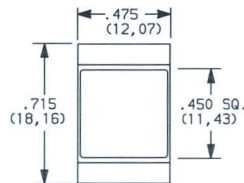
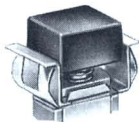
NO. POLES	MODEL NO.	UL/CSA* MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
			POS. 1	POS. 2	POS. 1	POS. 2	
SP	8121	U811	ON	MOM.	1-3	1-2	
	8125		ON	MOM.			
DP	8221	U821	ON	MOM.	1-3,4-6	1-2,4-5	
	8225		ON	MOM.			
3P	8321	U831	ON	MOM.	1-3,4-6,7-9	1-2,4-5,7-8	
	8325		ON	MOM.			
4P	8421	U841	ON	MOM.	1-3,4-6,7-9,10-12	1-2,4-5,7-8,10-11	
	8425		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.

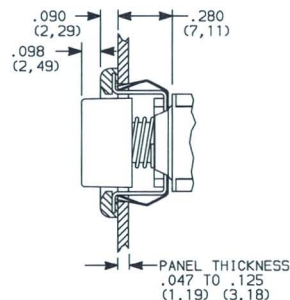
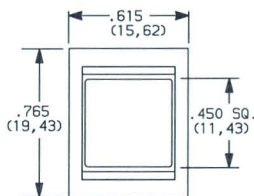
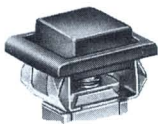
ACTUATORS—SNAP-IN FRONT MOUNT

J80

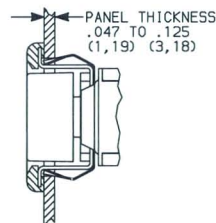
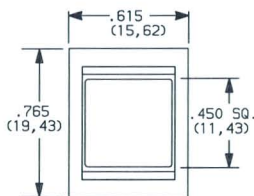


No frame color choice required.

J81 WITH FRAME AND RAISED CAP



J83 WITH FRAME AND FLUSH CAP



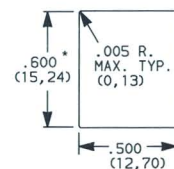
CAP AND FRAME COLORS

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

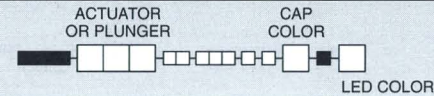
Available with Z, C, Z3, or W-W4 terminations and SPDT and DPDT models only.

PANEL MOUNTING J80 - J81 - J83

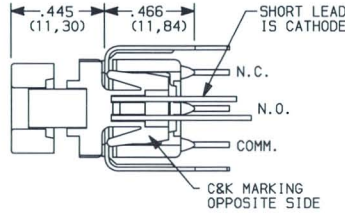
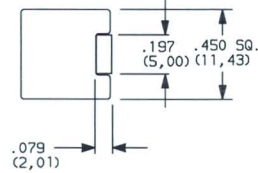
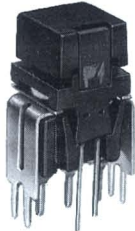


* Increase this dim. to .620/.625 (15, 75/15, 88) for .091/.125 (2,31/3,18) thk. panels.

ACTUATORS—P.C. MOUNT



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

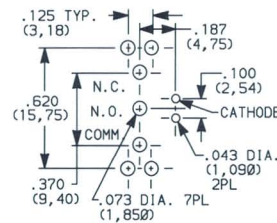
OPTION CODE	LED COLOR
3	RED (std.)
5	YELLOW
6	GREEN

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.

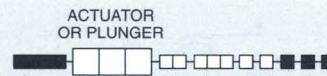
Available with V3 terminations and SPDT models only.

See page IX for LED information.

P.C. MOUNTING



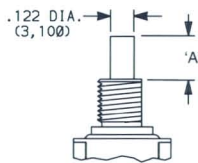
PLUNGER



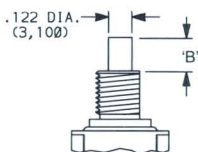
When selecting plunger option, bushing selection must also be made, see next page. No plunger option choice required when any JXX actuator option is selected.

(NONE) NO PLUNGER CHOICE REQUIRED WHEN ANY JXX ACTUATOR OPTION IS SELECTED.

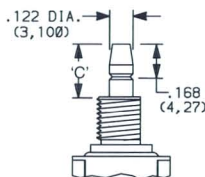
S (STD.)



L



M SNAP-FITTING



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)

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)

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.

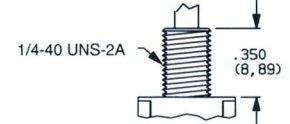
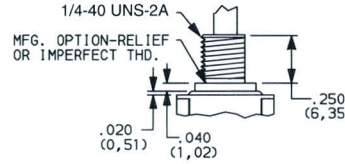
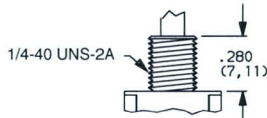
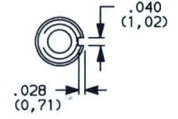
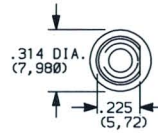
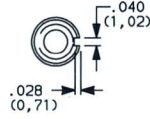
(NONE)

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.

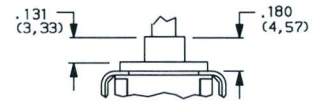
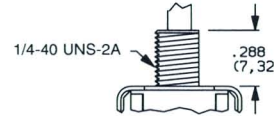
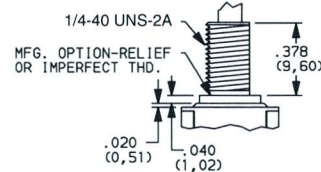
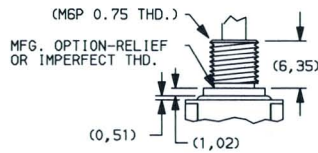
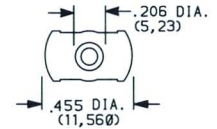
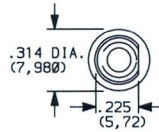
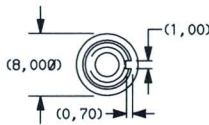
Will withstand 12 in.-lbs. of torque with no distortion.

Y3 METRIC

Y4

D2
D8 UNTHREADED

D3



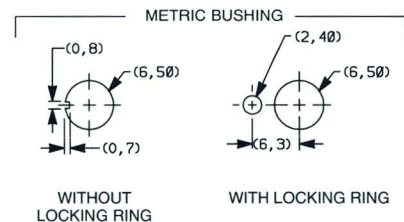
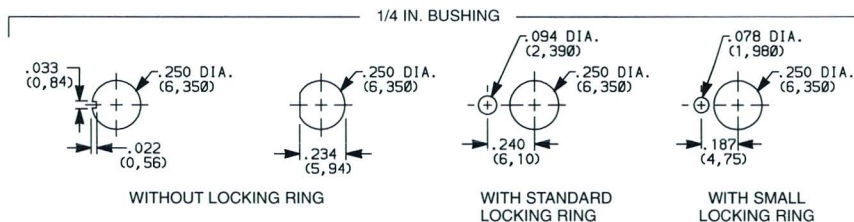
Y3, Y4 bushings not available on single pole models with A-A6, AW-AW4, R, R2 terminations.

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.

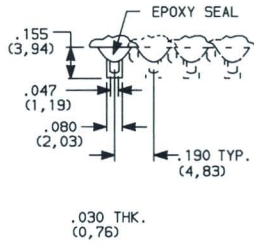
PANEL MOUNTING



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

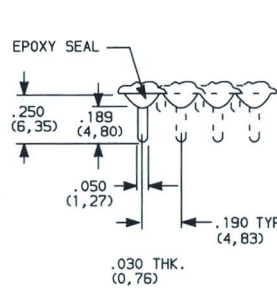
Z (STD.)



SPDT thru 4PDT

Not available with J95 actuator, K or L contact material.

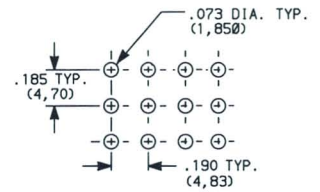
C



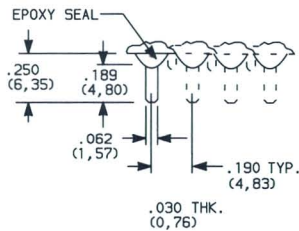
SPDT thru 4PDT

Not available with J95 actuator option.

P.C. MOUNTING



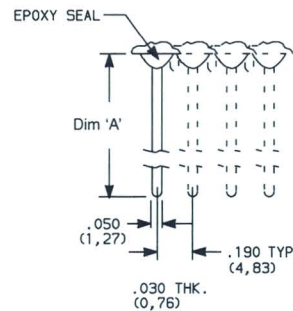
Z3 QUICK CONNECT



SPDT thru 4PDT

Not available with J95 actuator option. Mating quick connector available; order part no. 530100000.

W-W1-W3-W4 WIRE WRAP

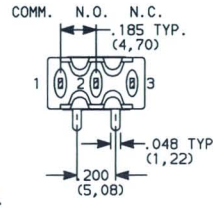
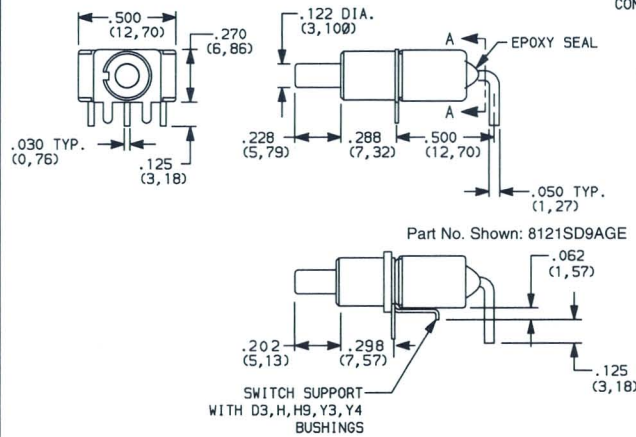


SPDT thru 4PDT

Not available with J95 actuator option.

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

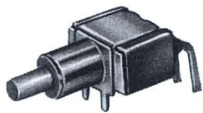
A



P.C. MOUNTING

TERM. NOS. FOR REFERENCE ONLY

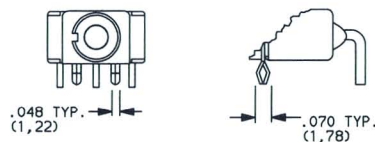
SECTION A-A



A

Part No. Shown: 8121SH9AGE

A3 SNAP-IN

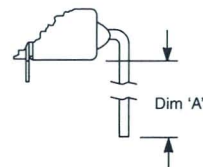


SPDT

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'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)

TERMINATIONS

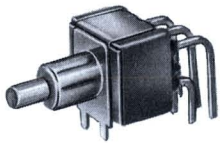
A

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 8221SD9AGE



A

DPDT

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

A3 SNAP-IN

SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4 EXTENDED

Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)

D

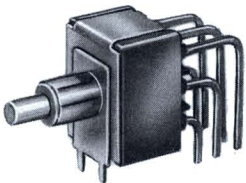
A

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 8321SD9AGE



A

3PDT

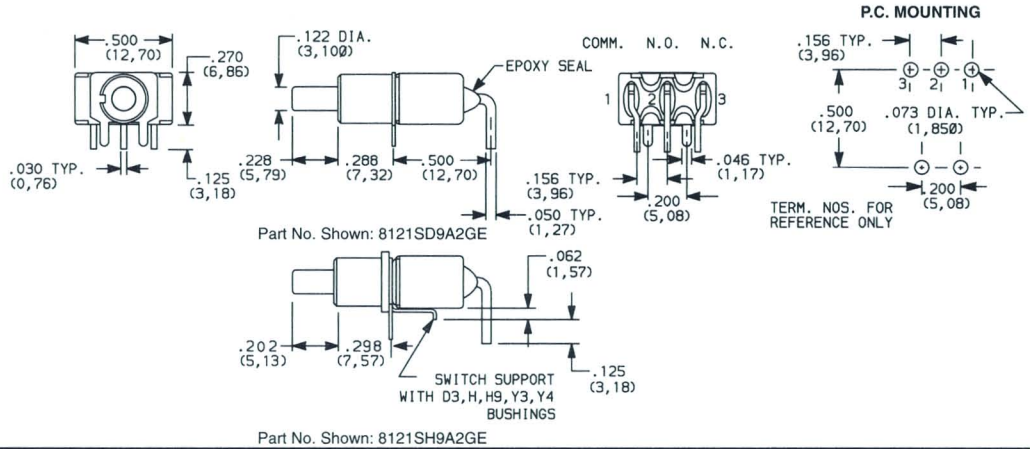
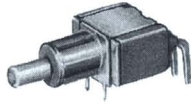
Term. bend radii and lead-in mfg. option. Not available with JXX actuators, I seal option.

AW4 EXTENDED

Option	Dim 'A'
AW4	.37 (9,4)

TERMINATIONS

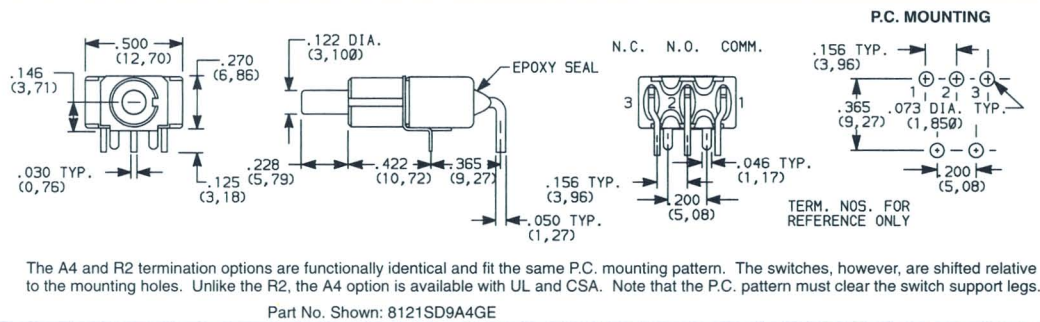
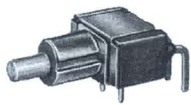
A2



SPDT

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

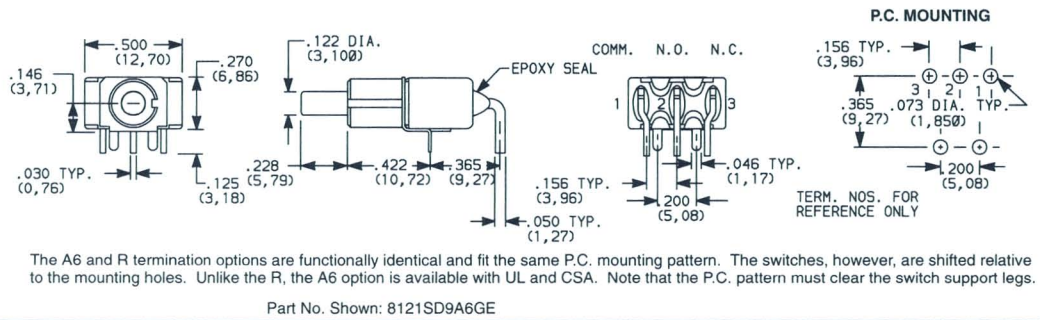
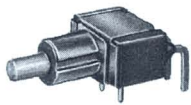
A4



SPDT

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

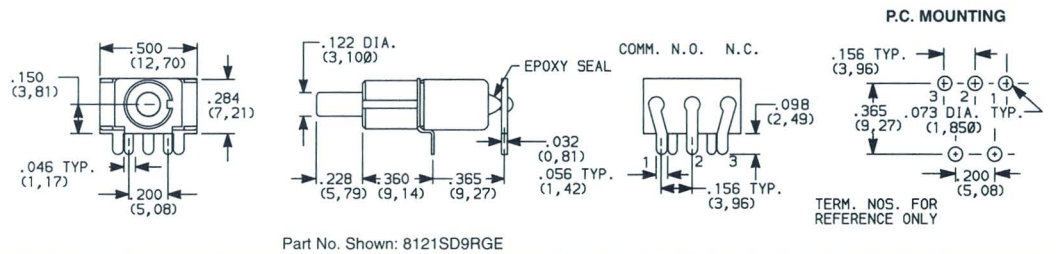
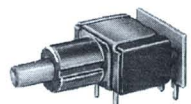
A6



SPDT

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

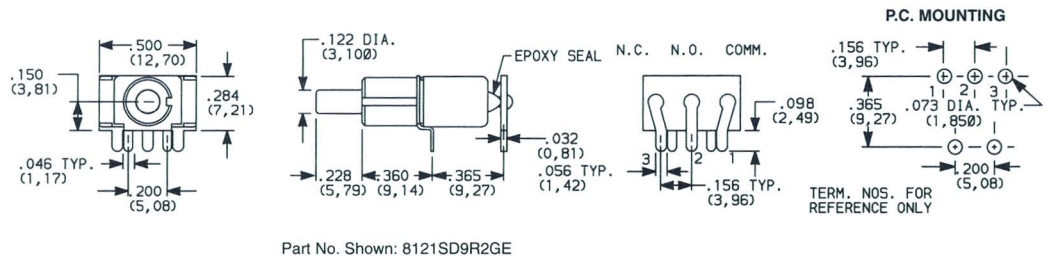
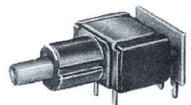
R



SPDT

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

R2



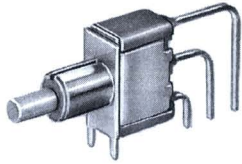
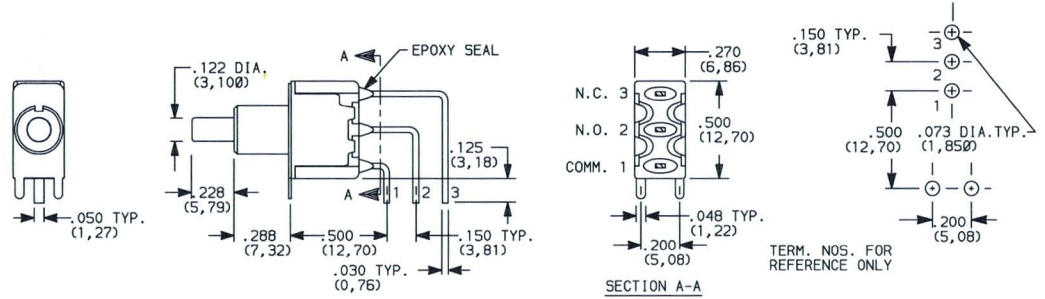
SPDT

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

TERMINATIONS

AV2

P.C. MOUNTING



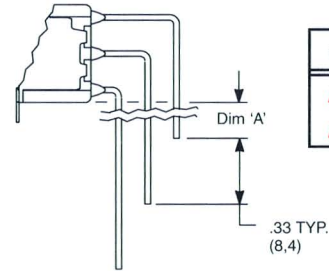
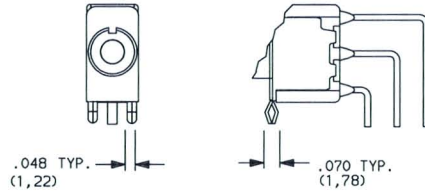
AV2

SPDT

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

AV3 SNAP-IN

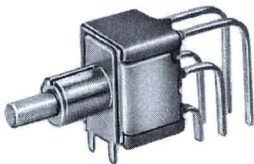
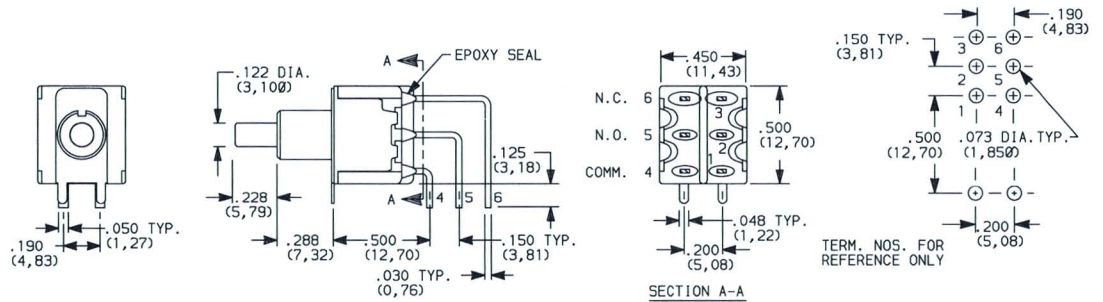
AV1-AV4 EXTENDED



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

AV2

P.C. MOUNTING



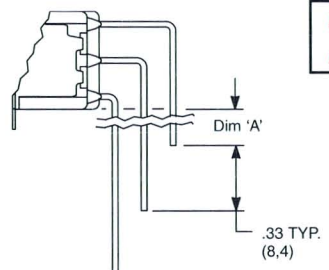
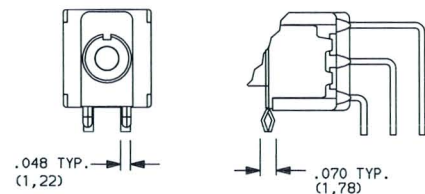
AV2

DPDT

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

AV3 SNAP-IN

AV1-AV4 EXTENDED

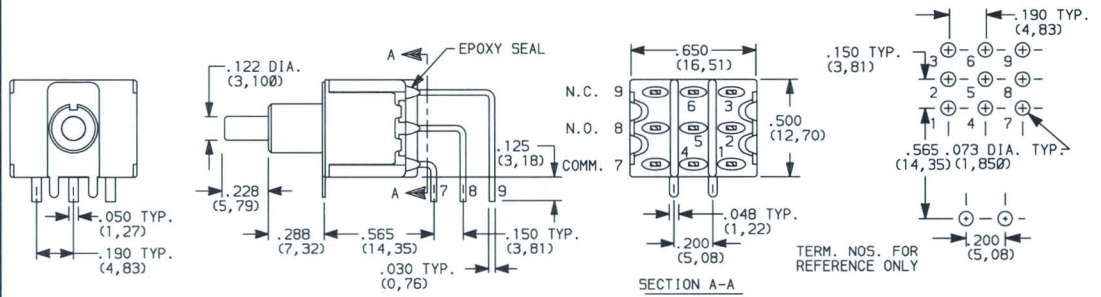


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

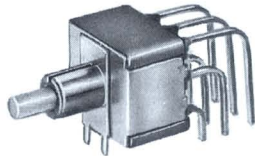
TERMINATIONS

AV2

P.C. MOUNTING



Part No. Shown: 8321SD9AV2GE



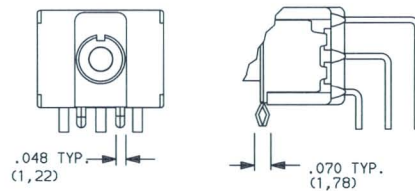
AV2

3PDT

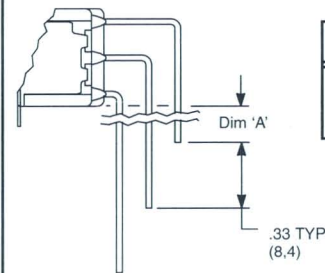
Term. bend radii and lead-in mfg. option. Not available with JXX actuators I seal option.

AV3 SNAP-IN

AV1-AV4 EXTENDED



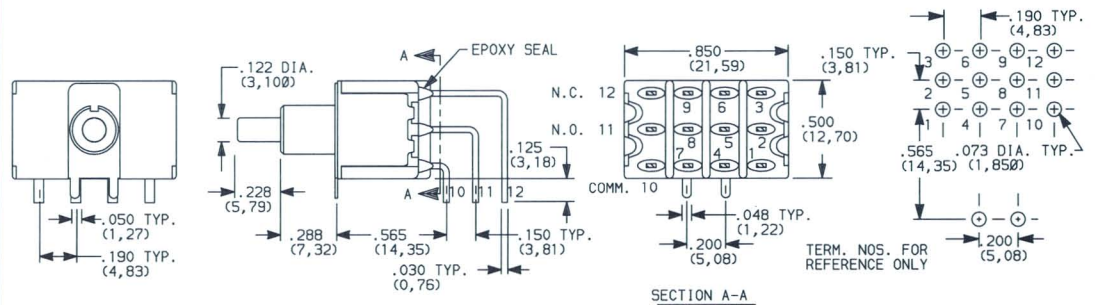
SNAP-IN DESIGN RETAINS SWITCH.



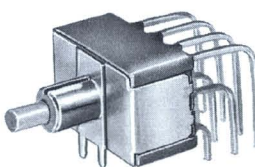
Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

AV2

P.C. MOUNTING



Part No. Shown: 8421SD9AV2GE



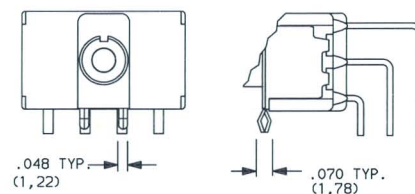
AV2

4PDT

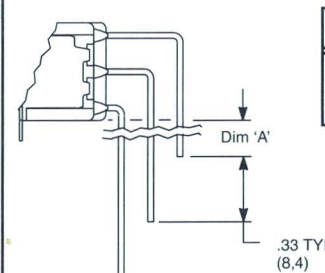
Term. bend radii and lead-in mfg. option. Not available with JXX actuators I seal option.

AV3 SNAP-IN

AV1-AV4 EXTENDED



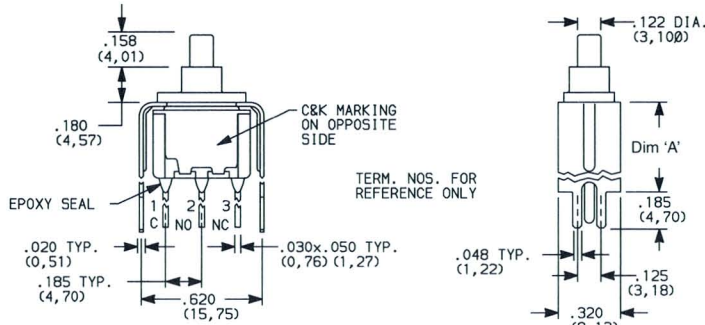
SNAP-IN DESIGN RETAINS SWITCH.



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

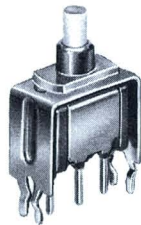
TERMINATIONS

V3-V4-V9 REPLACES V30-V40-V90

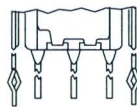


Part No. Shown: 8121SD3V__GE

V31-V41-V91 SNAP-IN

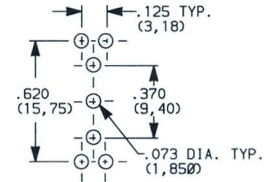


V31

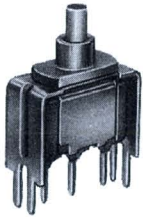


SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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

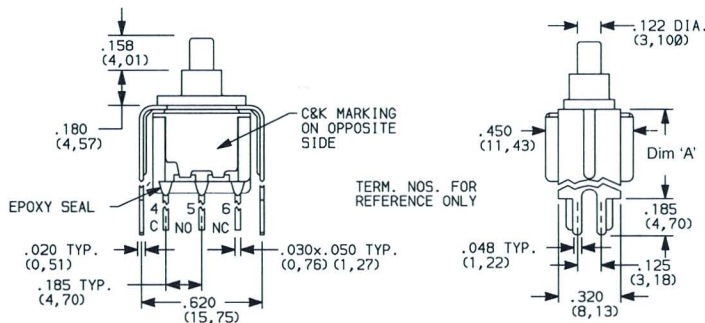


V3

SPDT

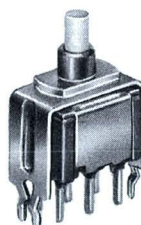
Not available with J8X actuators, I seal option.

V3-V4-V9 REPLACES V30-V40-V90

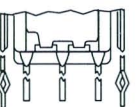


Part No. Shown: 8221SD3V__GE

V31-V41-V91 SNAP-IN

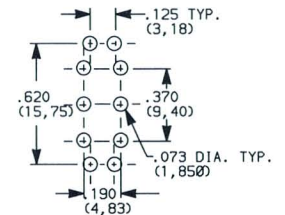


V31

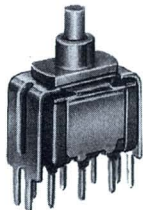


SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



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



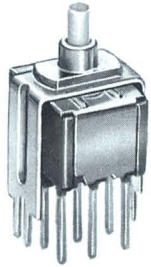
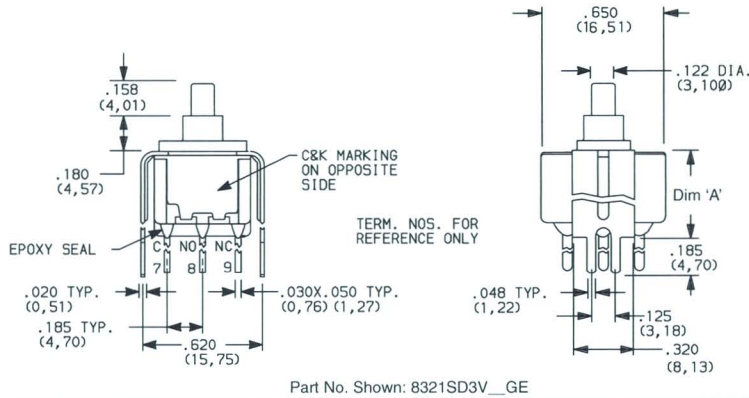
V3

DPDT

Not available with JXX actuators, I seal option.

TERMINATIONS

V4-V9



V4

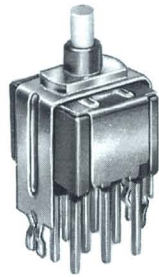
3PDT

Not available with JXX actuators, I seal option.

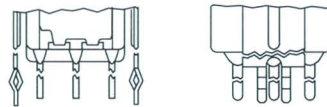
P.C. MOUNTING

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

V41-V91 SNAP-IN

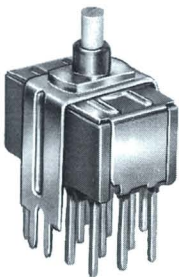
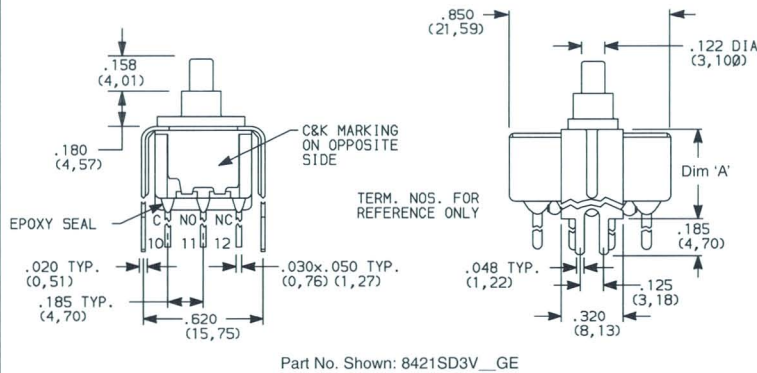


V41



SNAP-IN DESIGN RETAINS SWITCH.

V4-V9



V4

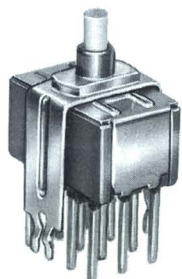
4PDT

Not available with JXX actuators, I seal option.

P.C. MOUNTING

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

V41-V91 SNAP-IN



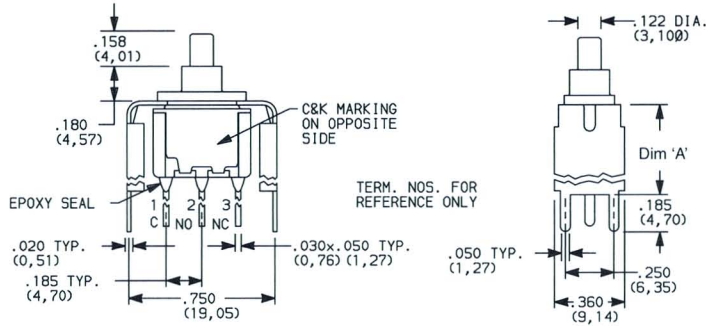
V41



SNAP-IN DESIGN RETAINS SWITCH.

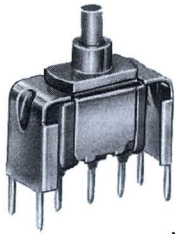
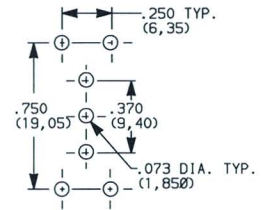
TERMINATIONS

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



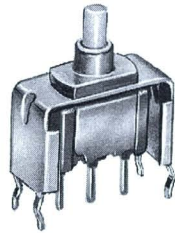
Part No. Shown: 8121SD3V__GE

P.C. MOUNTING

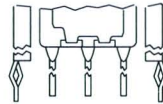


V6

V21-V61-V71-V81 SNAP-IN



V61



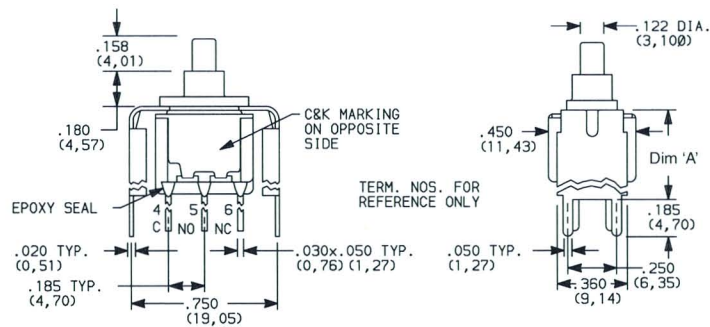
SNAP-IN DESIGN RETAINS SWITCH.

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

SPDT

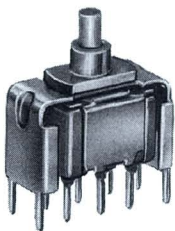
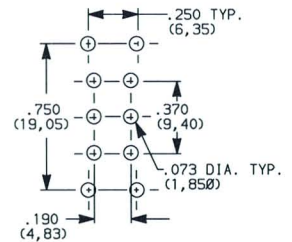
Not available with JXX actuators, I seal option.

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



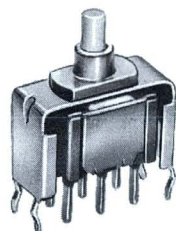
Part No. Shown: 8221SD3V__GE

P.C. MOUNTING

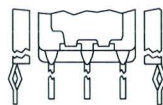


V6

V21-V61-V71-V81 SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

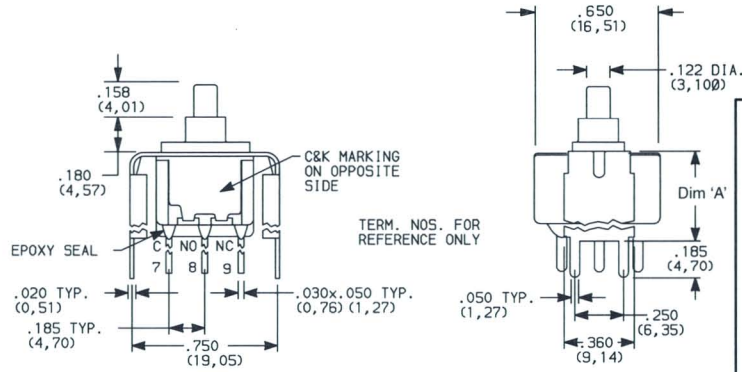
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

DPDT

Not available with JXX actuators, I seal option.

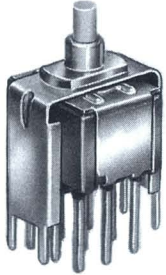
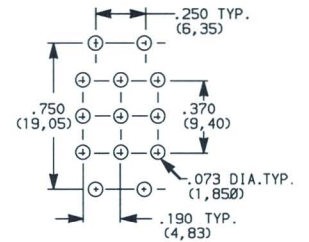
TERMINATIONS

V2-V7-V8



Part No. Shown: 8321SD3V__GE

P.C. MOUNTING

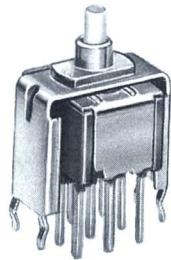


V7

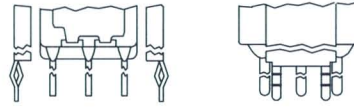
3PDT

Not available with JXX actuators, I seal option.

V21-V71-V81 SNAP-IN



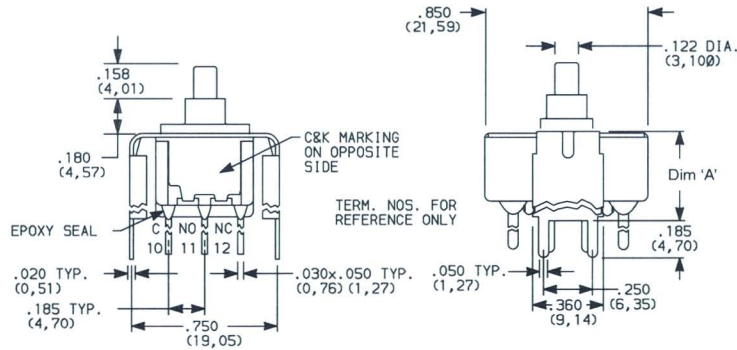
V71



SNAP-IN DESIGN RETAINS SWITCH.

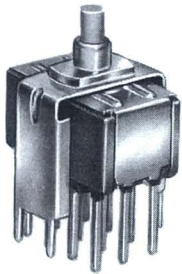
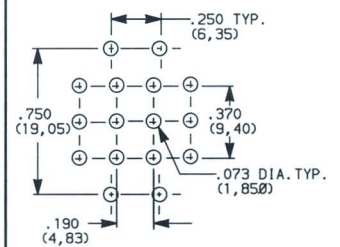
Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V2-V7-V8



Part No. Shown: 8421SD3V__GE

P.C. MOUNTING

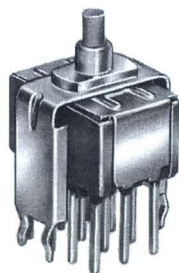


V7

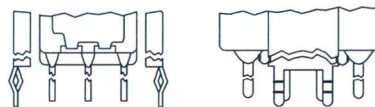
4PDT

Not available with JXX actuators, I seal option.

V21-V71-V81 SNAP-IN



V71



SNAP-IN DESIGN RETAINS SWITCH.

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	8X25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX.
K		TIN-LEAD ⁴		
G	GOLD OVER SILVER 2,3	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	8X21, U8X1 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC;
L		TIN-LEAD ⁴		

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

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

² N.O. & N.C. CONTACTS: Coin silver, with gold plate over nickel plate.

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

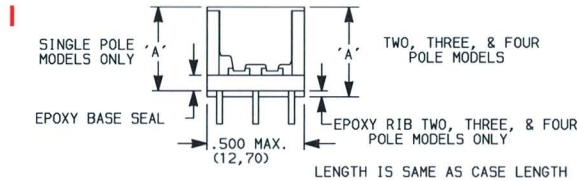
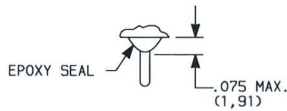
⁴ TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

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.

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.

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: 10⁹ 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.



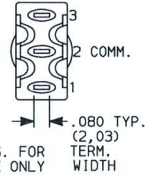
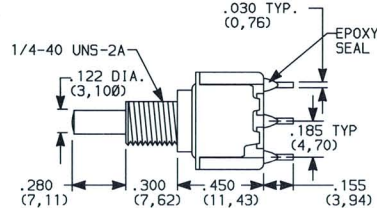
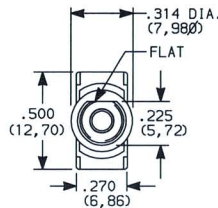


8060 Series

Alternate Action and Momentary Pushbutton Switches

SWITCHES WITH STANDARD OPTIONS

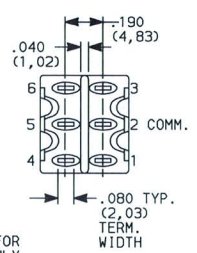
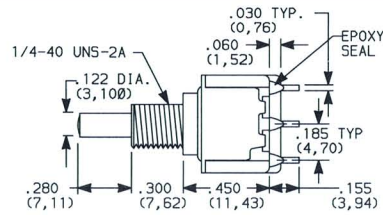
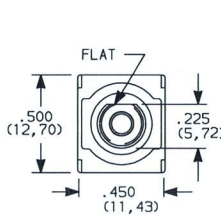
SPDT



U.S. PATENT NO. 4,095,070

Part No. Shown: 8161SHZQE2

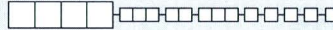
DPDT



U.S. PATENT NO. 4,095,070

Part No. Shown: 8261SHZQE2

SWITCH FUNCTION



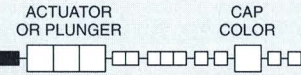
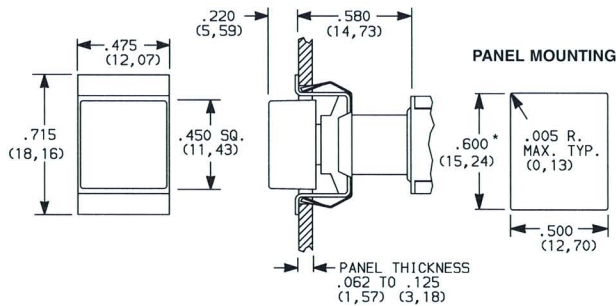
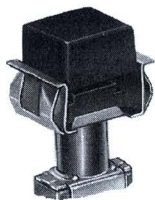
NO. POLES	MODEL [†] NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	8161	ON	ON	2-3	2-1	
	8168	ON	MOM.			
DP	8261	ON	ON	2-3-5-6	2-1-5-4	

MOM. = MOMENTARY

[†] 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



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.

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

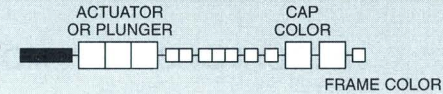


COMPONENTS, INC.

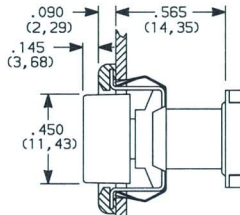
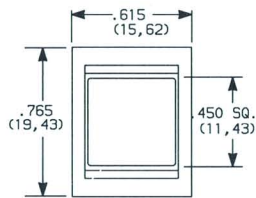
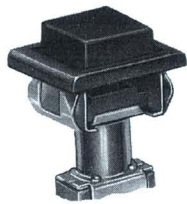
15 Riverdale Ave. Newton, MA 02158-1082

Tel: (617) 964-6400, Telex: 92-2544, Fax: (617) 527-3062

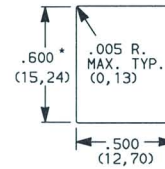
ACTUATORS—SNAP-IN FRONT MOUNT



J81 WITH FRAME



PANEL MOUNTING



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

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

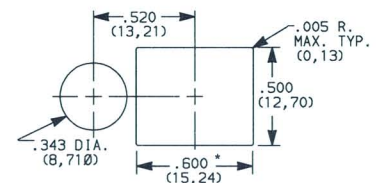
CAP AND FRAME COLORS

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

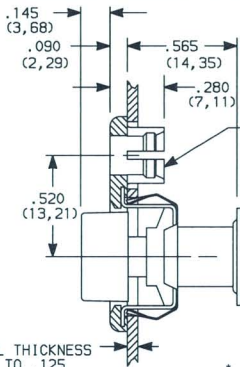
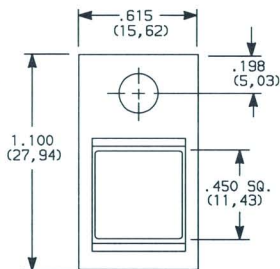
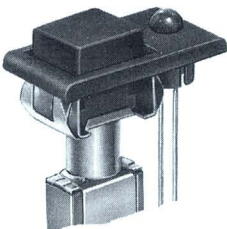
Select cap and frame colors from chart. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

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

PANEL MOUNTING



J82 WITH FRAME FOR LED



L.E.D. SNAPS SECURELY INTO FRAME. HEIGHT DEPENDS ON L.E.D. USED

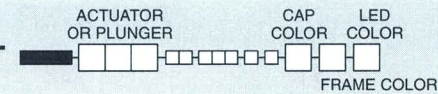
C&K MARKING THIS SIDE
N.O.
COMM.
N.C.

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

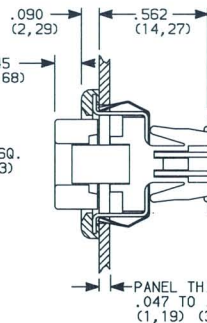
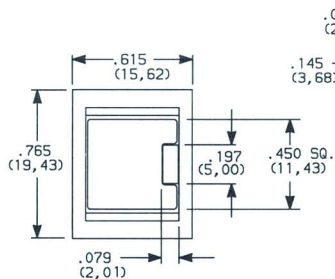
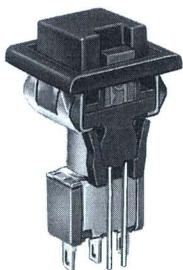
* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

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

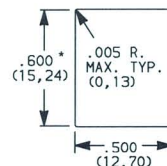
ACTUATORS—SNAP-IN FRONT MOUNT



J86 WITH 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

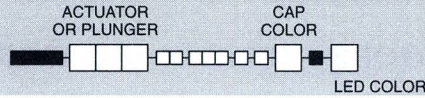
OPTION CODE	LED COLOR
3	RED (std.)
5	YELLOW
6	GREEN

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

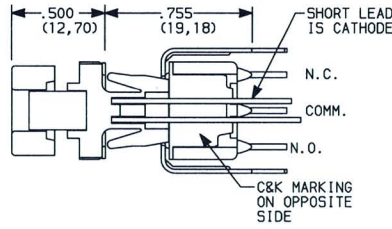
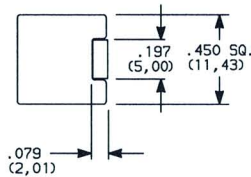
Available with Z, C, Z3 or W-W5 terminations and SPDT models only.

See page IX for LED information.

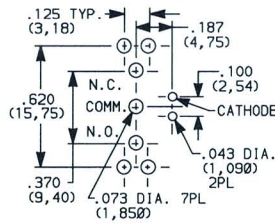
ACTUATORS—P.C. MOUNT



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.

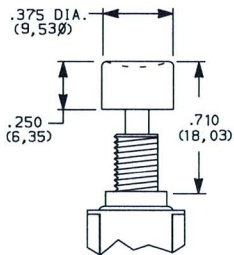
See page IX for LED information.

PLUNGER

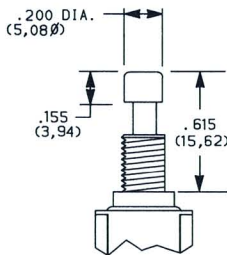


When selecting plunger & cap option, bushing selection must also be made, see next page.

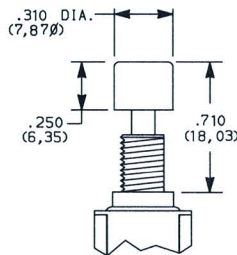
S (STD.)



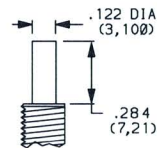
S1



S2



S, S1, S2 PLUNGER DIMS.



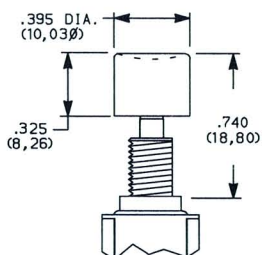
S, S1, S2 plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

CAP COLOR

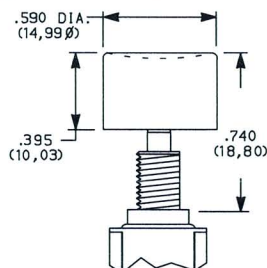
OPTION CODE	CAP COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

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.

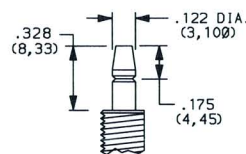
L SNAP-FITTING



L1 SNAP-FITTING



L, L1 PLUNGER DIMS.



L, L1 plunger material: Brass, chrome plated.

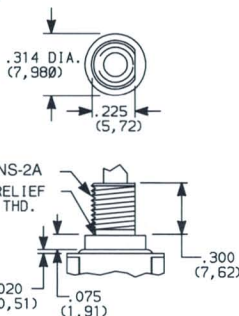
BUSHING

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)

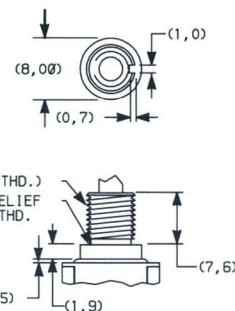
No bushing option choice required when any JXX actuator option is selected.

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

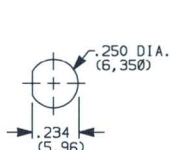


Withstands 12 in.-lbs. of torque with no distortion.

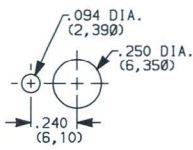
PANEL MOUNTING

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.

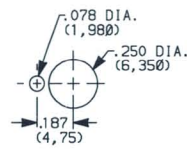
1/4 IN. BUSHING



WITHOUT LOCKING RING

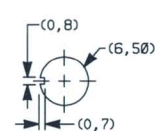


WITH STD. LOCKING RING

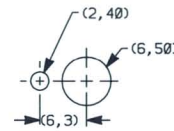


WITH SMALL LOCKING RING

METRIC BUSHING



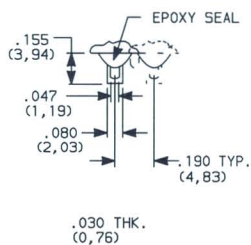
WITHOUT LOCKING RING



W/LOCKING RING

TERMINATIONS

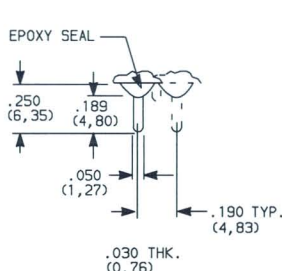
Z (STD.)



SPDT and DPDT

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

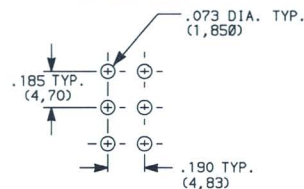
C



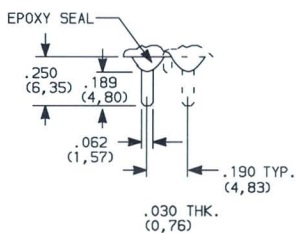
SPDT and DPDT

Q contact material std.

P.C. MOUNTING



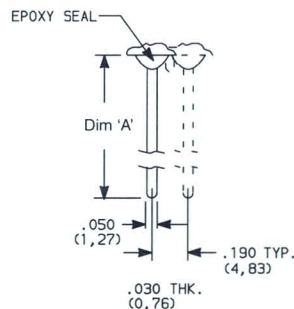
Z3 QUICK CONNECT



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



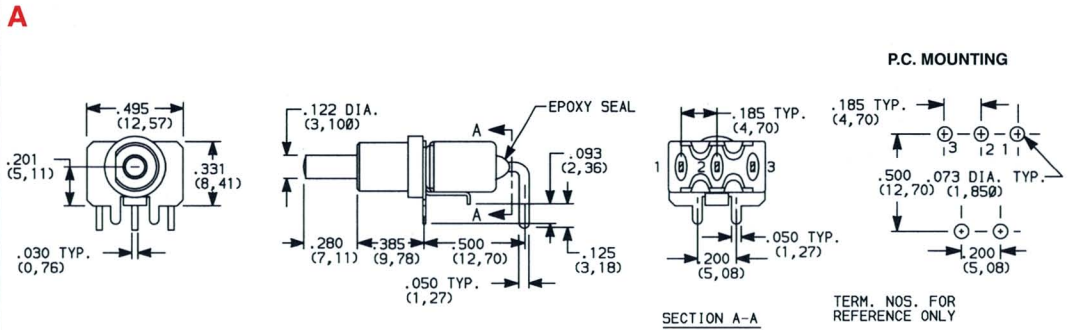
SPDT and DPDT

B contact material std.

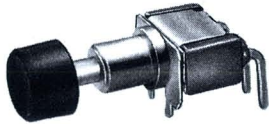
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)



TERMINATIONS

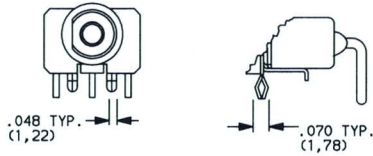


Part No. Shown: 8161SH9ABE2

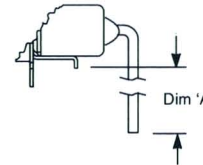


A

A3 SNAP-IN



AW-AW1-AW3-AW4-AW5 EXTENDED

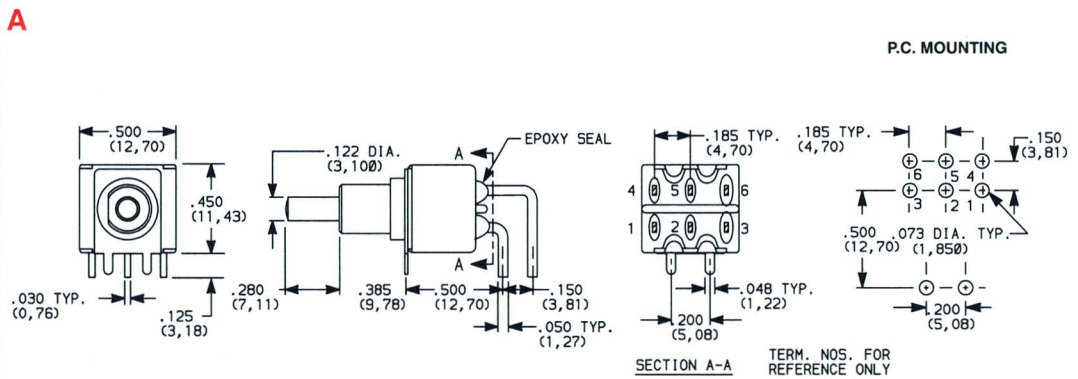


Option	Dim 'A'
AW	.44 (11,2)
AW1	.66 (16,8)
AW3	.14 (3,6)
AW4	.77 (19,6)
AW5	1.02 (25,9)

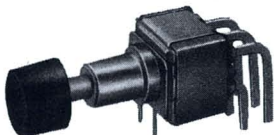
SPDT

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.

D

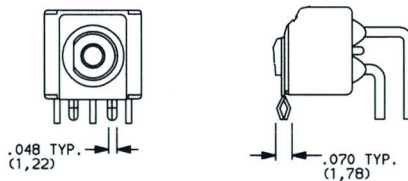


Part No. Shown: 8261SH9ABE2

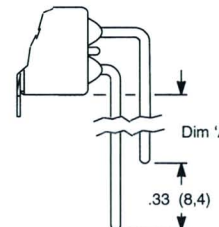


A

A3 SNAP-IN



AW-AW1-AW4-AW5 EXTENDED



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

DPDT

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

TERMINATIONS

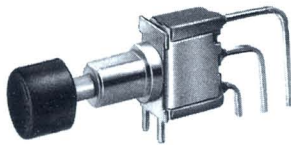
AV2

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

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)

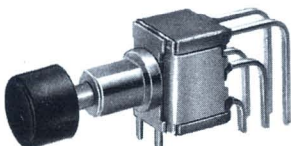
AV2

P.C. MOUNTING

SECTION A-A

TERM. NOS. FOR REFERENCE ONLY

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

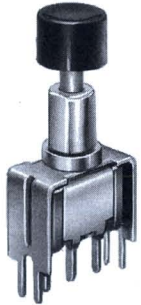
Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)



8060 Series

Alternate Action and Momentary Pushbutton Switches

TERMINATIONS

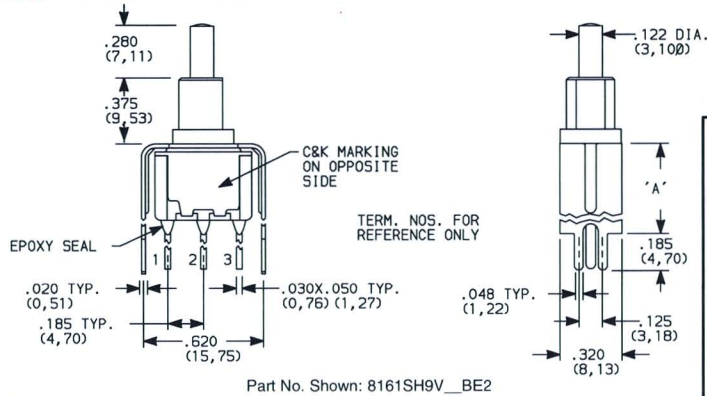


V3

SPDT

B contact material std.
Not available with I seal option.

V3-V4-V9 REPLACES V30-V40-V90



P.C. MOUNTING

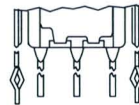
Dimensions: .125 TYP. (3,18), .620 (15,75), .370 (9,40), .073 DIA. TYP. (1,850).

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

V31-V41-V91 SNAP-IN



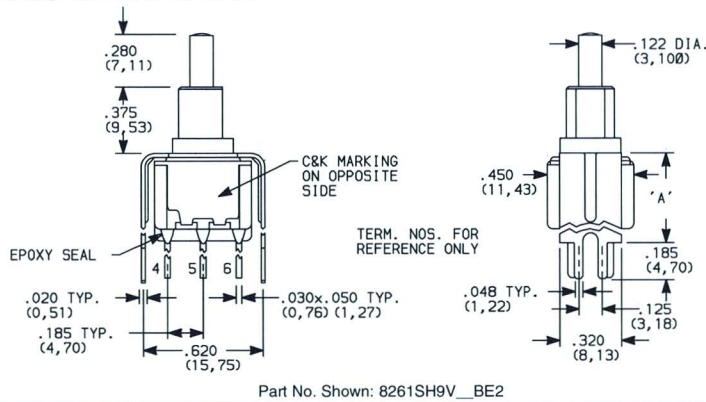
V31



SNAP-IN DESIGN RETAINS SWITCH.

D

V3-V4-V9 REPLACES V30-V40-V90

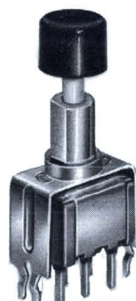


P.C. MOUNTING

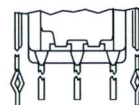
Dimensions: .125 TYP. (3,18), .620 (15,75), .370 (9,40), .073 DIA. TYP. (1,850), .190 (4,83).

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

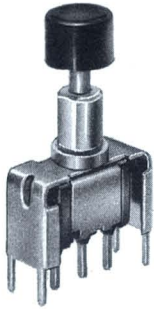


SNAP-IN DESIGN RETAINS SWITCH.

DPDT

B contact material std.
Not available with I seal option.

TERMINATIONS

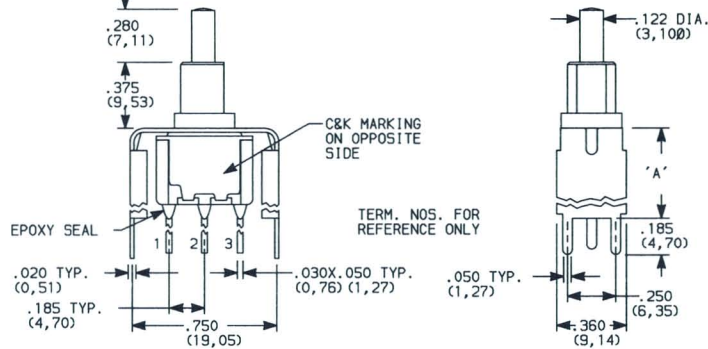


V6

SPDT

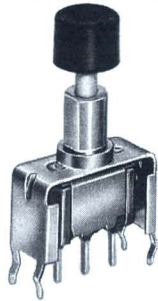
B contact material std.
Not available with I seal option.

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

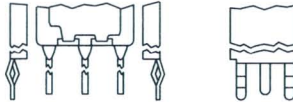


Part No. Shown: 8161SH9V__BE2

V21-V61-V71-V81 SNAP-IN

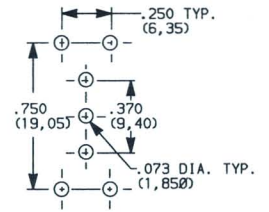


V61



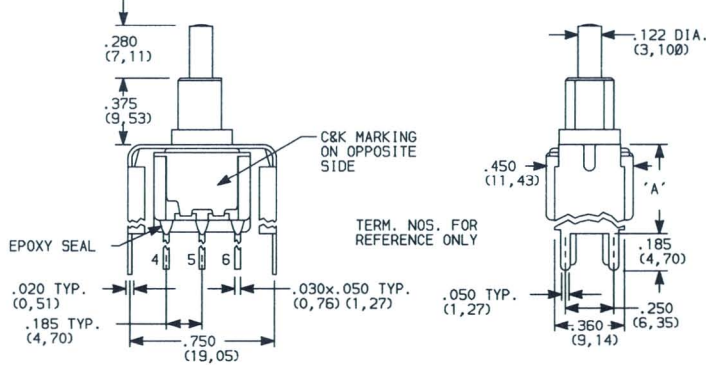
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



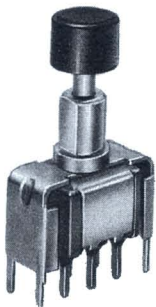
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

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



Part No. Shown: 8261SH9V__BE2

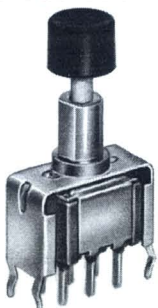
V21-V61-V71-V81 SNAP-IN



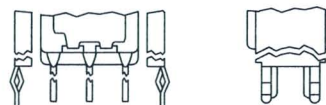
V6

DPDT

B contact material std.
Not available with I seal option.

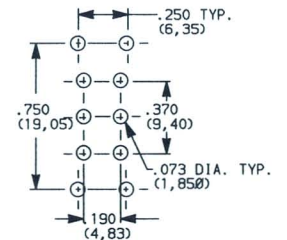


V61



SNAP-IN DESIGN RETAINS SWITCH.

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)

CONTACT MATERIAL

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

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.

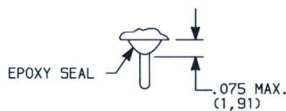
B contact material standard with all terminations except Z, C, Z3.
 Q contact material standard with Z, C, Z3 terminations.
 K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material. See pages D-48 and VIII.

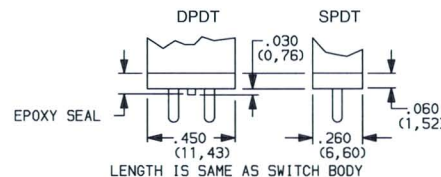
D

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: 10⁹ 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.

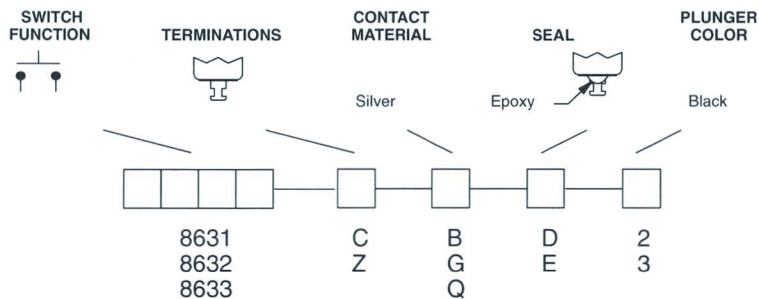
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



models available, see page D-58.

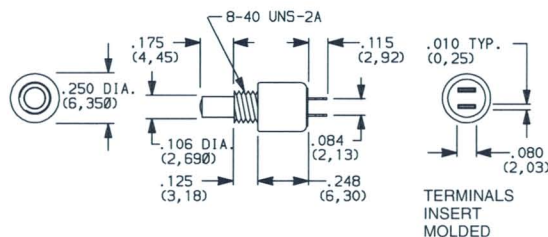
Easy Build-A-Switch:

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.



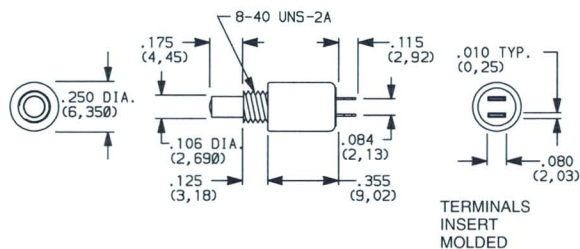
SWITCH FUNCTION

OPTION CODE	SWITCH FUNC.	
	POS. 1	POS. 2
8631		
Schematic:		
N.O. Total Travel: .040 (1.02) typ. Actuation Force: 5 OZ. (140g) typ.		



Part No. Shown: 8631ZQD2

OPTION CODE	SWITCH FUNC.	
	POS. 1	POS. 2
8632		
Schematic:		
N.O. w/Overtravel Total Travel: .106 (2,69) typ. Overtravel: .024 (0,61) typ. Actuation Force: 6.25 OZ. (177g) typ.		



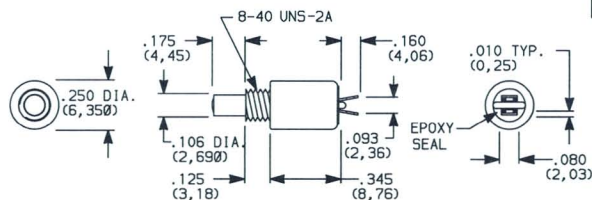
Part No. Shown: 8632ZQD2

PANEL MOUNTING



HARDWARE:
One mounting nut
supplied std.

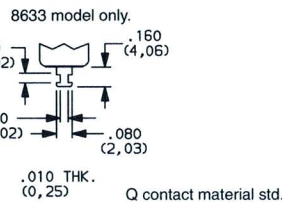
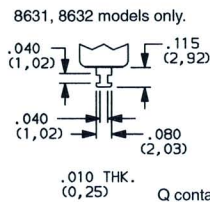
OPTION CODE	SWITCH FUNC.	
	POS. 1	POS. 2
8633		
Schematic:		
N.C. Total Travel: .048 (1,22) typ. Actuation Force: 5 OZ. (140g) typ.		



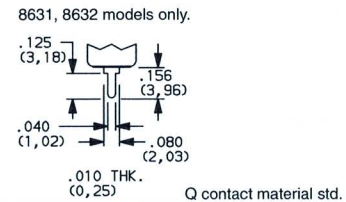
Part No. Shown: 8633ZQE2

TERMINATIONS

Z (STD.)



C



CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	SILVER ⁴	SILVER ⁵	POWER	8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC.
G	GOLD OVER SILVER ²	GOLD ³	LOW LEVEL / DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC.

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. 8633 model only: coin silver, with gold plate over nickel plate.
⁴ CONTACTS: Coin silver, silver plated.
⁵ TERMINALS: Copper alloy, silver plated. 8633 model only: coin silver.

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.




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: 10⁹ 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.

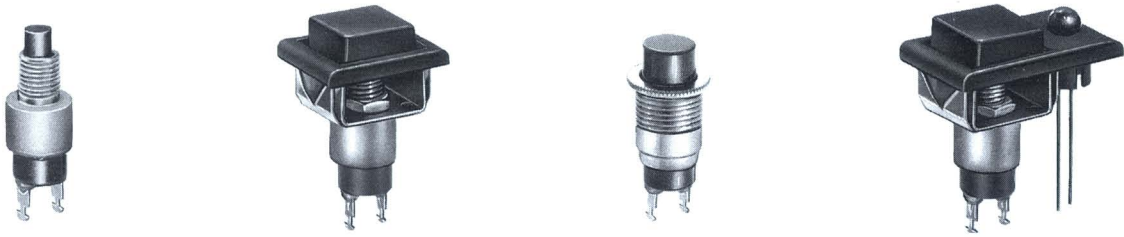
CONTACTS: Coin silver, silver plated (Q contact material).

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.

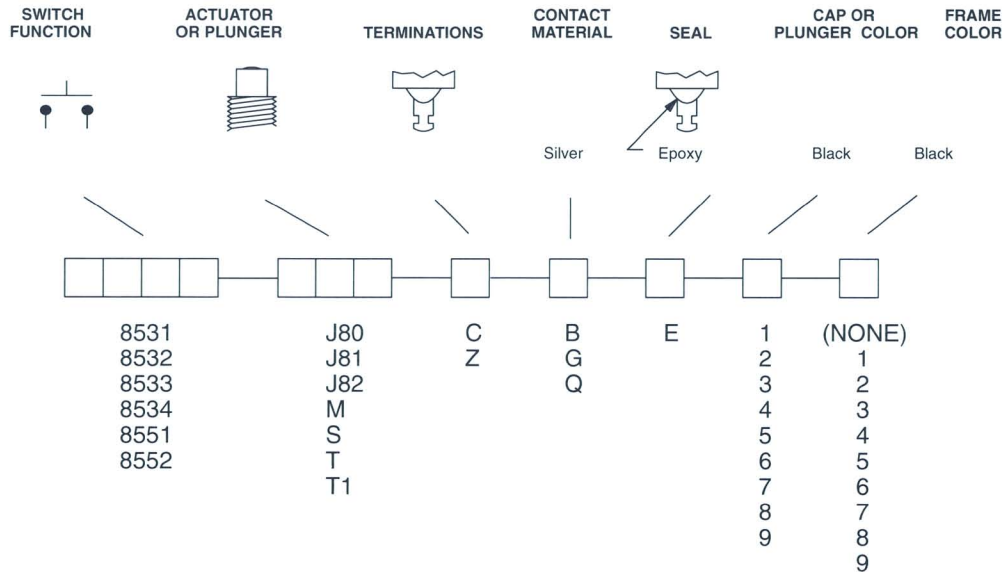
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



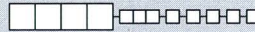
models available, see page D-60.

Easy Build-A-Switch:

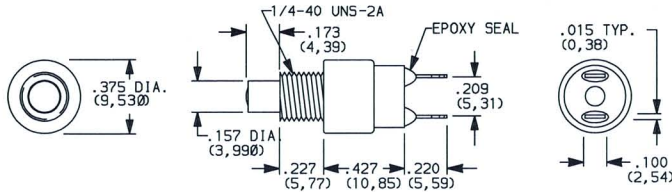
Below is a complete listing of available options for 8500 SERIES SUBMINIATURE PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown and described on pages D-60 thru D-62. When 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

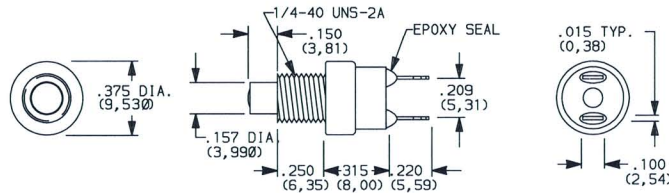


8531 — 1 Amp
8551 — 3 Amps



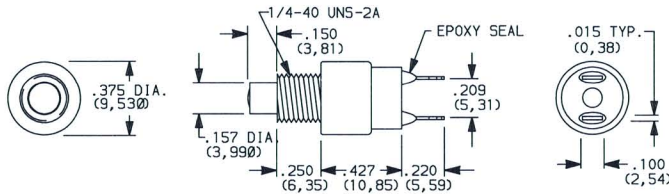
Part No. Shown: 8531MZQE2

8532 — 1 Amp
8552 — 3 Amps



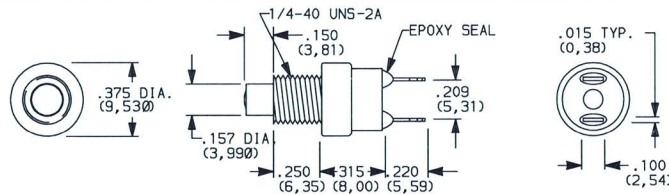
Part No. Shown: 8532MZQE2

8533 — 1 Amp



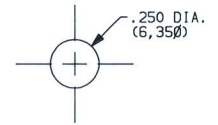
Part No. Shown: 8533MZQE2

8534 — 1 Amp



Part No. Shown: 8534MZQE2

PANEL MOUNTING



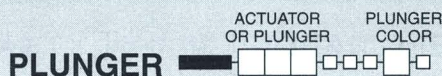
Hardware: Mounting hardware included, see HOW TO ORDER, page D-62.

D

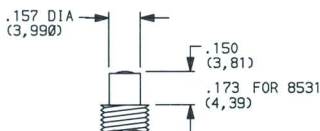
NO. POLES	MODEL NO.	SWITCH FUNCTION		TOTAL TRAVEL	ACTUATION FORCE	SCHEMATIC	
		POS. 1	POS. 2				
SP	8531	OFF	MOM.	.095 (2,41) TYP.	w/ Overtravel .042 (1,07) TYP.	7.7 oz (220g) TYP.	N.O. W/OVERTRAVEL
	8551						
	8532	OFF	MOM.	.050 (1,27) TYP.	6 oz (170g) TYP.	N.O.	
	8552						
	8533	ON	MOM.	.080 (2,03) TYP.	w/ Pretravel .057 (1,45) TYP.	11.5 oz (326 g) TYP.	N.C. W/PRETRAVEL
	8534	ON	MOM.	.032 (0,81) TYP.	w/ Overtravel .028 (0,71) TYP.	10.3 oz (292g) TYP.	N.C. W/OVERTRAVEL

MOM. = MOMENTARY

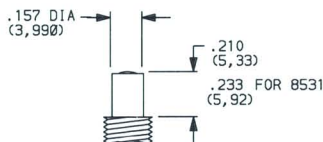
All models with all options when ordered with G or Q contact material. See AGENCY APPROVALS, page VIII.



M (STD.)

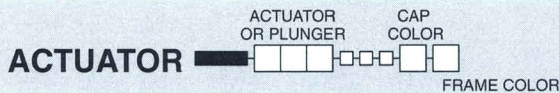


S

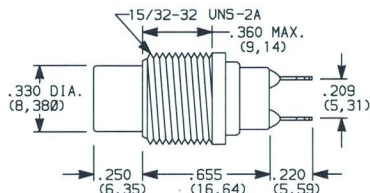


PLUNGER COLOR

- 2** BLACK (STD.)
- 3** RED

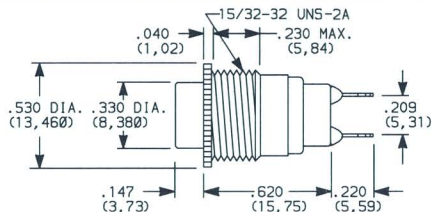


T



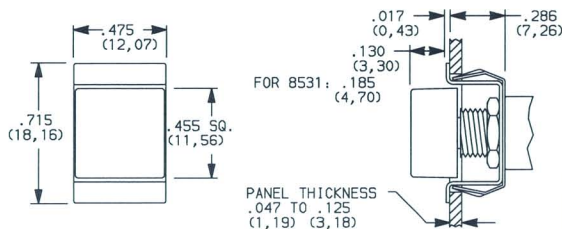
No frame color choice required.

T1



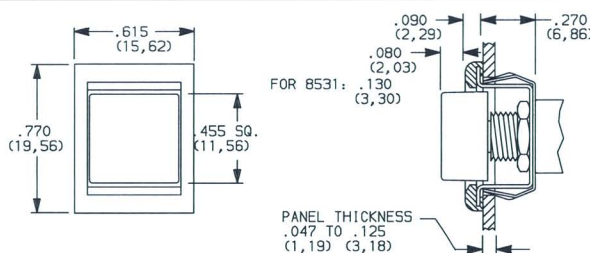
Available with 8532 and 8534 models only.
No frame color choice required.

J80

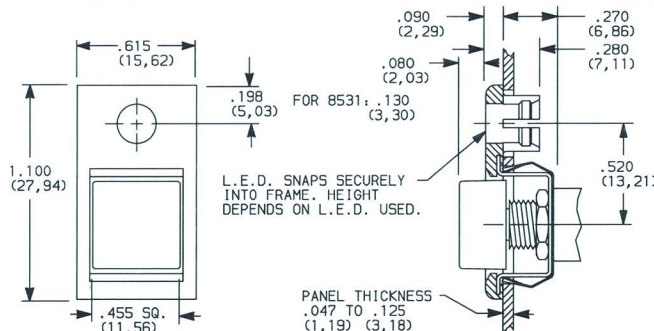


No frame color choice required.

J81



J82



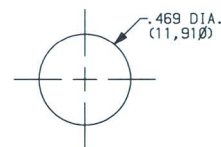
U.S. PATENT NO. 4,004,120
LED not included.
See page IX for LED information.

CAP AND FRAME COLORS

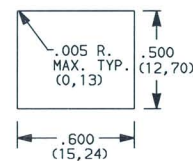
OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

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.

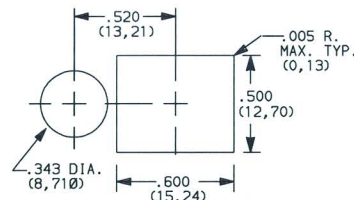
PANEL MOUNTING T - T1



PANEL MOUNTING J80 - J81

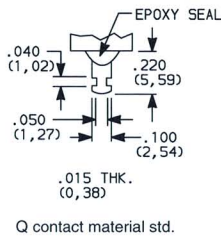


PANEL MOUNTING J82

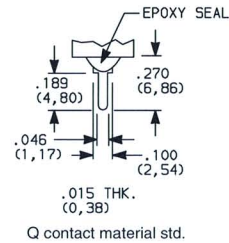


TERMINATIONS

Z (STD.)



C



CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	SILVER ⁴	SILVER ⁵	POWER	853X MODELS: 1 AMP @ 120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER ²	GOLD ³	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.

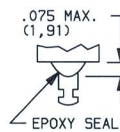
- ¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ CONTACTS: Coin silver, silver plated.
- ⁵ TERMINALS: Copper alloy, silver plated.

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: 10⁹ 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**

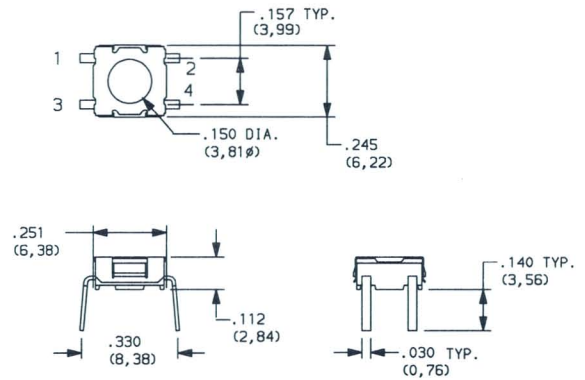
WITH C TERMINALS

PART NO.	ACTUATOR HEIGHT	SWITCH FUNCTION	
		POS. 1	POS. 2
KT11B0CM	FLUSH	OFF	MOM.
KT11B1CM	.025 (0,64)	OFF	MOM.
KT11B2CM	.088 (2,24)	OFF	MOM.
KT11P2CM	.093 (2,36)	OFF	MOM.
KT11P3CM	.044 (1,12)	OFF	MOM.
KT11P4CM	.156 (3,96)	OFF	MOM.
Conn. Terms		OPEN	1,2-3,4
Schematic			
SPST			

MOM. = MOMENTARY



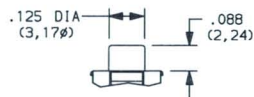
WITH B0 ACTUATOR



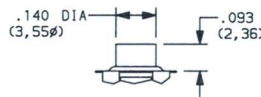
Part No. Shown: KT11B0CM



WITH B1 SILICONE RUBBER ACTUATOR



WITH B2 SILICONE RUBBER ACTUATOR



WITH P2 HARD PLASTIC ACTUATOR

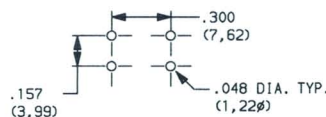


NEW WITH P3 HARD PLASTIC ACTUATOR



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

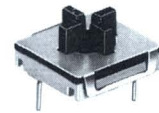
CONTACT RATING: 1.0 VA max. @ 50 V AC or DC max.
MECHANICAL & ELECTRICAL LIFE: 100,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.
OPERATING TEMPERATURE: -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

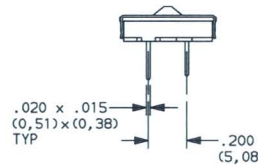
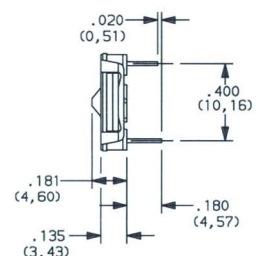
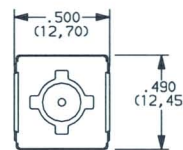


- **MINIATURE LOW PROFILE DESIGN—APPROX. .500 IN. SQ**
- **PROCESS COMPATIBLE—WITHSTANDS SOLDERING AND CLEANING PROCESSES —HIGH TEMPERATURE MATERIALS (UL 94V-0)**
- **AVAILABLE WITH AND WITHOUT ACTUATOR CAPS**
- **SEALED CONSTRUCTION—INTERNAL SILICONE RUBBER ACTUATOR SEAL AND EPOXY SEALED TERMINALS STANDARD**
- **ELECTRICAL AND MECHANICAL LIFE: 1 MILLION CYCLES AT FULL LOAD**

WITH SILICONE RUBBER ACTUATOR BUTTON

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
KA11B1CBE	OFF	MOM.
Conn. Terms.	OPEN	1-2
Schematic		
SPST		

MOM.=MOMENTARY

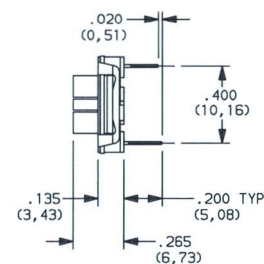
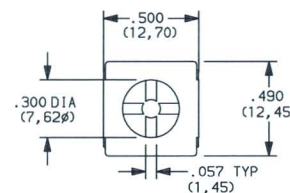
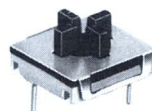


WITH ACTUATOR FOR CAPS

PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
KA11K1CBE	OFF	MOM.
Conn. Terms.	OPEN	1-2
Schematic		
SPST		

MOM.=MOMENTARY

Caps available separately — See catalog section H.





KA Series

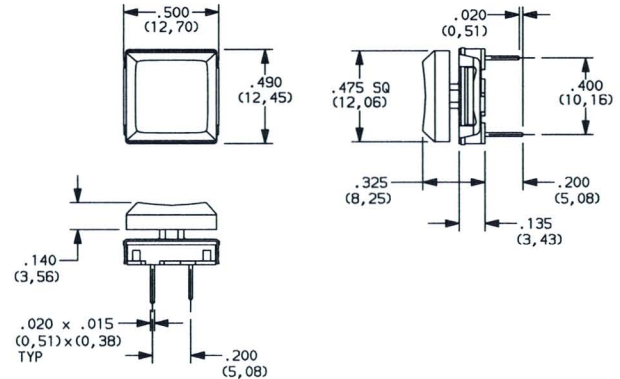
NEW

Sealed* Half-Inch Dome Pushbutton Switches

*Process sealed—withstands soldering and cleaning processes.

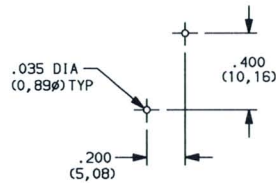
WITH ACTUATOR CAP

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			



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.

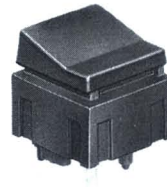
SPECIFICATIONS

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: 10⁹ 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

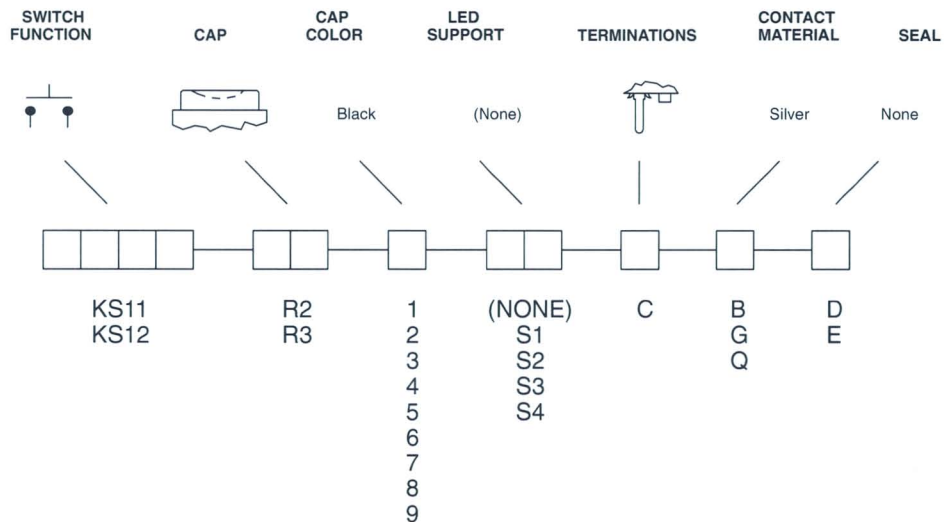
BASE: Glass filled nylon 4/6 (UL 94V-0).
 ACTUATOR BUTTON AND SEAL: Silicone rubber.
 ACTUATOR CAPS: 6/6 nylon, black standard.
 HOUSING: Stainless steel.
 MOVABLE CONTACT: Stainless steel, gold plated.
 STATIONARY CONTACTS AND TERMINALS: Copper alloy, gold plated.
 TERMINAL SEAL: Epoxy.

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



Easy Build-A-Switch:

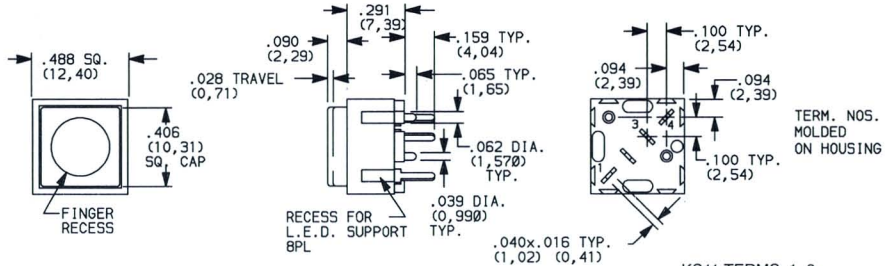
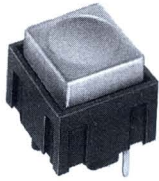
Below is a complete listing of available options for KS SERIES PUSHBUTTON KEY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need—simply select desired option from each category. All available options are shown on page D-68 and D-69. When building a part number, 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.



D



SWITCH FUNCTION

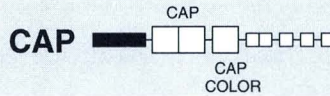


Part No. Shown: KS12R22CQD

KS11 TERMS. 1, 3
KS12 TERMS. 1, 3, 4

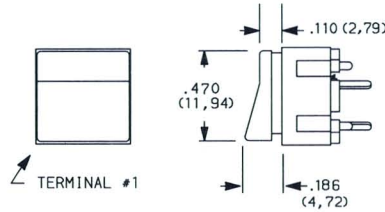
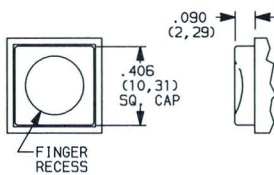
NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	KS11	OFF	MOM.	OPEN	1-3	SPST
	KS12	ON	MOM.	1-4	1-3	SPDT

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.

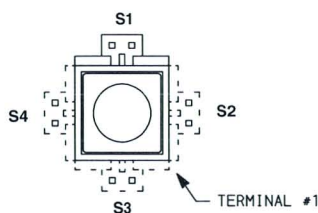
LED SUPPORT

(NONE) (STD.)

S1-S2-S3-S4

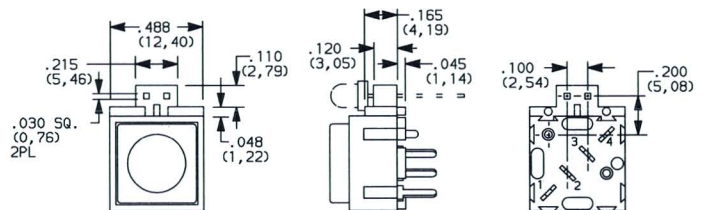


No LED support.



Position of factory installed LED support.

TYPICAL INSTALLATION

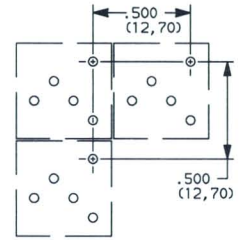
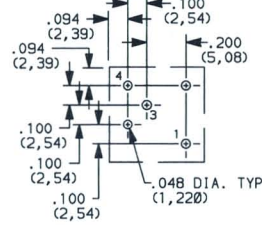
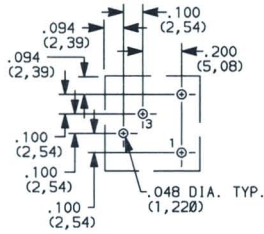
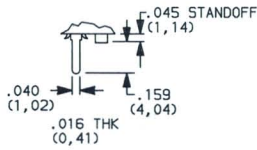


LED support shown in position S1. LED not supplied. LED support also available separately, see catalog section H.

TERMINATIONS

C (STD.)

P.C. MOUNTING



Q contact material std.

KS11

KS12

MULTIPLE SWITCH SPACING

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	SILVER ²	SILVER ²	POWER	25 mA MAX. @ 50 V AC OR DC MAX.
G	GOLD OVER SILVER ³	GOLD ³	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.

- MOVABLE CONTACT: Beryllium copper, with gold plate over nickel plate.
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- MOVABLE CONTACT: Beryllium copper, silver plated
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- 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.)

E

NO SEAL



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: 10⁹ 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

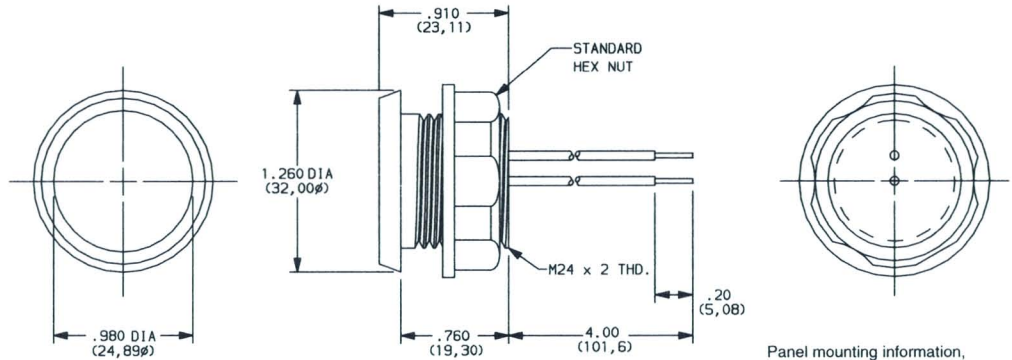
- CASE: Glass filled nylon (UL 94 V-0).
- ACTUATOR: ABS or polycarbonate—ABS blend, matte finish, black standard.
- MOVABLE CONTACT: Beryllium copper, silver plated (Q contact material).
- STATIONARY CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact material).
- TERMINAL SEAL: Epoxy.

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

MODELS

L LARGE—PLASTIC

MODEL NO.	CIRCUIT TYPE	HOUSING COLOR
KPA1L1	AC	WHITE
KPA1L2	AC	BLACK
KPA1L3	AC	RED
KPD1L1	DC	WHITE
KPD1L2	DC	BLACK
KPD1L3	DC	RED
SPST N.O. MOMENTARY (See schematic page D-73.)		



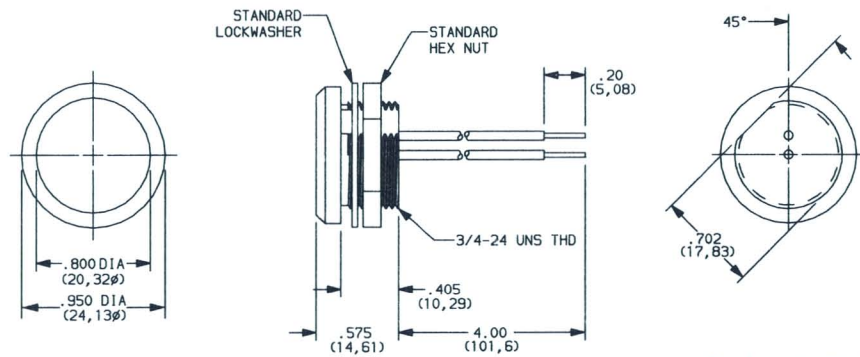
Panel mounting information, see page D-73.

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
KPD1M0	DC	NATURAL
SPST N.O. MOMENTARY (See schematic page D-73.)		



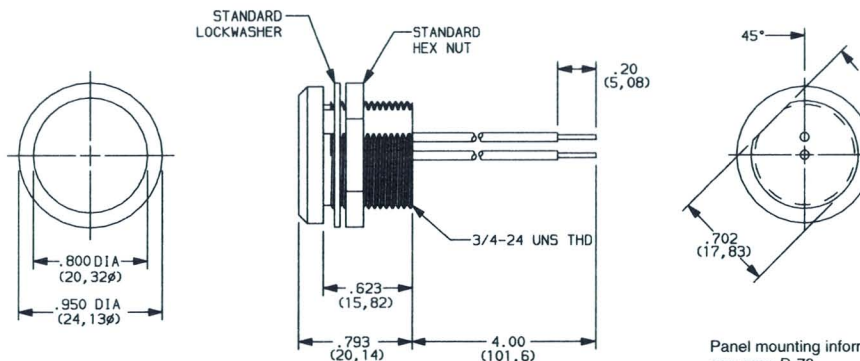
Panel mounting information, see page D-73.

NOTE: Metal housing of M Small Aluminum Model should be grounded.

Part No. Shown: KPD1M0W4

S SMALL—PLASTIC

MODEL NO.	CIRCUIT TYPE	HOUSING COLOR
KPD1S1	DC	WHITE
KPD1S2	DC	BLACK
KPD1S3	DC	RED
SPST N.O. MOMENTARY (See schematic page D-73.)		

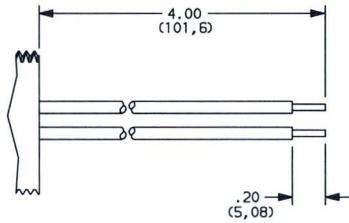


Panel mounting information, see page D-73.

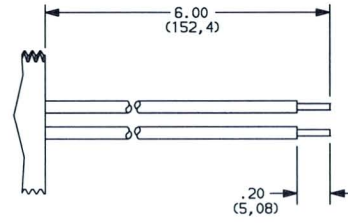
Part No. Shown: KPD1S2W4

TERMINATIONS

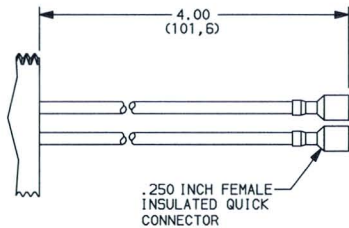
W4 4 INCH WIRE LEAD, .20 STRIP



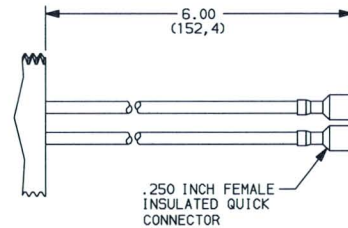
W6 6 INCH WIRE LEAD, .20 STRIP



Y4 4 INCH WIRE LEAD WITH .250 FEMALE INSULATED QUICK CONNECTOR



Y6 6 INCH WIRE LEAD WITH .250 FEMALE INSULATED QUICK CONNECTOR

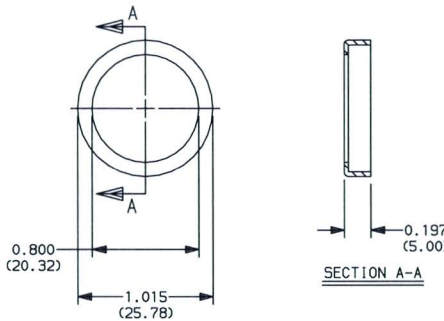


NOTE: Standard wire leads are 22 AWG. Standard wire colors: AC models — all leads red, DC models — red positive lead, violet negative lead. Other colors, lengths, gages available, consult factory.

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: 10⁹ ohms min.
 ACTUATION: 8oz typical up to 3lbs max.
 OPERATING TEMPERATURE: -40° C to 85° C.
 CIRCUIT CLOSURE DURATION: 50 mS min.

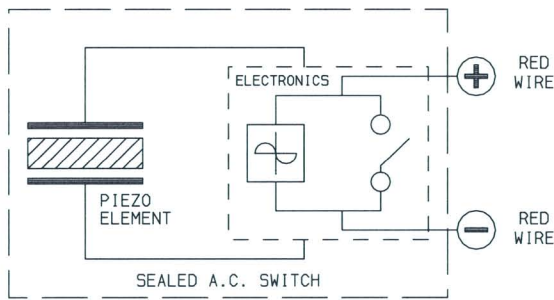
MATERIALS

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.

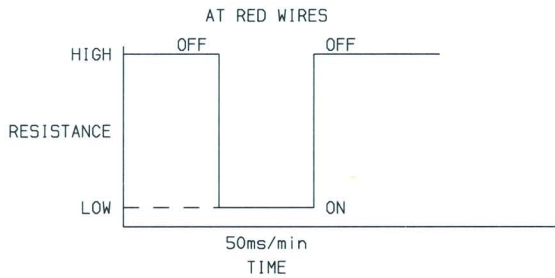
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

SCHEMATICS:

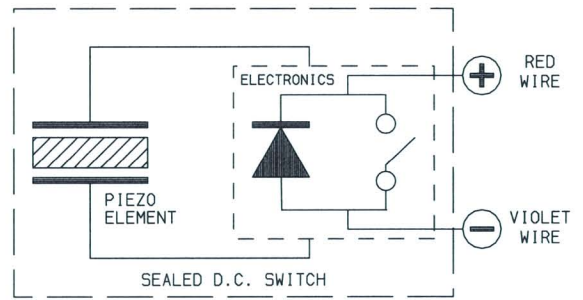
AC—KPA1 MODEL



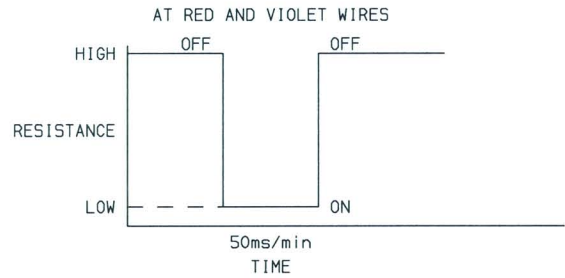
SPST NORMALLY OPEN MOMENTARY



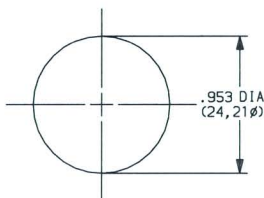
DC—KPD1 MODEL



SPST NORMALLY OPEN MOMENTARY

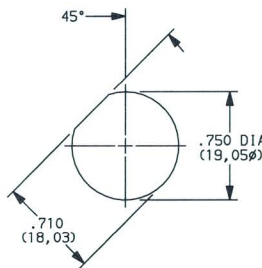


PANEL MOUNTING



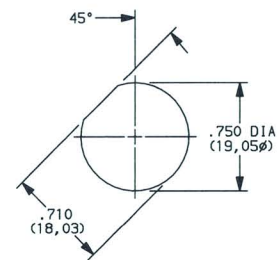
L MODELS

Panel thickness: .250 (6,35) max.



M MODELS

Panel thickness: .200 (5,80) max.



S MODELS

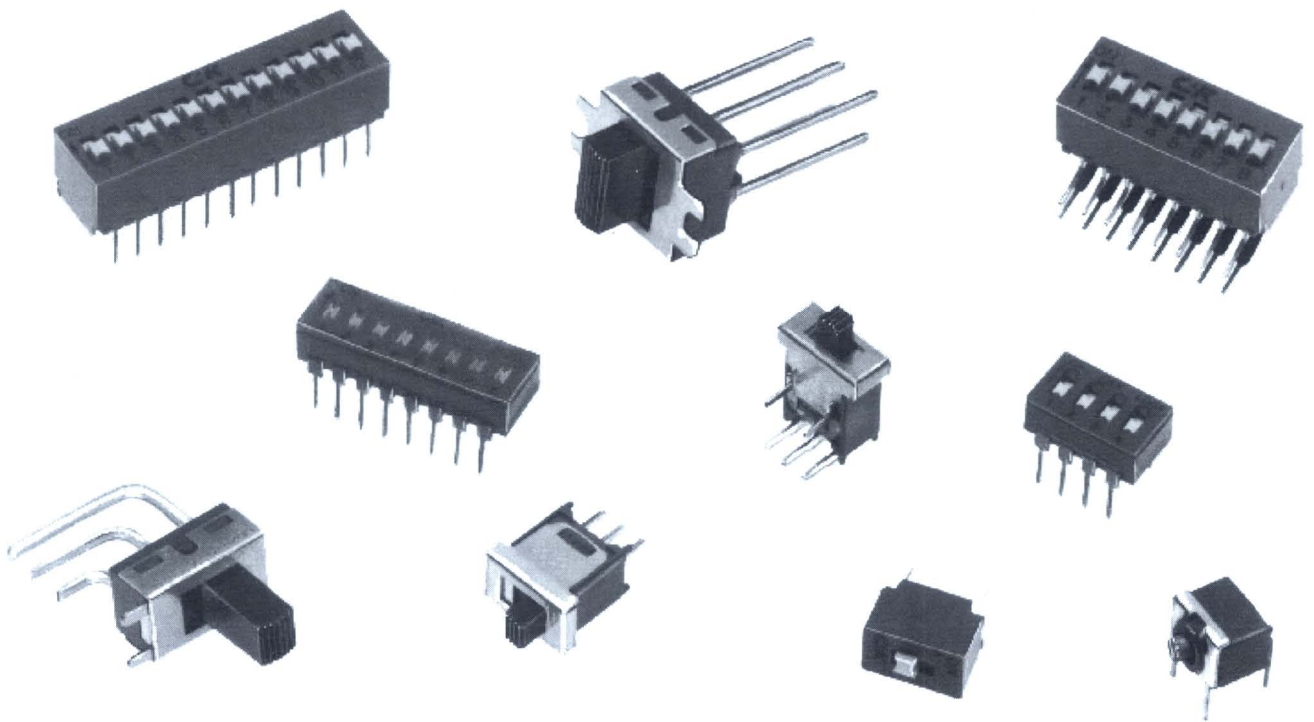
Panel thickness: .350 (8,89) max.

D

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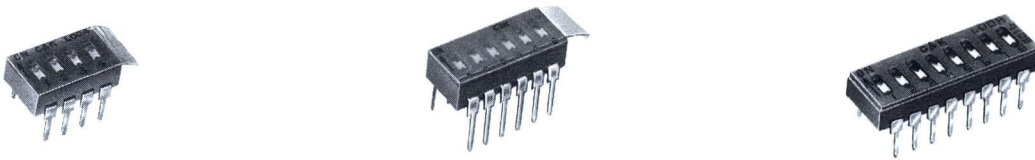
SECTION E

DIP AND SLIDE SWITCHES



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

*Process sealed—withstands soldering and cleaning processes.



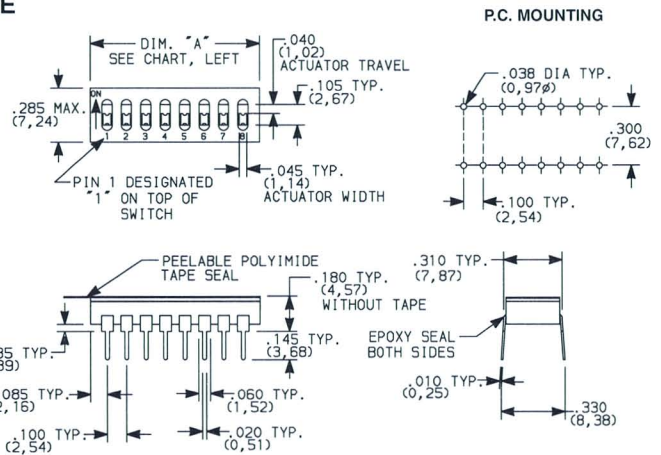
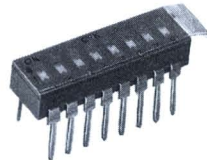
- MACHINE INSERTABLE—LOW PROFILE DESIGN—SPST—4, 5, 6, 7, 8, 10 POSITIONS
- RECESSED SLIDE ACTUATORS AND POSITIVE DETENT—PREVENT ACCIDENTAL ACTUATION
- PROCESS SEALED CONSTRUCTION—WITHSTANDS SOLDERING AND CLEANING PROCESSES—REMOVABLE POLYIMIDE TOP TAPE SEAL STANDARD
- BIFURCATED GOLD PLATED CONTACTS—NO LUBRICANTS REQUIRED
- DESIGNED WITH HIGH TEMPERATURE MATERIALS (UL 94V-0)
- 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



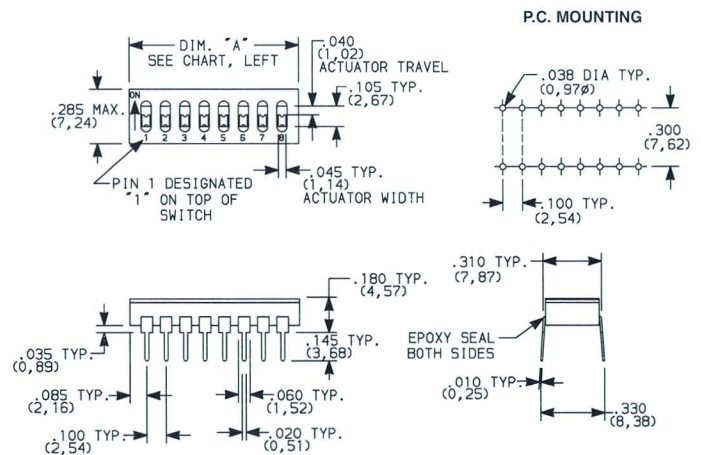
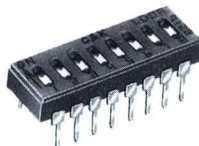
Part No. Shown: LD08H0K

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

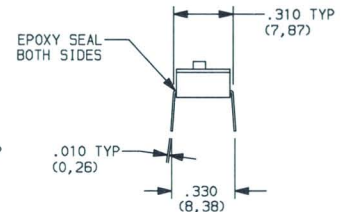
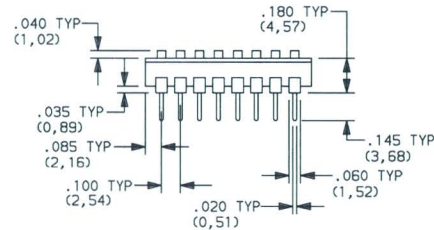
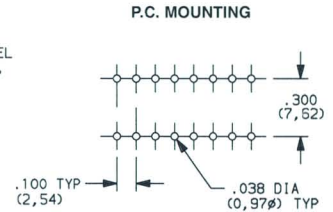
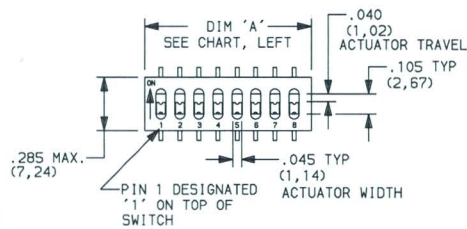
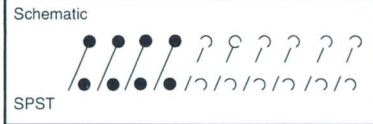


Part No. Shown: LD08H0KD

*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)



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: 10⁹ 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).

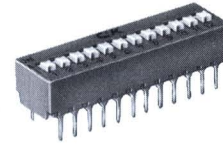
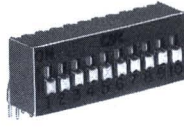
CONTACTS: Copper alloy, with gold plate over nickel plate.

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.



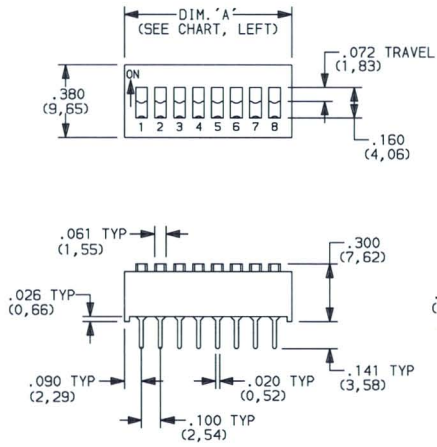
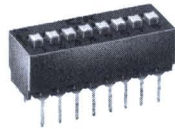
- PROVEN WASHABLE DESIGN—NO BOOTS, CAPS OR TAPE REQUIRED—OPEN BASE DESIGN ALLOWS CLEANERS TO FLUSH THROUGH—NEW CLOSED BASE MODELS ALSO AVAILABLE
- HIGH TEMPERATURE MATERIALS (UL 94V-0) WITHSTANDS SOLDERING AND CLEANING TEMPERATURES AND PROCESSES
- SLIDE ACTUATORS WITH POSITIVE DETENT—PREVENT ACCIDENTAL ACTUATION
- RELIABLE WIPING CONTACT MECHANISM
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY

WITH OPEN BASE

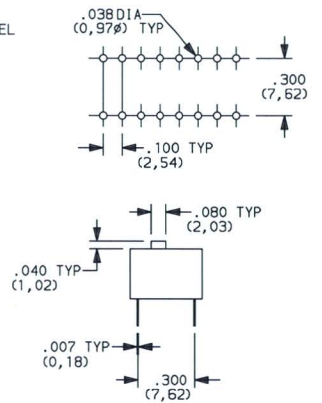
PART NO.	NO. POS.	DIM. 'A'
BD01	1	.180 (4,57)
BD02	2	.280 (7,11)
BD03	3	.380 (9,65)
BD04	4	.480 (12,19)
BD05	5	.580 (14,73)
BD06	6	.680 (17,27)
BD07	7	.780 (19,81)
BD08	8	.880 (22,35)
BD09	9	.980 (24,89)
BD10	10	1.080 (27,43)
BD12	12	1.280 (32,51)

Schematic

SPST



P.C. MOUNTING



Part No. Shown: BD08

WITH CLOSED BASE & EPOXY TERMINAL SEAL

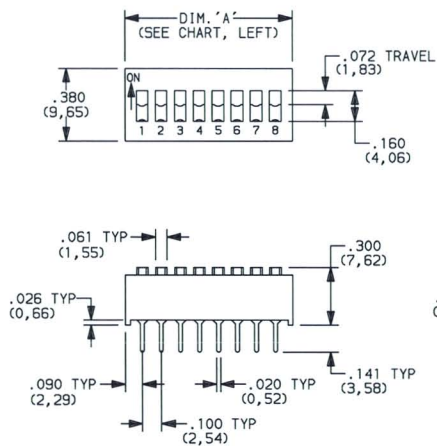
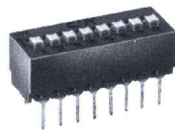
(SUITABLE FOR BOTTOM WASH CLEANING METHODS ONLY)

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)

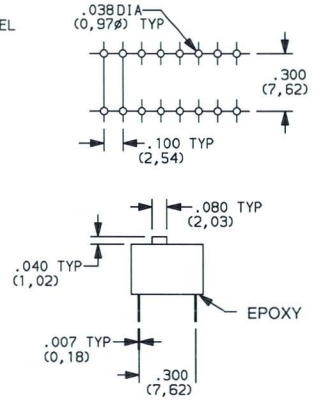
Schematic

SPST

NEW



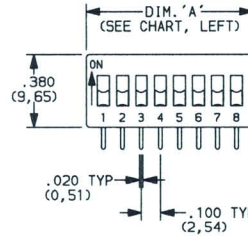
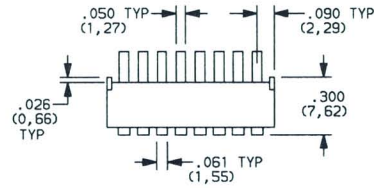
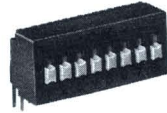
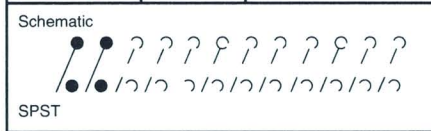
P.C. MOUNTING



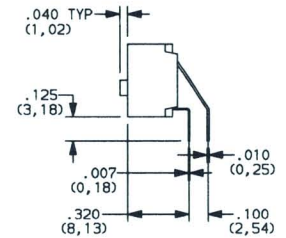
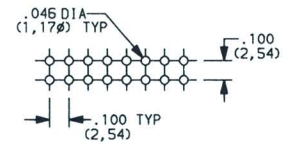
Part No. Shown: BD08E

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

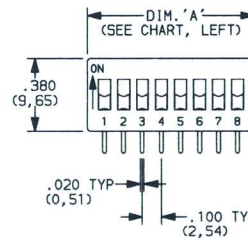
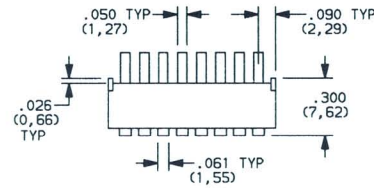
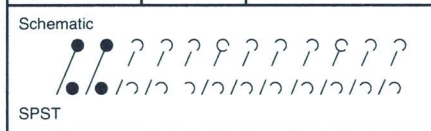


Part No. Shown: BD08AV

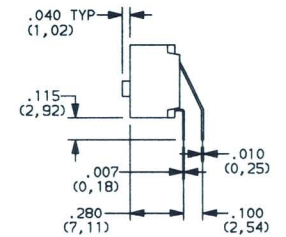
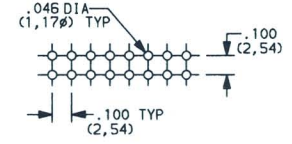
Term. bend radii mfg. option.

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: 10⁹ 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.

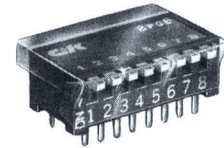
TERMINAL SEAL: Epoxy.

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

INSTALLATION, SOLDERING & CLEANING

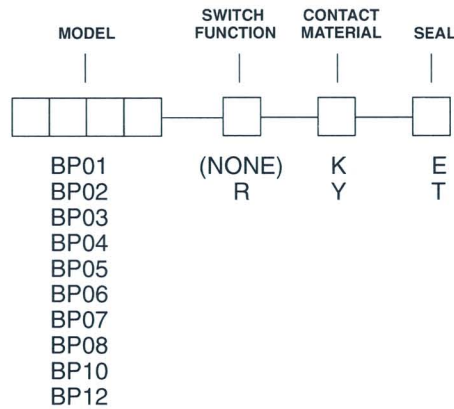
All BD Series DIP Switches can be hand soldered or machine soldered without the use of boots, caps, tapes or special attention. Open base washable models have unique design, allowing solvent cleaners and water/detergent solutions to flush and clean the electrical contacts of contaminants and fluxes. 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.



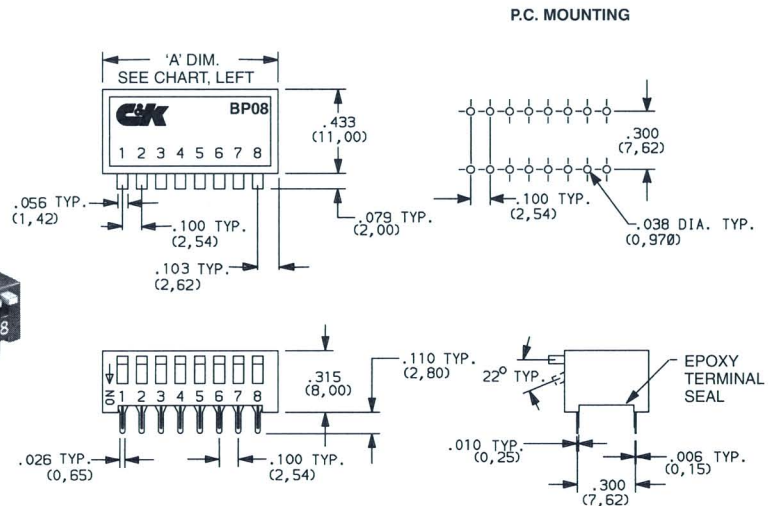
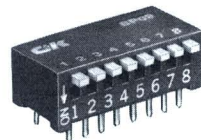
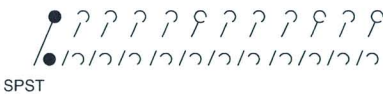
Easy Build-A-Switch:

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 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)

Schematic:

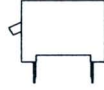
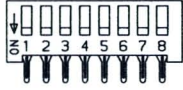


Part No. Shown: BP08KE

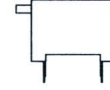
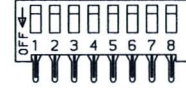
SWITCH FUNCTION

(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	
K	GOLD ¹	TIN ²	LOW LEVEL / DRY CIRCUIT	CARRY: 100 mA max. @ 50 V DC; SWITCH: 100 mA max. @ 5 V DC or 25 mA max. @ 25 V DC.
Y	TIN ²	TIN ²		

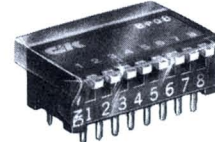
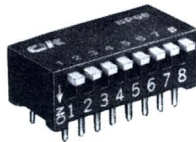
¹ CONTACTS: Gold over nickel over phosphor bronze.

² 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: 10⁹ 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.

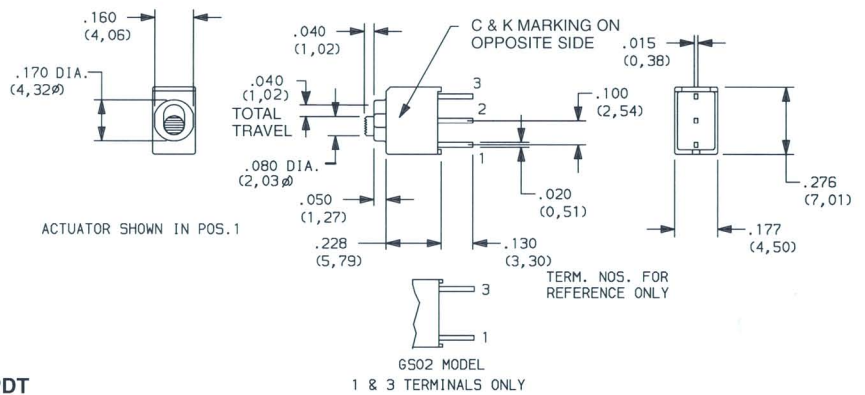


- FOUR P.C. TERMINAL STYLES—.100 IN. TERMINAL SPACING
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY
- SPST AND SPDT MODELS AVAILABLE

- 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
GS01MCKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		
GS02MCKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic		
SPST		

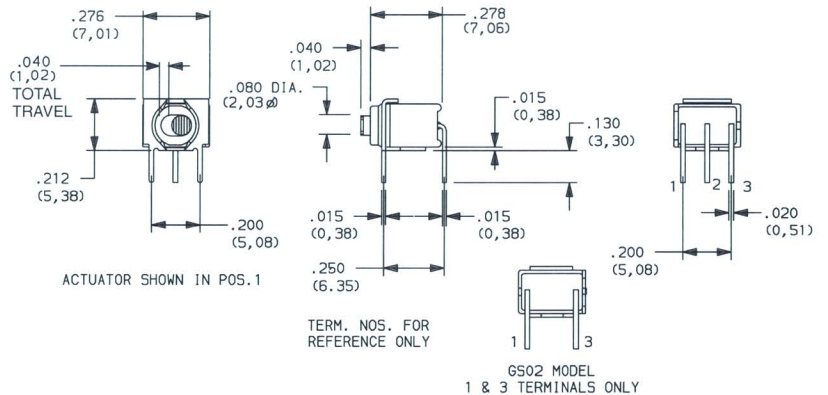


SPST and SPDT

GS02 MODEL
1 & 3 TERMINALS ONLY

SP MODELS WITH A TERMINALS

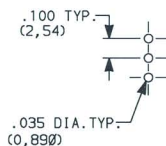
PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GS01MAKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		
GS02MAKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic		
SPST		



SPST and SPDT

GS02 MODEL
1 & 3 TERMINALS ONLY

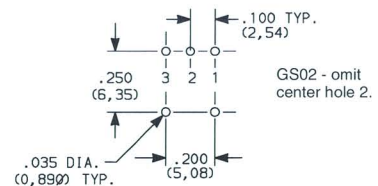
C TERMINAL STYLE



GS02 - omit center hole.

P.C. MOUNTING

A TERMINAL STYLE

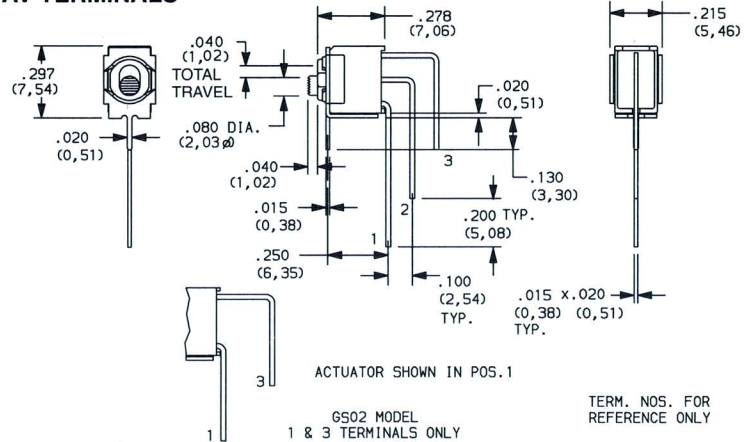


GS02 - omit center hole 2.



SP MODELS WITH AV TERMINALS

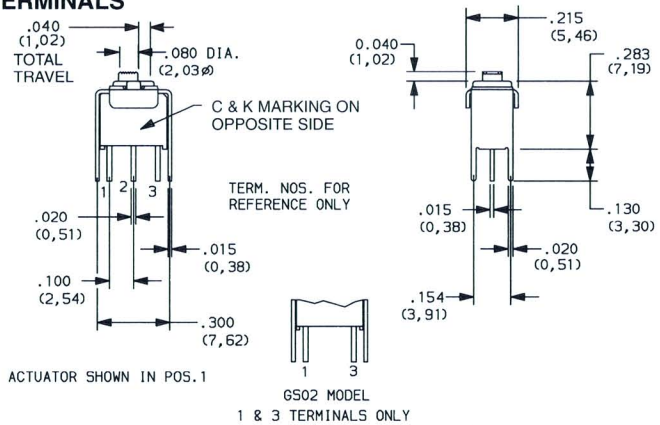
PART NO.	SWITCH FUNCTION	
	POS. 1	POS. 2
GS01MAVKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		
GS02MAVKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic		
SPST		



SPST and SPDT

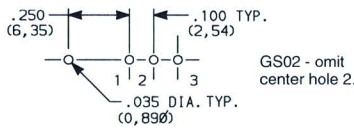
SP MODELS WITH V3 TERMINALS

PART NO.	POS. 1	POS. 2
	GS01MV3KE	ON
Conn. Terms.	2-1	2-3
Schematic		
SPDT		
GS02MV3KE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic		
SPST		

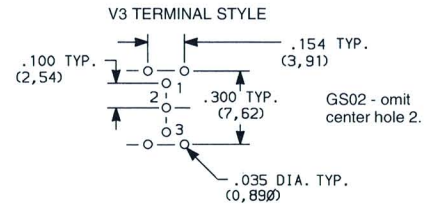


SPST and SPDT

AV TERMINAL STYLE



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.

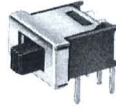
SPECIFICATIONS


- 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: 10⁹ 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.

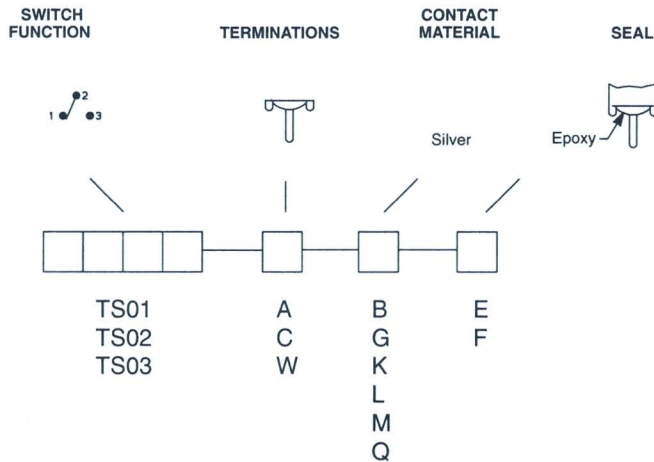
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



 models available, see page E-12.

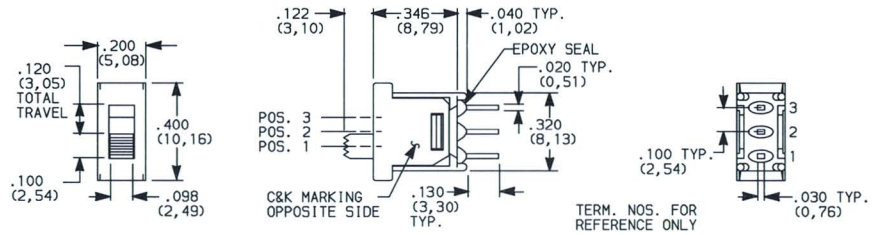
Easy Build-A-Switch:

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: TS01CQE

SWITCH FUNCTION

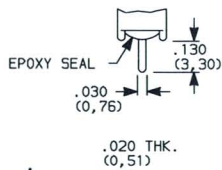
NO. POLES	MODEL* NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	TS01	ON	NONE	ON	1-2	OPEN	2-3	
	TS03	ON	OFF	ON				
	TS02	OFF	NONE	ON	OPEN	N/A	3-1	

* 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.

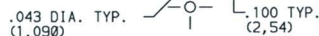
TERMINATIONS

C (STD.)



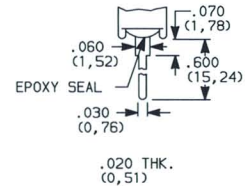
SPST and SPDT

P.C. MOUNTING



Q contact material std.

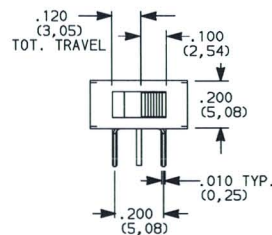
W WIRE WRAP



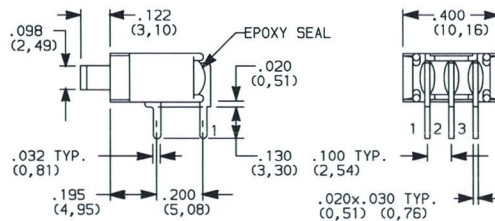
SPST and SPDT

B contact material std.

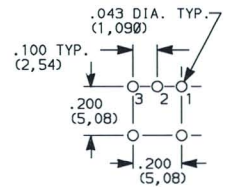
A



SPDT



P.C. MOUNTING



TERM. NOS. FOR REFERENCE ONLY

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	GOLD ¹	GOLD ¹	LOW LEVEL / DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	TS01 MODELS: 3 AMPS @ 120 V AC OR 28 V DC. TS02, TS03 MODELS: 1 AMP @ 120 V AC OR 28 V DC.
M		TIN-LEAD ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	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. TS02, TS03 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
L		TIN-LEAD ⁶		

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.

All models with all options when ordered with G, L, M or Q contact material. See pages E-12 and VIII.

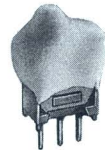
B contact material standard with A and W terminations.
Q contact material standard with C terminations.

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: 10⁹ 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.

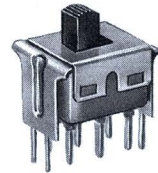
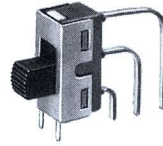
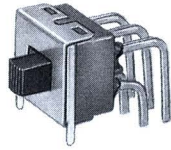
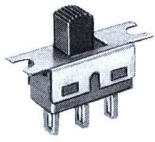
HOUSING: Stainless steel. Models with A termination options: stainless steel, nickel plated.

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.

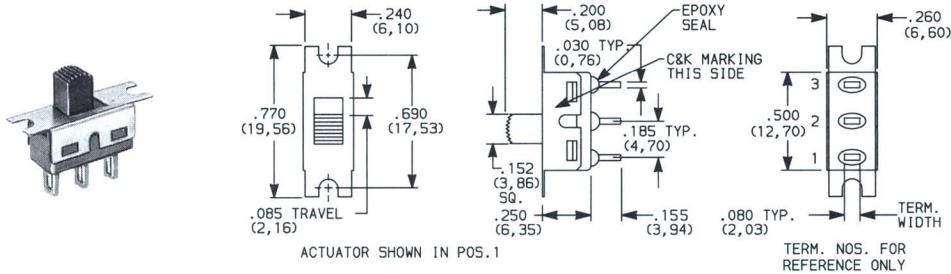
Easy Build-A-Switch:

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			

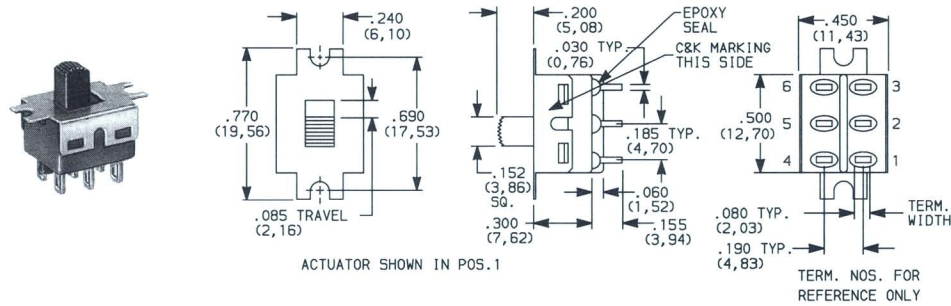
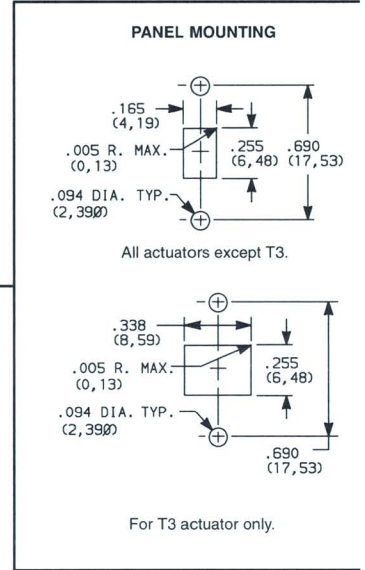
E

SWITCHES WITH STANDARD OPTIONS



SPDT

Part No. Shown: 1101M1S3ZQE2



DPDT

Part No. Shown: 1201M1S3ZQE2

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				
	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	
	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



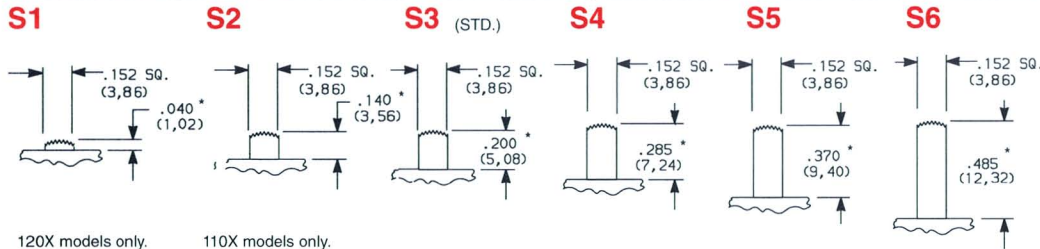
Available with Z, C, Z3, W-W5 terminations only. No mounting hardware supplied.

M2 P.C. MOUNT



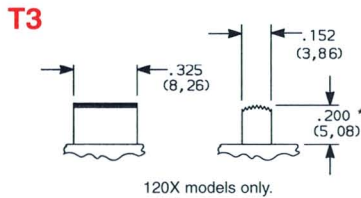
Available with C, W-W5, A, AW-AW5, AV1-AV5, V3-V4 terminations only.

ACTUATOR



120X models only.

110X models only.



120X models only.

* Subtract .014 (0,36) from actuator height - all models with A, AW-AW5, AV1-AV5, V3-V4 terminations.

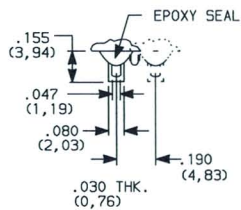
ACTUATOR COLOR

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

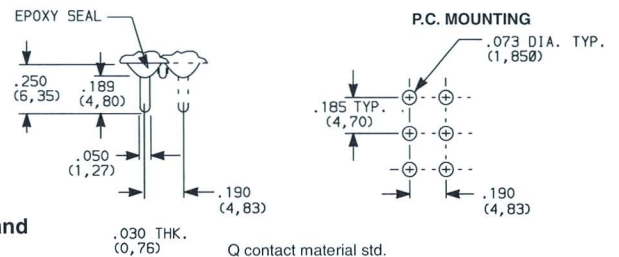
Z (STD.)



SPDT and DPDT

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

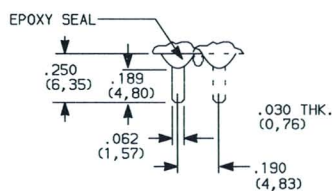
C



SPDT and DPDT

Q contact material std.

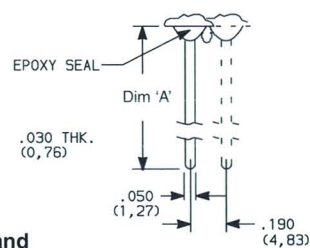
Z3 QUICK CONNECT



SPDT and DPDT

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

W-W1-W3-W4-W5 WIRE WRAP



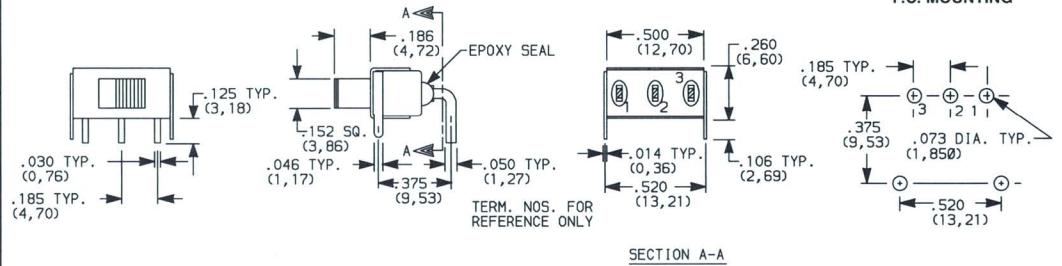
SPDT and DPDT

B contact material std.

Option	DIM 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

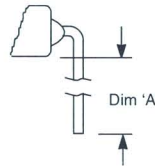
TERMINATIONS

A



A

AW-AW1-AW3-AW4-AW5 EXTENDED

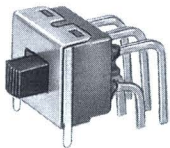
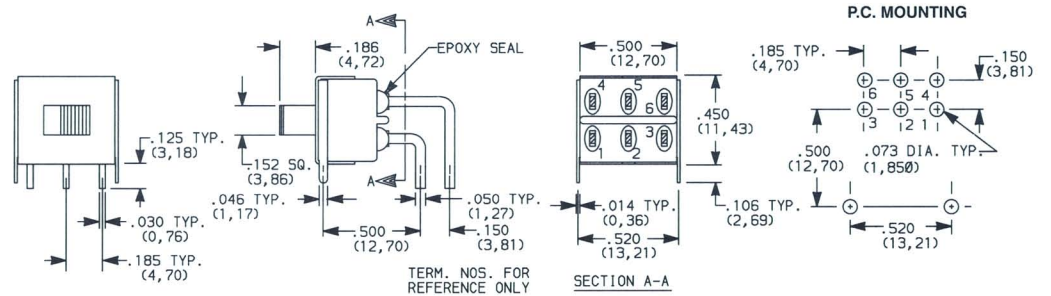


Option	DIM 'A'
AW	.50 (12,7)
AW1	.71 (18,0)
AW3	.20 (5,1)
AW4	.81 (20,6)
AW5	1.06 (26,9)

SPDT

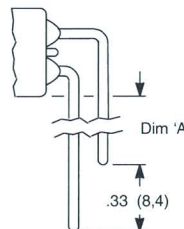
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

A



A

AW1-AW4-AW5 EXTENDED



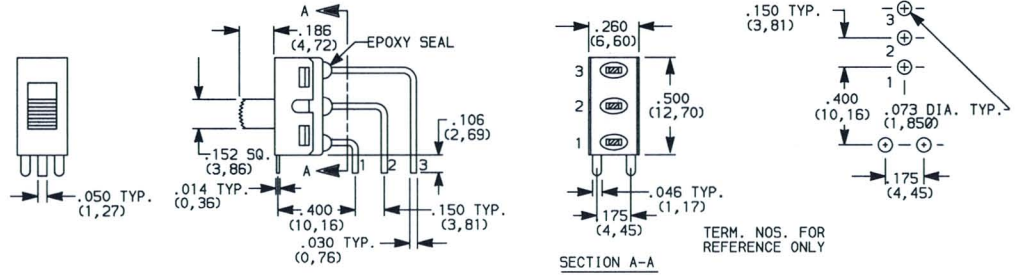
Option	DIM 'A'
AW1	.35 (8,9)
AW4	.46 (11,7)
AW5	.70 (17,8)

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.

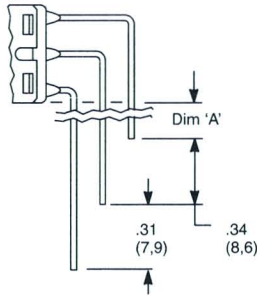
TERMINATIONS

AV2

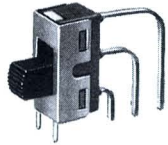


Part No. Shown: 1101M2S3AV2BE2

AV1-AV4-AV5 EXTENDED



Option	DIM 'A'
AV1	.13 (3,3)
AV4	.22 (5,6)
AV5	.46 (11,7)

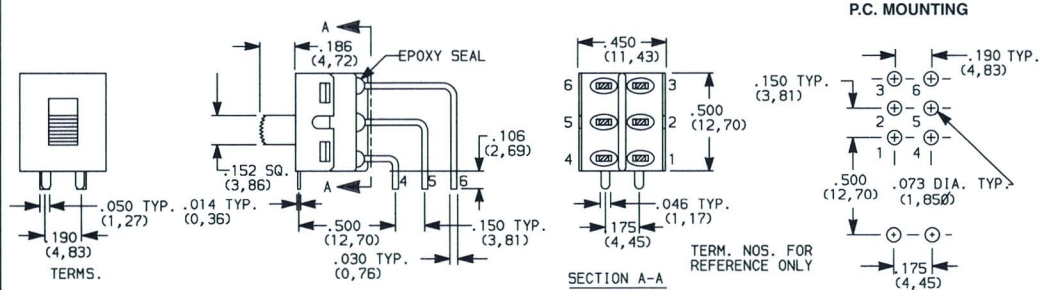


AV2

SPDT

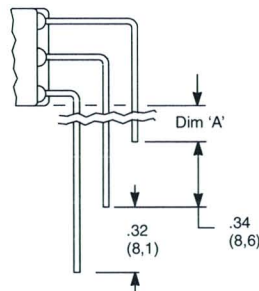
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with M1 mtg. style, I seal option.

AV2

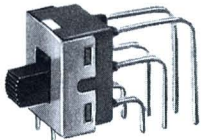


Part No. Shown: 1201M2S3AV2BE2

AV4-AV5 EXTENDED



Option	DIM 'A'
AV4	.16 (4,1)
AV5	.40 (10,2)



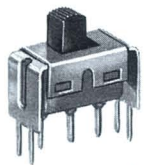
AV2

DPDT

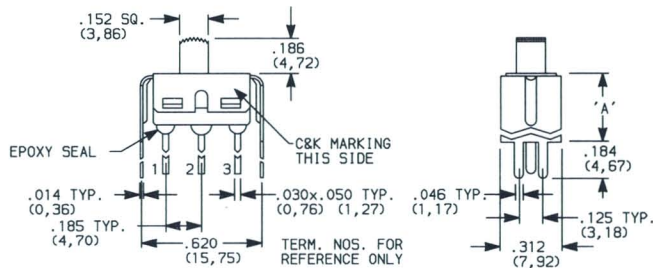
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with M1 mtg. style, I seal option.

TERMINATIONS

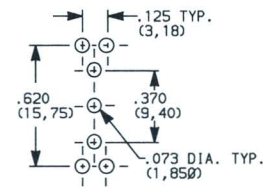
V3-V4



V3



P.C.MOUNTING



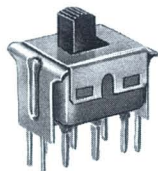
Option	DIM 'A'
V3	.350 (8,89)
V4	.525 (13,34)

SPDT

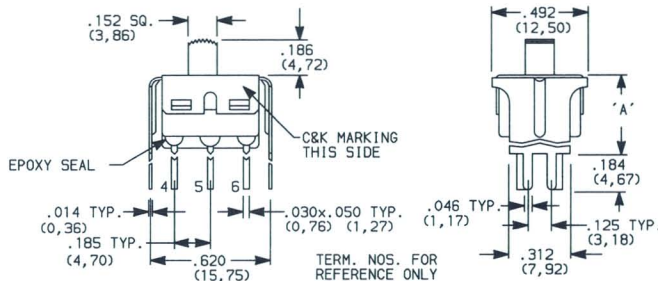
Actuator shown in pos. 1.
B contact material std.
Not available with M1 mtg. style, I seal option.

Part No. Shown: 1101M2S3V_BE2

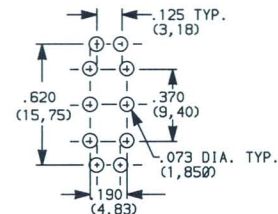
V3-V4



V3



P.C.MOUNTING



Option	DIM 'A'
V3	.400 (10,16)
V4	.575 (14,61)

DPDT

Actuator shown in pos. 1.
B contact material std.
Not available with M1 mtg. style, I seal option.

Part No. Shown: 1201M2S3V_BE2

CONTACT MATERIAL

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

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.

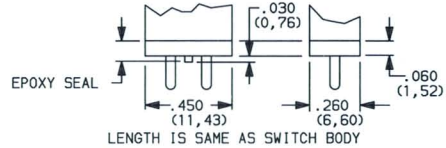
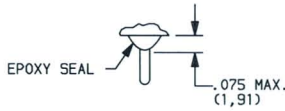
B contact material standard with all terminations except Z, C, Z3.
 Q contact material standard with Z, C, Z3 terminations.

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.)



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).

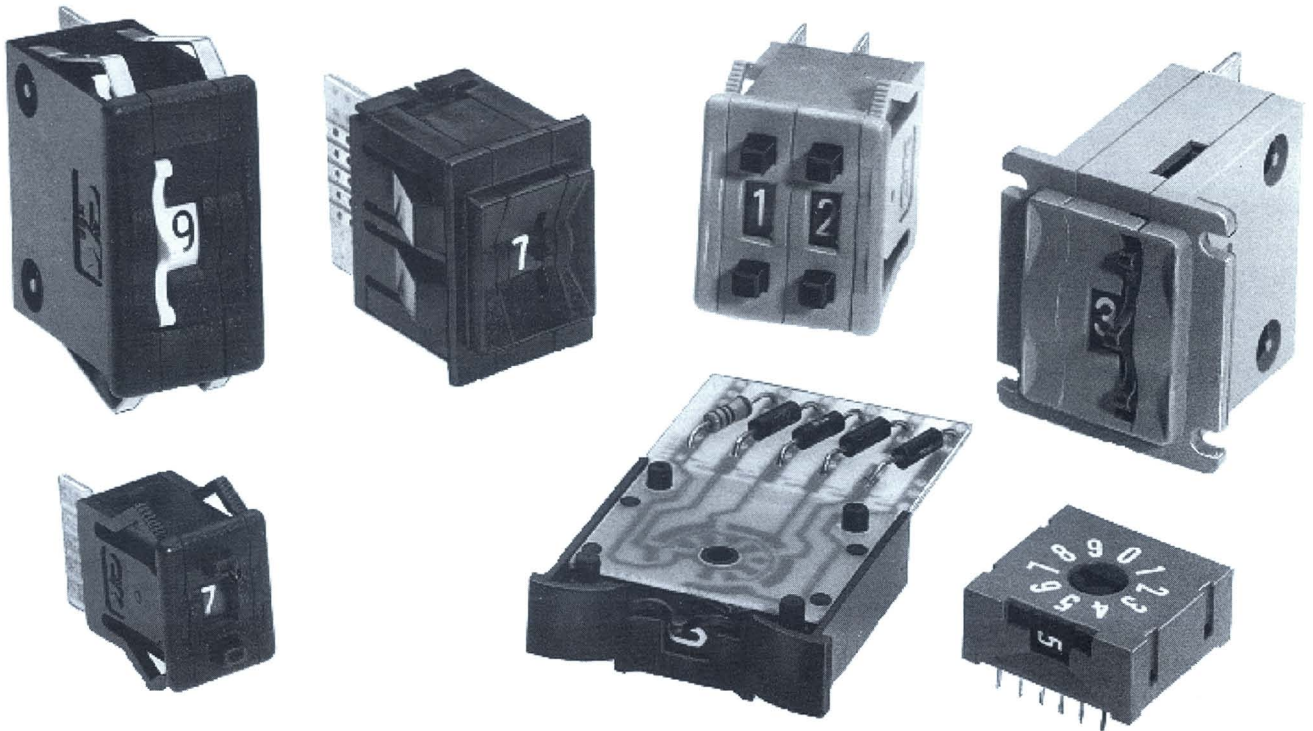
MATERIALS

- 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.

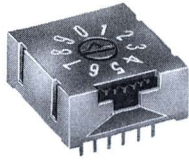
NOTE: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

SECTION F

CODED SWITCHES

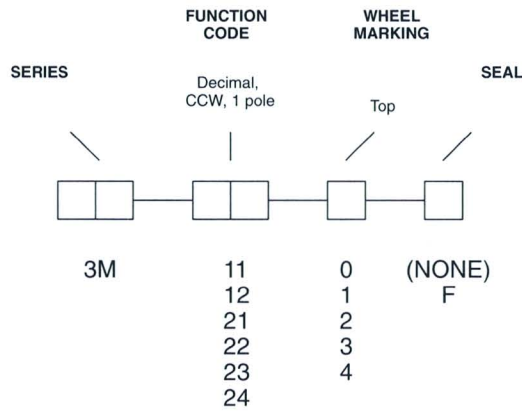


3M Series	Minithumbwheel Switches	F-2 thru F-4
3U Series	Tiny Pushwheel Switches	F-5 thru F-9
3P Series	Miniature Pushwheel Switches	F-10 thru F-14
S2 Series	Subminiature Thumbwheel Switches	F-15 thru F-20
SF/SR Series	Thumbwheel Switches	F-21 thru F-31
3 Series	Thumbwheel Switches	F-32 thru F-44



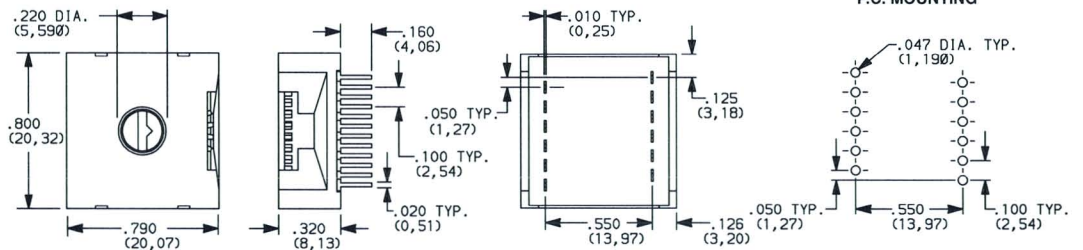
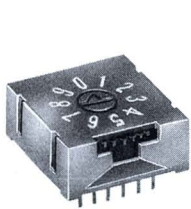
Easy Build-A-Switch:

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

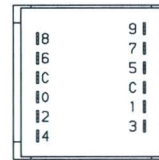
11 DECIMAL, CCW, 1 POLE

12 DECIMAL, CW, 1 POLE

W H M 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										●

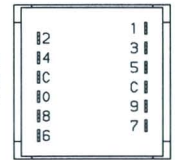
FUNCTION CODE 11

Wheel opening this side.



FUNCTION CODE 12

Wheel opening this side.



CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).

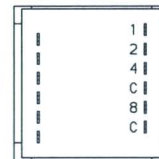
21 BCD, CCW, 1 POLE

22 BCD, CW, 1 POLE

W H M L	COMM. (C) CONN TO TERM. IND.			
	1	2	4	8
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●		●
7	●	●	●	
8				●
9	●			●

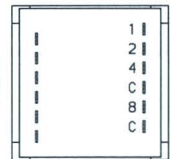
FUNCTION CODE 21

Wheel opening this side.



FUNCTION CODE 22

Wheel opening this side.



CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).
All unused terminals should not be connected.

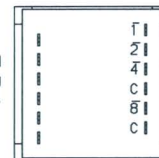
23 COMPLEMENT OF BCD, CCW, 1 POLE

24 COMPLEMENT OF BCD, CW, 1 POLE

W H M L	COMM. (C) CONN TO TERM. IND.			
	1	2	4	8
0	●	●	●	●
1		●	●	●
2	●		●	●
3		●		●
4	●	●		●
5		●		●
6	●		●	
7		●	●	●
8	●	●		●
9		●	●	●

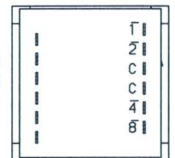
FUNCTION CODE 23

Wheel opening this side.



FUNCTION CODE 24

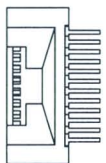
Wheel opening this side.



CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).
All unused terminals should not be connected.

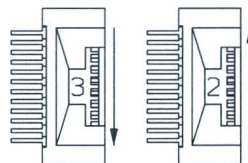
WHEEL MARKING

0 NO WHEEL MARKING (STD.)



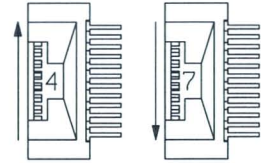
1

CCW CW

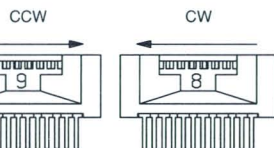


2

CCW CW

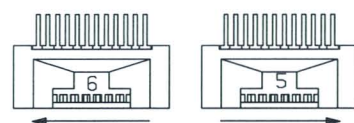


3



4

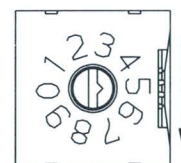
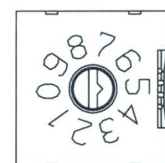
CCW CW


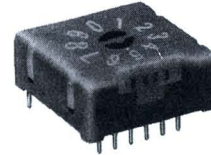


TOP MARKINGS - ALL SWITCHES

CCW

CW



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: 10⁵ detent operations @ 25°C.**CONTACT RESISTANCE:** Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.**INSULATION RESISTANCE:** 10⁸ 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 1 2 3 4 5 6 7 8 9	11 12 21 61 65 91 98 99	0	0 1 3 9 A L P	0 1 9	0 2	(NONE) 3 5 6

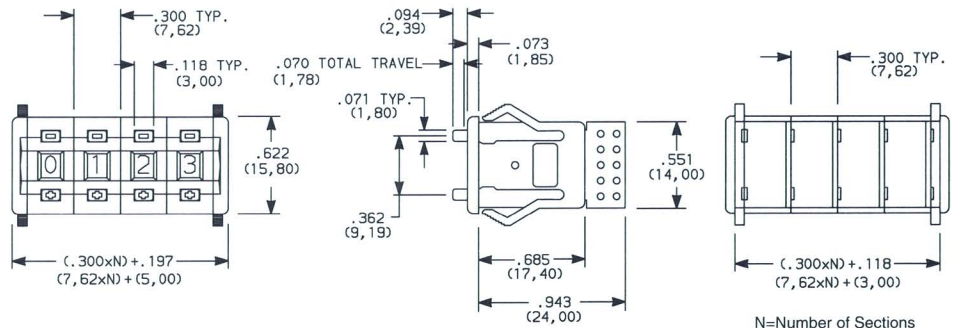
Special switch no. assigned by C&K.



Configuration form required, see page F-9.

SERIES

3U



N=Number of Sections

Part No. Shown: 3U4210000

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 H E E L	SIGNALS CONNECTED TO COMMON SIGNAL C										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-7.

12 DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS
L, P

W H E E L	SIGNALS CONNECTED TO COMMON SIGNAL C										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-7.

21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS
0, 1, 3, A, L, P

W H E E L	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	
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 H E E L	SIG. CONN. TO 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 H E E L	SIG. CONN. TO C		
	0	5	
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

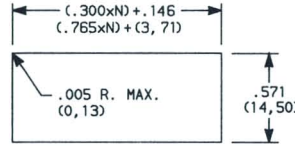
98 IC ROM, 32 WORD X 8 BIT, USER PROGRAMMABLE, ADDRESS 0 THRU 9

AVAILABLE TERMINATIONS
L, P

99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-9 AND CONSULT FACTORY.

MOUNTING STYLE

0 SNAP-IN FRONT MOUNTING



RECOMMENDED PANEL THICKNESS

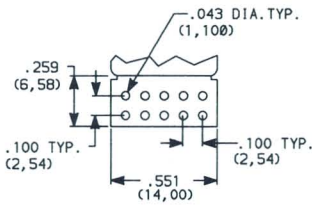
.039 - .156
(0,99) - (3,95)

N = Number of sections.

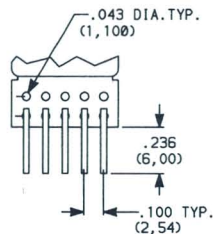
TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

0 (STD.)

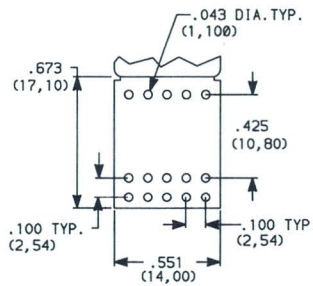


3 TYPE 0 WITH SOLDER PINS



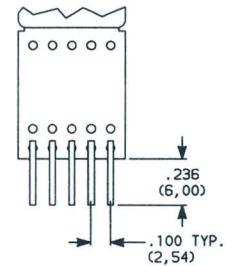
See fig. 1, below.

1 EXTENDED BOARD W/PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

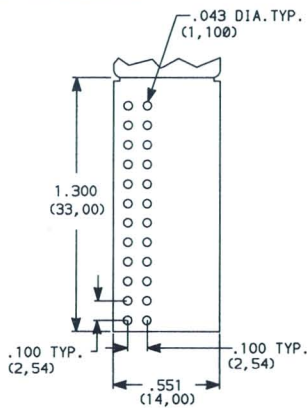
A TYPE 1 WITH SOLDER PINS



See fig. 1, below.

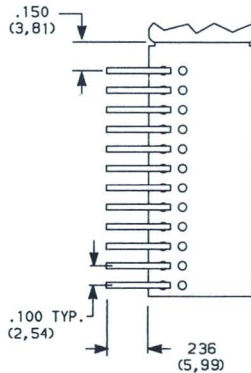
P.C. BOARD 1/32" (0,79) THK.

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

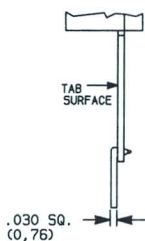


Fig. 1

TERMINAL LOCATION NUMBERS

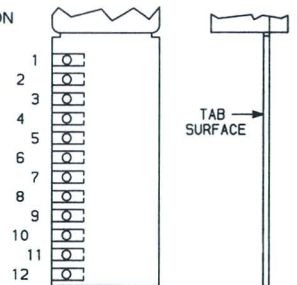


Fig. 3

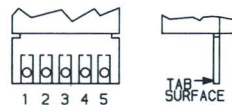


Fig. 2

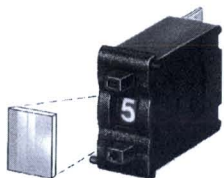
See function codes, page F-6 for signal locations.



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: 10⁹ 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.



3P Series

NEW ILLUMINATED MODELS

Miniature Pushwheel Switches



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 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-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						

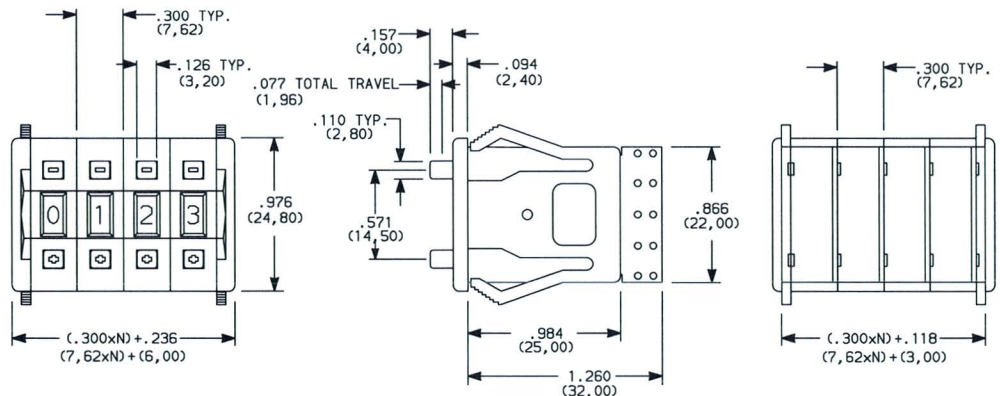
Special switch no. assigned by C&K.



Configuration form required, see page F-14.

SERIES

3P



N = Number of Sections

Part No. Shown: 3P4210000

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

WHEEL	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

WHEEL	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.

21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

WHEEL	SIGNALS CONN. TO COMM. SIG. C			
	1	2	4	8
0				●
1	●			●
2		●		●
3	●	●		●
4			●	●
5	●	●	●	●
6		●	●	●
7	●	●	●	●
8				●
9	●			●
	1	3	5	7
	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

WHEEL	SIGNALS CONN. TO COMM. SIG. C			
	1	2	4	8
0	●	●	●	●
1	●	●	●	●
2	●	●	●	●
3	●	●	●	●
4	●	●	●	●
5	●	●	●	●
6	●	●	●	●
7	●	●	●	●
8	●	●	●	●
9	●	●	●	●
	1	7	9	3
	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

WHEEL	SIG. CONN. TO C	
	+	-
0	●	●
+	●	●
-	●	●
+	●	●
-	●	●
+	●	●
-	●	●
+	●	●
-	●	●
+	●	●
-	●	●
	3	5
	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

WHEEL	SIG. CONN. TO C	
	0	5
0	●	●
5	●	●
0	●	●
5	●	●
0	●	●
5	●	●
0	●	●
5	●	●
0	●	●
5	●	●
	3	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

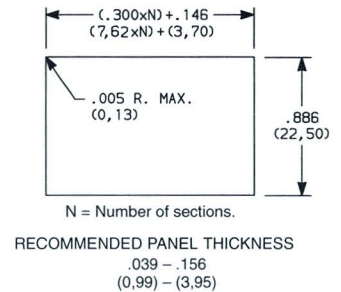
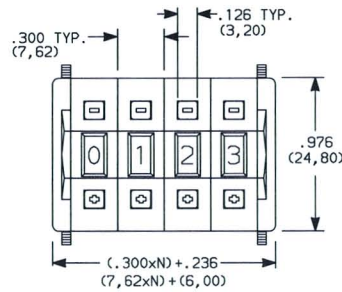
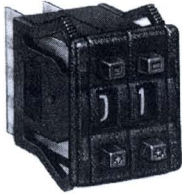
AVAILABLE TERMINATIONS

L, P

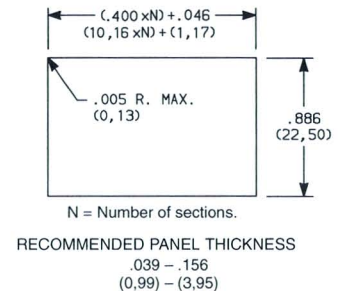
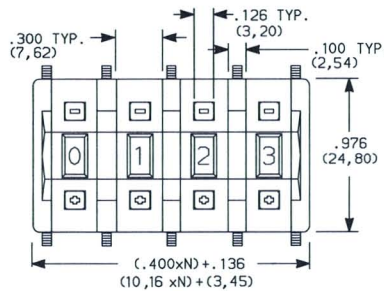
99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-14 AND CONSULT FACTORY.

MOUNTING STYLE

0 SNAP-IN FRONT MOUNTING
SECTION PITCH: 300 (7,62) EA. SECTION



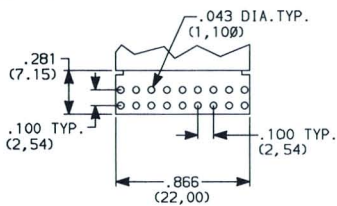
3 SNAP-IN FRONT MOUNTING W/ SPACER-SECTION PITCH:
400 (70,16) EA. SECTION (LAST SECTION .300 (7,62))



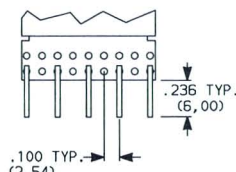
TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

0 (STD.)

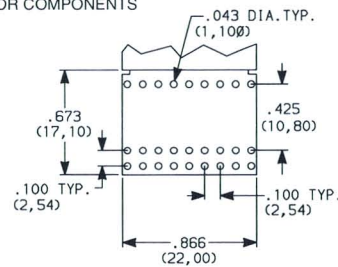


3 TYPE 0 W/ SOLDER PINS



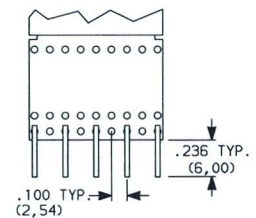
See fig. 1, page F-13.

1 EXTENDED BOARD W/ PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

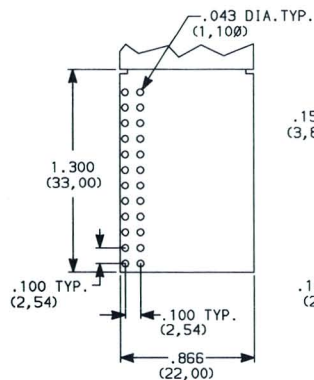
A TYPE 1 W/ SOLDER PINS



See fig. 1, page F-13.

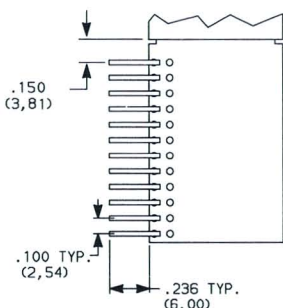
P.C. BOARD 1/32" (0,79) THK.

L RIGHT ANGLE BOARD



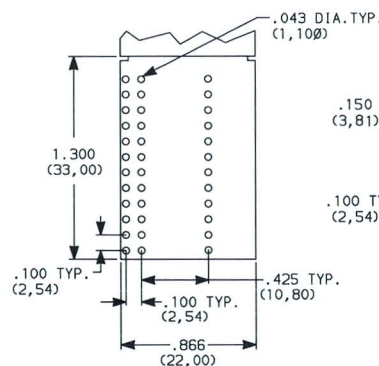
P.C. BOARD 1/32" (0,79) THK.

P TYPE L W/ SOLDER PINS



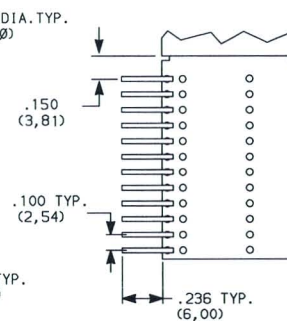
See fig. 1, page F-13.
Unsuitable for panel mounting.

W RIGHT ANGLE BOARD W/ PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

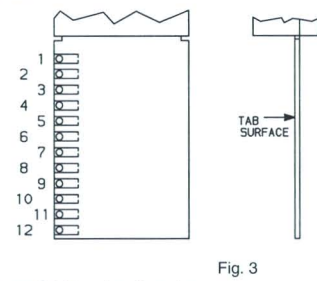
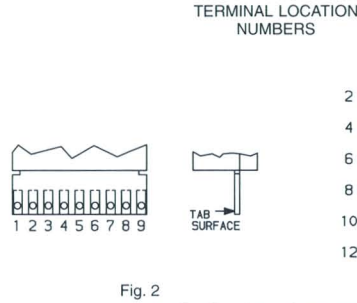
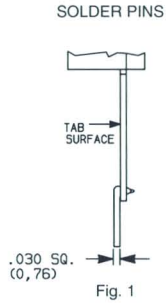
Y TYPE W W/ SOLDER PINS



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

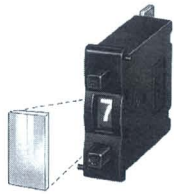


See function codes, page F-11 for signal locations.

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: 10⁹ 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:

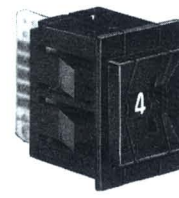
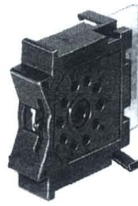
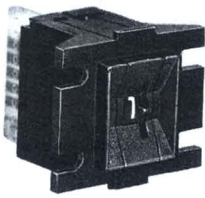
ORIGINATED BY _____ SALES REP. _____

PUSHWHEEL SECTIONS		NO. OF SEC.	FUNCTION CODE—TERMINATIONS— COLOR/MARKING/STOPS—DUST LENS <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"/>	<input type="checkbox"/> 1 <input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/> 2 <input type="checkbox"/>	2	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 3 <input type="checkbox"/>	3	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 4 <input type="checkbox"/>	4	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 5 <input type="checkbox"/>	5	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 6 <input type="checkbox"/>	6	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 7 <input type="checkbox"/>	7	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 8 <input type="checkbox"/>	8	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 9 <input type="checkbox"/>	9	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 0 <input type="checkbox"/>	10	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 1 <input type="checkbox"/>	11	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 2 <input type="checkbox"/>	12	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 3 <input type="checkbox"/>	13	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 4 <input type="checkbox"/>	14	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 5 <input type="checkbox"/>	15	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
<input type="checkbox"/>	<input type="checkbox"/> 6 <input type="checkbox"/>	16	<input type="text"/> 3 <input type="text"/> P <input type="text"/> - <input type="text"/> <input type="text"/> - <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 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.

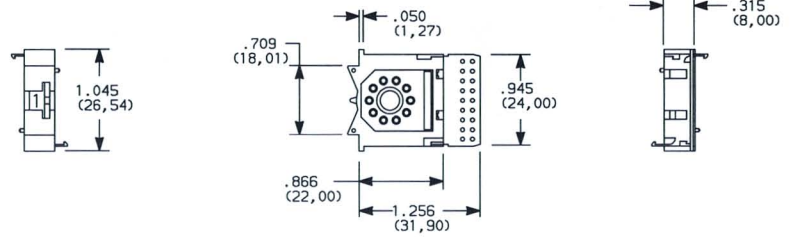
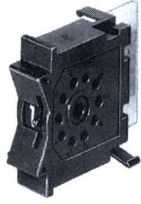


Configuration form required, see page F-20.

F

MOUNTING STYLE

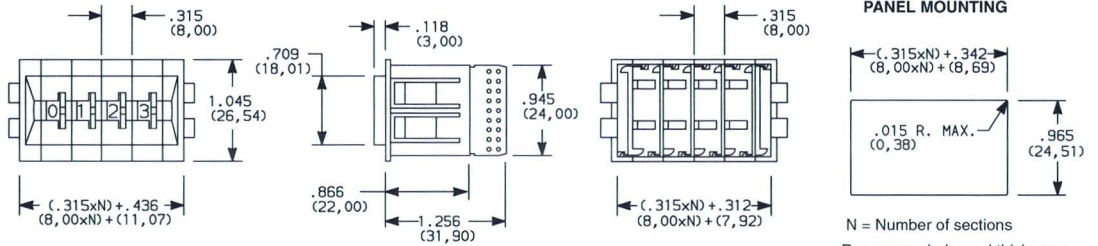
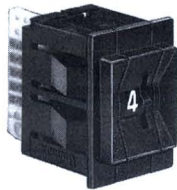
S2D SWITCH SECTION ONLY (ENDPLATES NOT SUPPLIED)



MUST BE ORDERED WITH 0 NUMBER OF SECTIONS OPTION, SEE PAGE F-19.

Part No. Shown: S2DXXXS00

S2F SNAP-IN FRONT MOUNTING

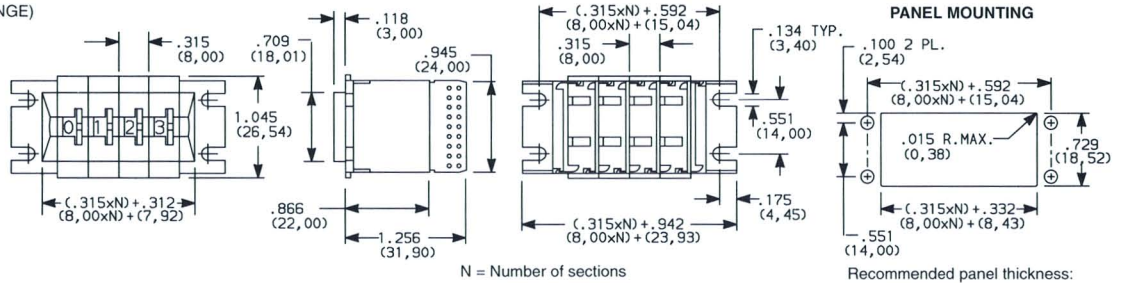
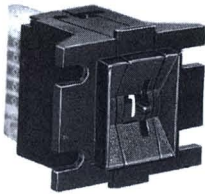


PANEL MOUNTING

N = Number of sections
Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2FXXXS04

S2R REAR MOUNT (8MM FLANGE)

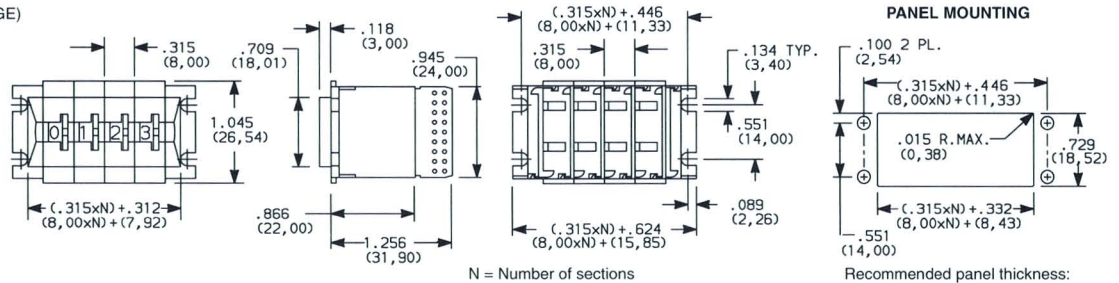
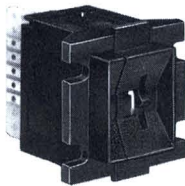


PANEL MOUNTING

N = Number of sections
Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2RXXXS04

S2S REAR MOUNT (4MM FLANGE)

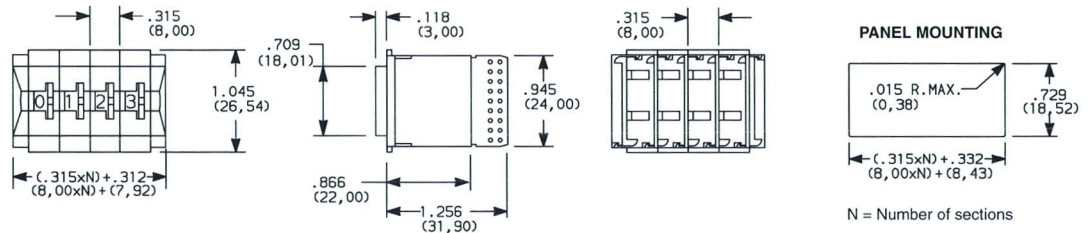
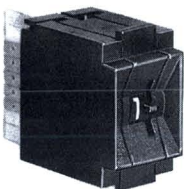


PANEL MOUNTING

N = Number of sections
Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2SXXXS04

S2T REAR MOUNT (NO FLANGE)



PANEL MOUNTING

N = Number of sections
Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2TXXXS04

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 COMM. SIG. C				TO COMM. SIG. C
	1	2	4	8	
0	●	●	●	●	●
1					●
2	●				●
3		●			●
4	●	●			●
5			●		●
6	●				●
7				●	●
8	●				●
9		●	●	●	●
	4	5	6	7	3
	2	3	4	5	1
	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 COMM. SIG. C				TO COMM. SIG. C
	1	2	4	8	
0					●
1	●				●
2		●			●
3			●		●
4				●	●
5	●				●
6		●			●
7	●	●			●
8			●		●
9	●				●
	4	5	6	7	3
	2	3	4	5	1
	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	T	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

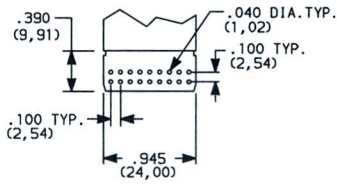
099 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-20 AND CONSULT FACTORY.

TERMINATIONS

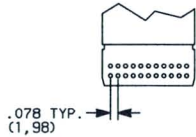
NOTE: All terminal holes shown may not be present for all function codes, consult factory.

S (STD.)

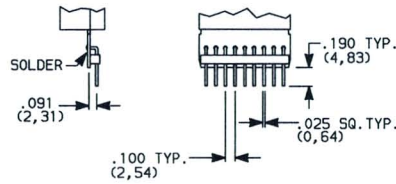
For all function codes except 012.



For function code 012.

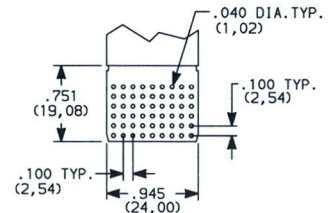


C TYPE S W/ SOLDER PINS (HEADER)

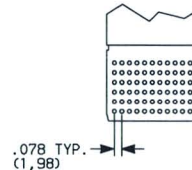


E EXTENDED BOARD

For all function codes except 012.

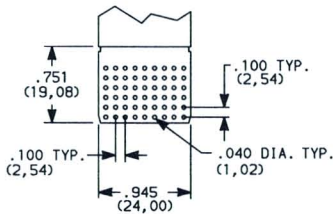


For function code 012.

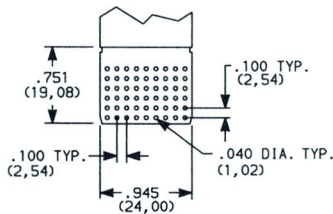


P.C. BOARD 1/32" (0,79) THK.

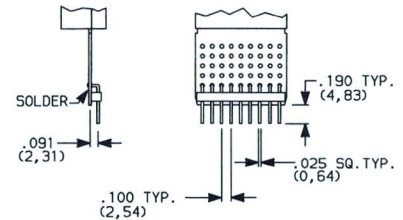
A W/ PROVISIONS FOR COMPONENTS



B W/ COMPONENTS MOUNTED (CONFIGURATION FORM REQUIRED, SEE PAGE F-20)



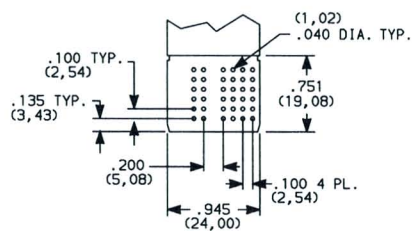
T TYPE E W/ SOLDER PINS (HEADER)



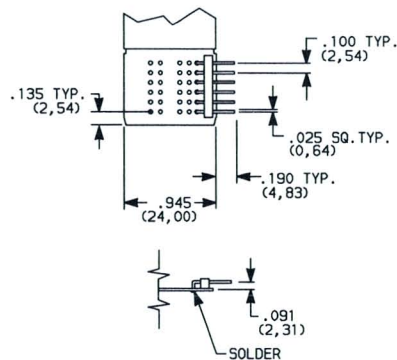
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

L RIGHT ANGLE



P TYPE L W/ SOLDER PINS (HEADER)



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

Unsuitable for panel mounting.

P.C. BOARD 1/32" (0,79) THK.

TERMINAL LOCATION NUMBERS

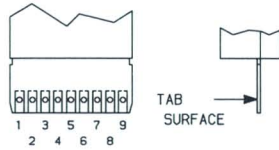


Fig. 1

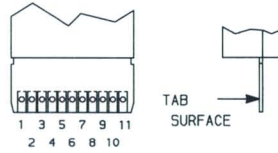


Fig. 2

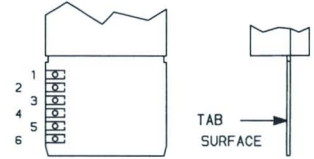


Fig. 3

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.

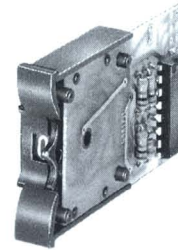
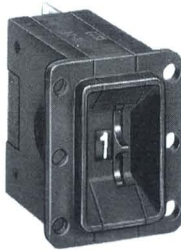
SPECIFICATIONS

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: 10⁹ 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.



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

Special switch no. assigned by C&K.

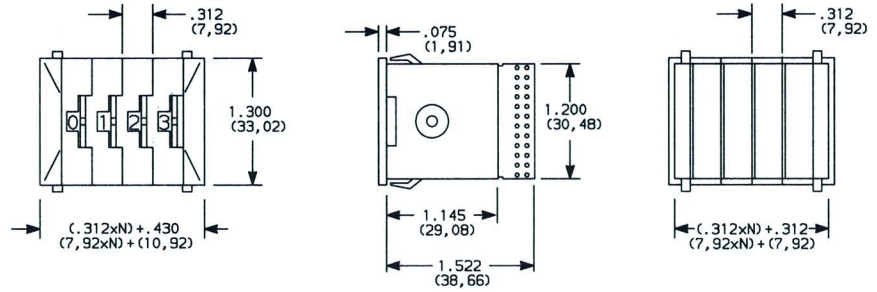
Configuration form required, see page F-31.

SF	012	160	9	0
SR	013	161	A	1
	014	163	B	2
	017	164	C	3
	018	165	D	4
	019	166	E	5
	020	167	F	6
	021	168	N	7
	022	169	R	8
	023	170	S	9
	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			



MOUNTING STYLE

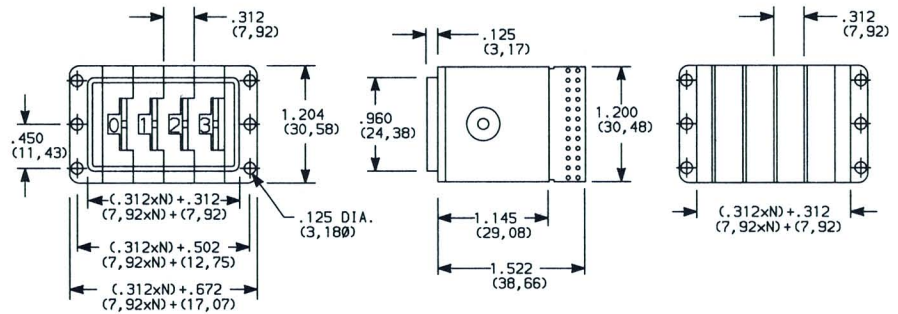
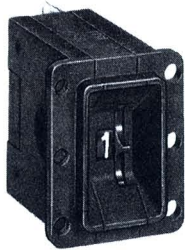
SF SNAP-IN FRONT MOUNTING



N = Number of Sections

Part No. Shown: SFXXS04

SR REAR MOUNTING (8MM FLANGE)

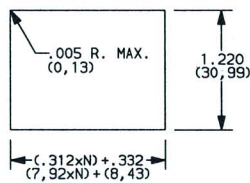


N = Number of Sections

Part No. Shown: SRXXS04

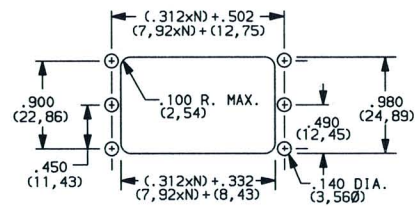
PANEL MOUNTING

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.

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 COMMON SIG. C				
	1	2	4	2'	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●	●		●	●
6				●	●
7	●		●	●	●
8				●	●
9	●	●	●	●	●
10 7, 6, 4, 5 2 12					
TERM. LOCATION					

See fig. 1, page F-29.

AVAILABLE TERMINATIONS

C, S

WHEEL	SIGNALS CONN. TO COMMON 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											●	●
12 11 10 9 8 7 6 5 4 3 2 1												
TERM. LOCATION												

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

WHEEL	WHEEL	SIGNALS CONN. TO COMMON SIG. C																
		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.

WHEEL	WHEEL	SIGNALS CONN. TO COMMON SIG. C			
		1	2	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				●
10 8 6 2 4					
TERM. LOCATION					

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.

WHEEL	WHEEL	SIGNALS CONN. TO COMMON SIG. C			
		1	2	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	●	●		●
10 8 6 2 4					
TERM. LOCATION					

See fig. 1, page F-29.

AVAILABLE TERMINATIONS

9

092 BLANK SECTION W/ RIBBED CENTER (INACTIVE)

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

KELVIN-VARLEY VOLTAGE DIVIDER

AVAILABLE TERMINATIONS

B, R

Configuration form required for B and R terminations, see page F-31.



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.

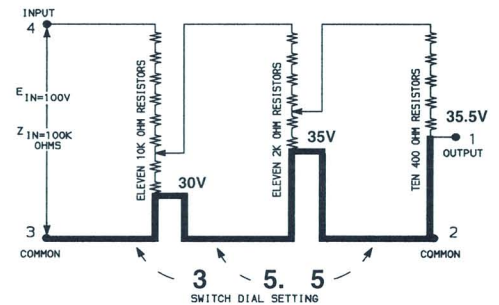
The accuracy and the resolution is not solely dependent on the accuracy of the resistors used, but mainly in the number of decades used. For example: a 100 volt signal can be divided in 10 volt steps with a 10 volt resolution with only one decade; or 1 volt steps with a 1 volt resolution with 2 decades; 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 H E E L	PINS 1 AND 2 CONNECTED ACROSS RESISTORS INDICATED													
	R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	1	2	3	4
0	●	●												
1		●	●											
2			●	●										
3				●	●									
4					●	●								
5						●	●							
6							●	●						
7								●	●					
8									●	●				
9										●	●			
											8, 10	4, 6	12	1, 2
											TERM. LOCATION			

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

074 RESISTANCE DECADE; 1-2-3-6 CODE, 10 POSITION (W/O COMPONENTS)

AVAILABLE TERMINATIONS

A, B, C, N, R, S

W H E E L	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0	●				●
1		●			●
2	●	●	●		●
3		●	●		●
4	●		●		●
5			●		●
6	●	●			●
7		●			●
8	●				●
9					●
	6	8	2	4	10
	TERM. LOCATION				

See fig. 1, page F-29.

AVAILABLE TERMINATIONS

A, B, N, R

Configuration form required for B and R terminations, see page F-31.

W H E E L	RESISTORS IN CIRCUIT					
	R1	R2	R3	R6	A	B
0					●	●
1	●					
2		●				
3			●			
4	●		●			
5		●	●			
6	●	●				
7	●		●			
8		●				
9			●	●		
					10	2
	TERM. LOCATION					

See fig. 1, page F-29.

FUNCTION CODE

For terminal location diagram, see Fig. 1, page F-29.

072, 160, 161, 163, 164, 165

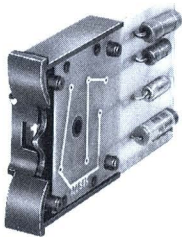
AVAILABLE TERMINATIONS
160, 161, 163, 164, 165 MODELS

B

AVAILABLE TERMINATIONS
072 MODELS

A, B

Configuration form required for 072 models when ordered with B terminations, see page F-31.



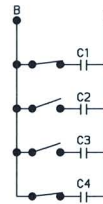
CAPACITANCE DECADE

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.

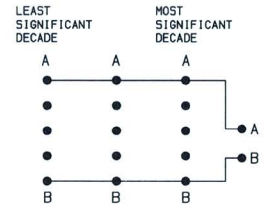
FUNCTION CODE	CAPACITANCE RANGE	MAXIMUM VOLTAGE
072	Without Components	
160	10 to 90.0 μ f	10 V DC
161	1 to 9.0 μ f	15 V DC
163	0.1 to 0.9 μ f	25 V DC
164	0.01 to 0.09 μ f	50 V DC
165	0.001 to 0.009 μ f	100 V DC

Other capacitors available, consult factory.

W H E E 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

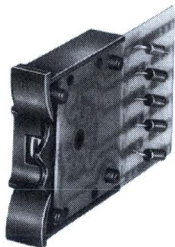
1, 2, 2, 2, 2 CODE

AVAILABLE TERMINATIONS
166 THRU 172 MODELS

B, R

AVAILABLE TERMINATIONS
060 MODELS

A, N



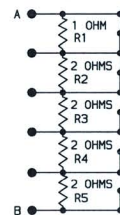
RESISTANCE DECADE

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.

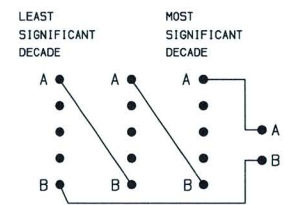
FUNCTION CODE _____ RESISTANCE RANGE _____

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 H E E L	RESISTORS IN CIRCUIT BETWEEN A & B						
	R1	R2	R3	R4	R5	A	B
0							
1	●						
2		●					
3			●				
4				●			
5	●				●		
6		●				●	
7			●				●
8	●						●
9		●					●
	2,	4,	6,	8,	10,		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 m 55, other resistors are available depending on application, consult factory.

FUNCTION CODE

For terminal location diagram, see Fig. 1, page F-29.

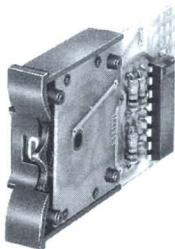
173, 174, 176, 177

AVAILABLE TERMINATIONS
174, 176, 177 MODELS

B, R

AVAILABLE TERMINATIONS
173 MODELS

A, N,



SEVEN SEGMENT DRIVER

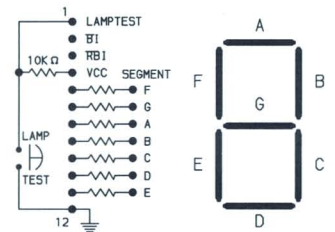
This Seven Segment Driver has a built-in decoder driver. The decimal number displayed is converted to BCD and supplied to the decoder's BCD inputs. The Seven Segment (A thru G) lines are available at the P.C. board terminals in addition to the V_{CC} , ground, ripple blanking input and lamptest. This 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 H E E L	● DENOTES SEGMENT "ON" DIAL											
	A	B	C	D	E	F	G	V _{cc}	B ₁	B ₀	LAMPTEST	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											

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.

See fig. 1, page F-29.

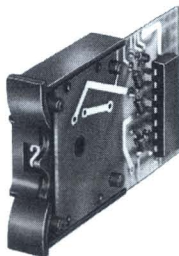
050, 178, 179

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_p) 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

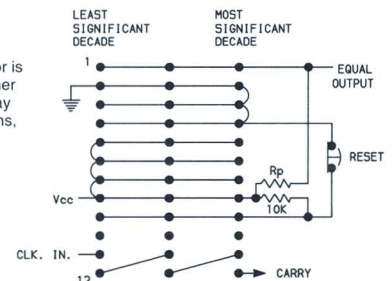
Pulses applied at the count input of the LSD switch are counted and converted to BCD; the "BCD 8" output of the LSD, and so forth; when the accumulated count in the decade counter equals the number displayed by the switches, an "Equal" signal is generated at the "Equal" output.

FUNCTION CODE	LOGIC TYPE	I.C. TYPE	OPERATING VOLTAGE	R_p
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 _{cc}
6	V _{cc}
7	V _{cc}
8	V _{cc}
9	RESET
10	N.O.
11	CLOCK INPUT IN
12	CLOCK OUTPUT OUT

Only one "Pull-up" (R_p) 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

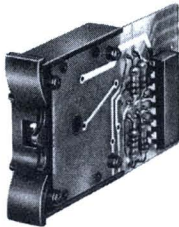
AVAILABLE TERMINATIONS
187 MODELS

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

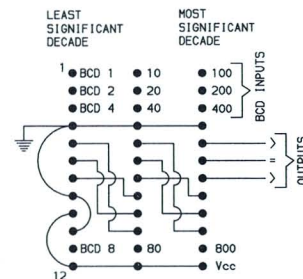
1. Unused input should be connected to ground.
2. Unused decades: BCD inputs should be connected to ground and corresponding switch set to zero.
3. Unused polarity inputs: (+) is Low and (-) is High. If it is not to be used, connect the (+) input to V_{CC} through 1K ohm resistor and set switch on "-"; 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	V_{CC}



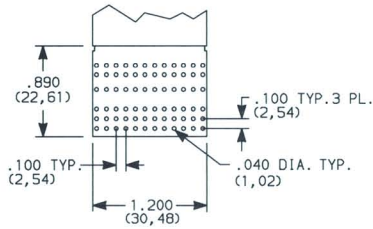
Typical three decade connection (rear view).

F

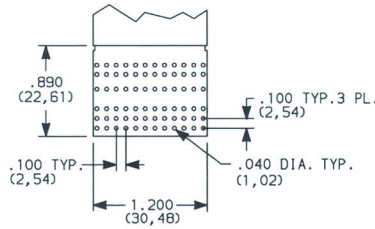
TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

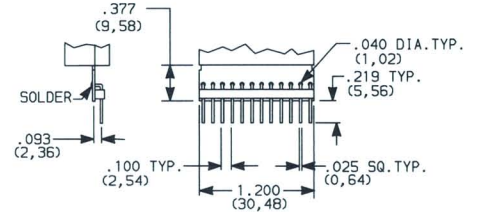
A EXTENDED BOARD W/ PROVISIONS FOR COMPONENTS



B EXTENDED BOARD W/ COMPONENTS MOUNTED



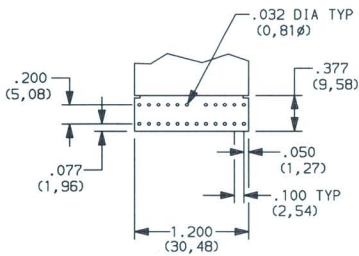
C TYPE S W/ SOLDER PINS (HEADER)



Signal traces cut except for common(s).

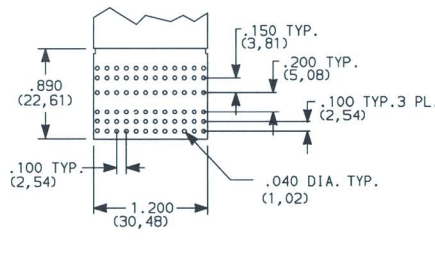
P.C. BOARD 1/32" (0,79) THK

D FOR 013 CODE ONLY



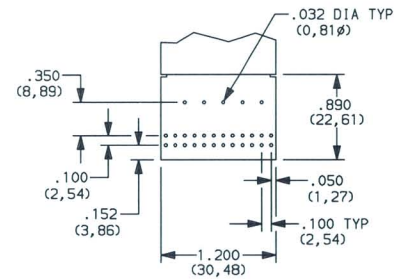
For terminal locations, consult factory.

E EXTENDED BOARD



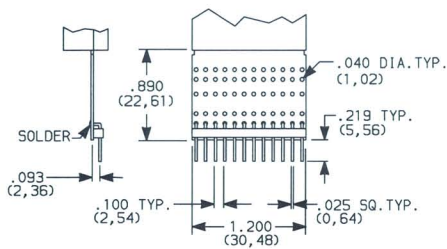
P.C. BOARD 1/32" (0,79) THK

F FOR 052, 055 CODES ONLY

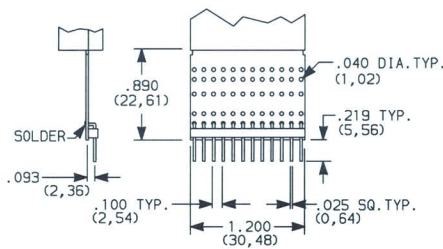


For terminal locations, consult factory.

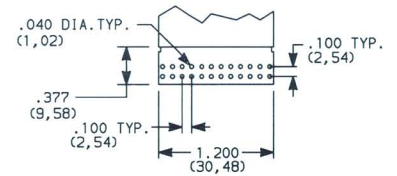
N TYPE A W/ SOLDER PINS (HEADER) AND PROVISION FOR COMPONENTS



R TYPE B W/ SOLDER PINS (HEADER) AND COMPONENTS MOUNTED



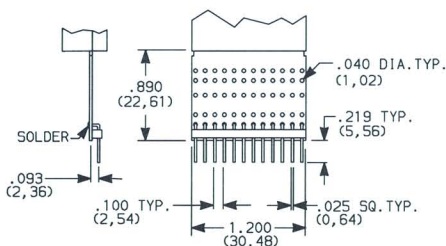
S (STD.)



Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK

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

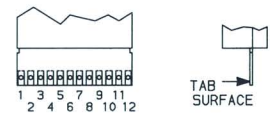


Fig. 1

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: 10⁹ 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.

S

C&K PART NUMBER

C&K PART NUMBER

COMPANY NAME _____

REVISION:

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

DETAILS:

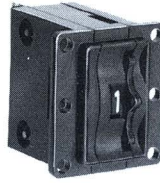
ORIGINATED BY _____ SALES REP. _____

THUMBWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE — TERMINATIONS — COLOR/MARKING/STOPS/SEAL <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"/> <input type="text"/> -	
	2	S - <input type="text"/> <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"/> <input type="text"/> -	
	4	S - <input type="text"/> <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"/> <input type="text"/> -	
	6	S - <input type="text"/> <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"/> <input type="text"/> -	
	8	S - <input type="text"/> <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"/> <input type="text"/> -	
	10	S - <input type="text"/> <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"/> <input type="text"/> -	
	12	S - <input type="text"/> <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"/> <input type="text"/> -	
	14	S - <input type="text"/> <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"/> <input type="text"/> -	
	16	S - <input type="text"/> <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 ____

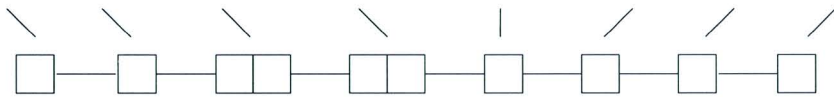


Easy Build-A-Switch:

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
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3	One	Decimal 1 Pole	Front Mount		Black w/ white Markings	Unsealed	None
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Special switch no. assigned by C&K.



Configuration form required, see page F-44.

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			

F

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

12 DECIMAL—1 POLE; 10 POSITION

AVAILABLE TERMINATIONS
0, 1, 3, A

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										●	●
	2	3	4	5	6	7	8	9	10	11	12

TERM. LOCATION

See fig.1, page F-42.

AVAILABLE TERMINATIONS
1, 4, 5, A, D, E

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										●	●
	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

14 RESISTOR DECADE; 1-2-2-2-2 CODE (RESISTORS NOT SUPPLIED)

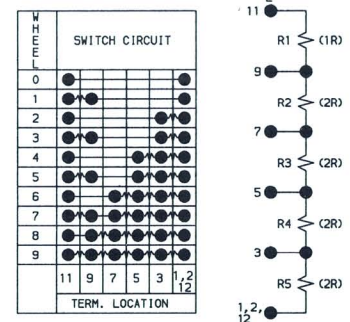
AVAILABLE TERMINATIONS
M, U

WHEEL	COMMON A CONN. TO:	COMMON B 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.

AVAILABLE TERMINATIONS
1, A



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.)

AVAILABLE TERMINATIONS
1, 4, 5, A, D, E

W H E E 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.

- 35** BCD 1-2-4-8 W/ SEPARATE COMMON TO NOT TRUE BITS, 10 POSITION

AVAILABLE TERMINATIONS
0, 1, 3, A

W H E E 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.

- 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
0, 1, 3, A

W H E E L	SIGNALS CONN. TO COMM. SIG. C			
	1	2	4	8
0	●	●	●	●
1	●	●	●	●
2	●	●	●	●
3	●	●	●	●
4	●	●	●	●
5	●	●	●	●
6	●	●	●	●
7	●	●	●	●
8	●	●	●	●
9	●	●	●	●
	10	9	8	7
	TERM. LOCATION			

See fig.1, page F-42.

- 45** BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS
0,3

W H E E 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

AVAILABLE TERMINATIONS
0, 1, 3, 4, 5, A, D, E

W H E E L	SIGNALS CONN. TO COMM. SIG. C			
	1	2	4	8
0	●	●	●	●
1	●	●	●	●
2	●	●	●	●
3	●	●	●	●
4	●	●	●	●
5	●	●	●	●
6	●	●	●	●
7	●	●	●	●
8	●	●	●	●
9	●	●	●	●
	5	4	3	2
	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

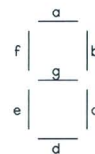
AVAILABLE TERMINATIONS
F, H

W H E E L	SIGNALS CONNECT TO COMMON GROUND							
	a	b	c	d	e	f	g	8ndVcc
0	●	●	●	●	●	●	●	●
1	●	●	●	●	●	●	●	●
2	●	●	●	●	●	●	●	●
3	●	●	●	●	●	●	●	●
4	●	●	●	●	●	●	●	●
5	●	●	●	●	●	●	●	●
6	●	●	●	●	●	●	●	●
7	●	●	●	●	●	●	●	●
8	●	●	●	●	●	●	●	●
9	●	●	●	●	●	●	●	●
	1	2	4	8				
	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 H E E L	COMMON (C) CONNECTED TO TERMINAL INDICATED							
	a	b	c	d	e	f	g	8ndVcc
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 H E E L	SIG. CONN. TO C		
	+	-	C
0	●	●	●
1	●	●	●
2	●	●	●
3	●	●	●
4	●	●	●
5	●	●	●
6	●	●	●
7	●	●	●
8	●	●	●
9	●	●	●
A	●	●	●
B	●	●	●
C	●	●	●
D	●	●	●
E	●	●	●
F	●	●	●
	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 H E E 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 H E E 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 H E E 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 H E E 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 H E E 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

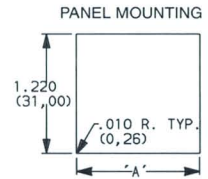
99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-44 AND CONSULT FACTORY

AVAILABLE TERMINATIONS

CONSULT FACTORY.

MOUNTING STYLE

TYPE 0 SNAP-IN FRONT MOUNTING

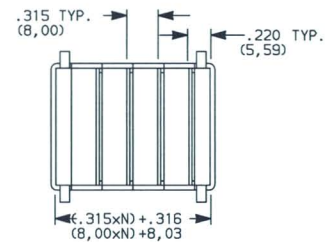
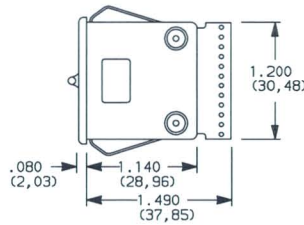
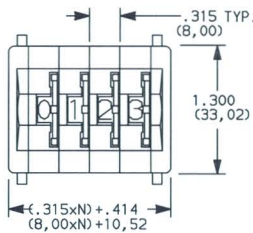


DIM. A	MOUNTING STYLE
$(.315 \times N) + .326$ $(8,0 \times N) + (8,28)$	00
$(.394 \times N) + .326$ $(10,0 \times N) + (8,28)$	03
$(.500 \times N) + .326$ $(12,7 \times N) + (8,28)$	04

N = Number of sections

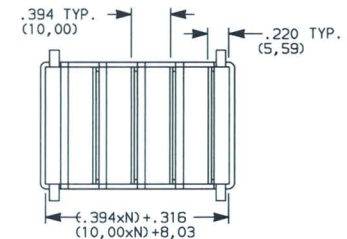
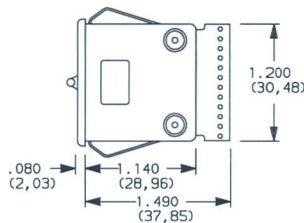
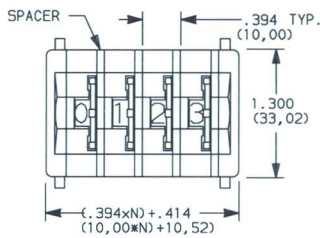
Recommended Panel Thickness:
.046 - .125 (1,16 - 3,18)

00 SWITCH ASSEMBLY W/ ENDPLATES — .315 (8,00) SECTION PITCH



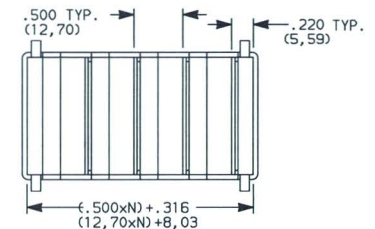
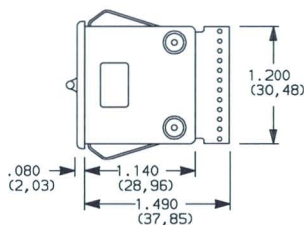
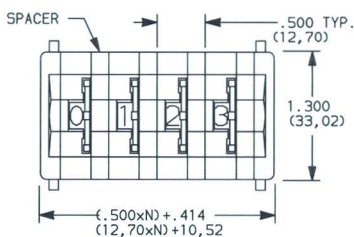
N = Number of sections

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

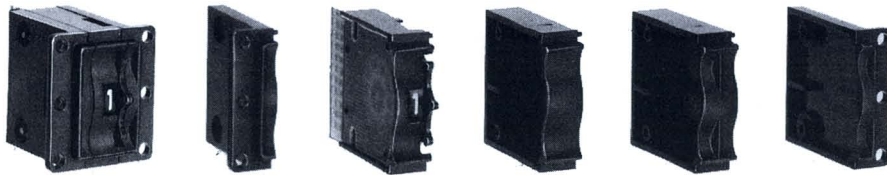
09

Switch section only—unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

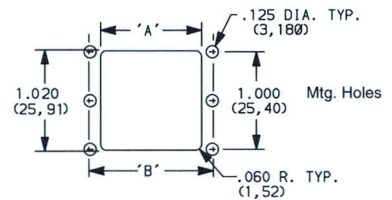
NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

MOUNTING STYLE

TYPE 1 REAR MOUNTING



PANEL MOUNTING

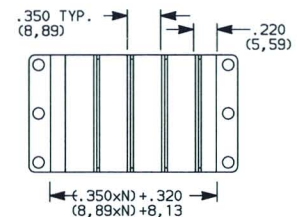
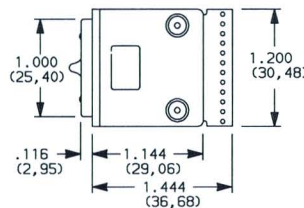
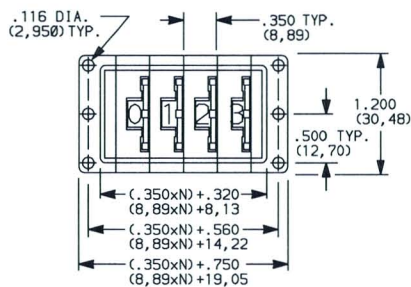


DIM. A	DIM. B	MOUNTING STYLE
$(.350 \times N) + .340$ (8,89 x N) + (8,64)	$(.350 \times N) + .560$ (8,89 x N) + (14,22)	10
$(.500 \times N) + .340$ (12,7 x N) + (8,64)	$(.500 \times N) + .560$ (12,7 x N) + (14,22)	14

N = Number of sections

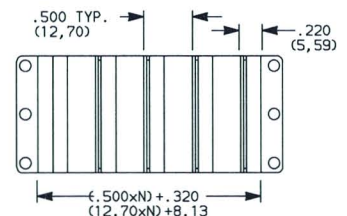
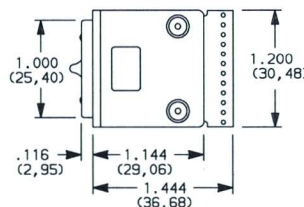
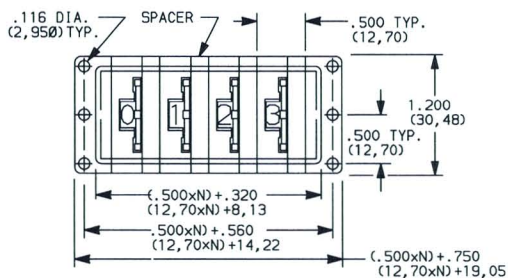
Recommended Panel Thickness:
.046 - .125 (1,16 - 3,18)

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

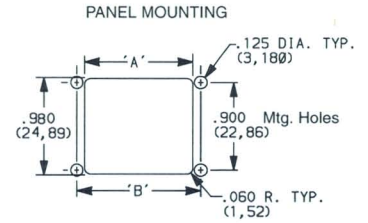
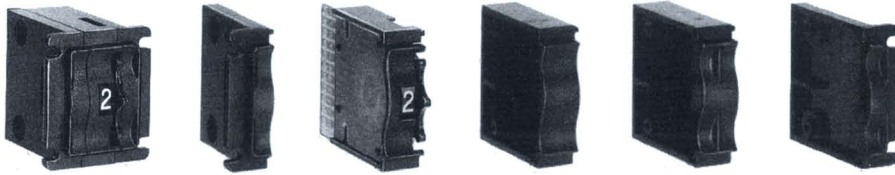
19

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

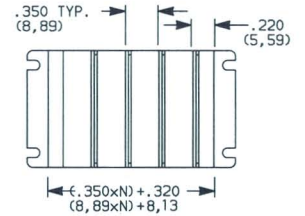
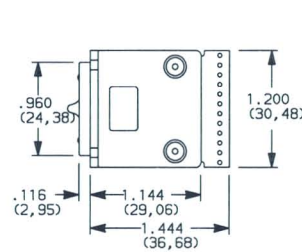
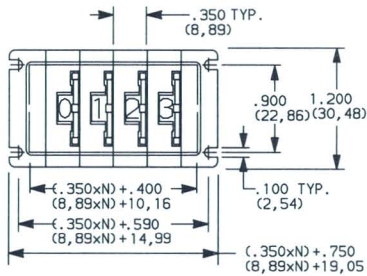


DIM. A	DIM. B	MOUNTING STYLE
$(.350 \times N) + .420$ (8,89 x N) + (10,67)	$(.350 \times N) + .590$ (8,89 x N) + (14,99)	20
$(.500 \times N) + .420$ (12,7 x N) + (10,67)	$(.500 \times N) + .590$ (12,7 x N) + (14,99)	24

N = Number of sections

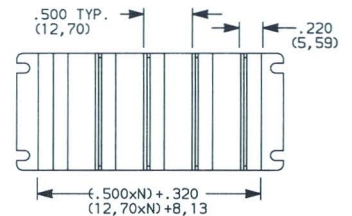
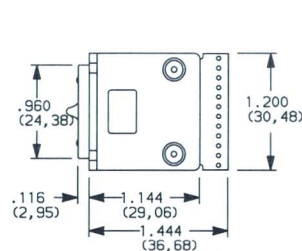
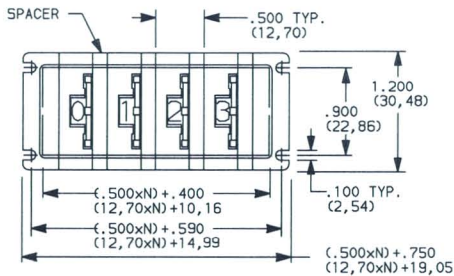
Recommended Panel Thickness:
.046 - .125 (1,16 - 3,18)

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

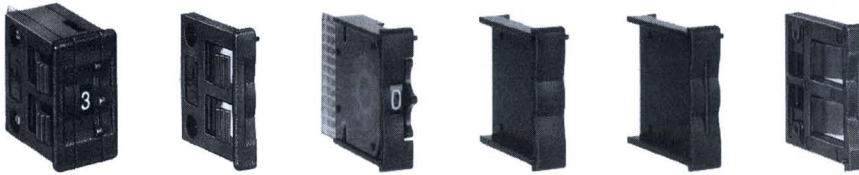
29

Switch section only—unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

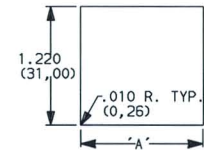
NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

MOUNTING STYLE

TYPE 3 SNAP-IN FRONT MOUNTING



PANEL MOUNTING

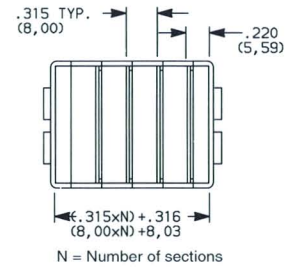
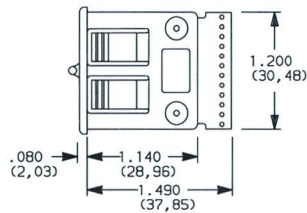
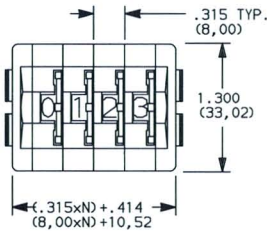


DIM. A	MOUNTING STYLE
$(.315 \times N) + .360$ $(8,0 \times N) + (9,14)$	30
$(.394 \times N) + .360$ $(10,0 \times N) + (9,14)$	33
$(.500 \times N) + .360$ $(12,7 \times N) + (9,14)$	34

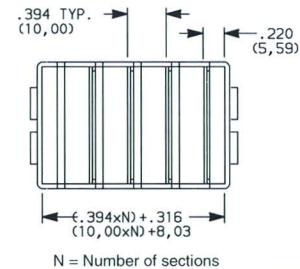
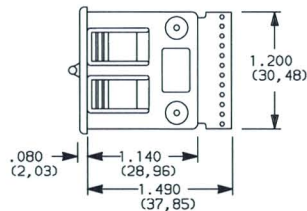
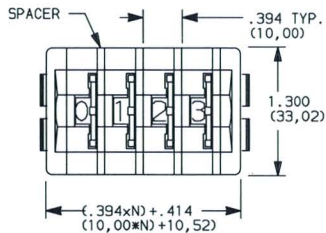
N = Number of sections

Recommended Panel Thickness:
.046 - .125 (1,16 - 3,18)

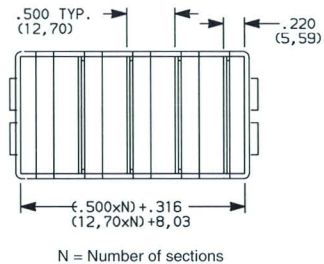
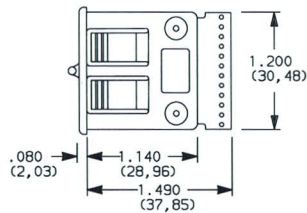
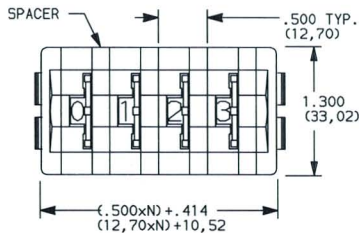
30 SWITCH ASSEMBLY W/ ENDPLATES — .315 (8,00) SECTION PITCH



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

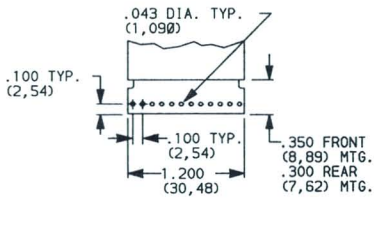
Switch section only — unassembled, without endplates or spacers (must be ordered with 0 number of sections, see page F-33).

NOTE: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

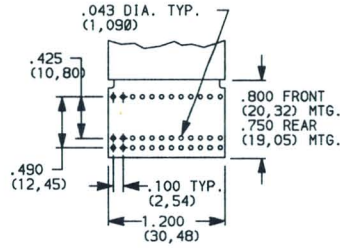
TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

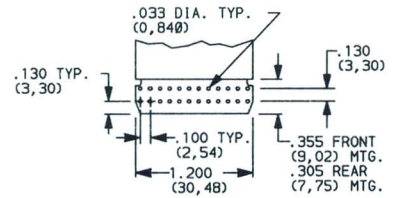
0 (STD.)



1



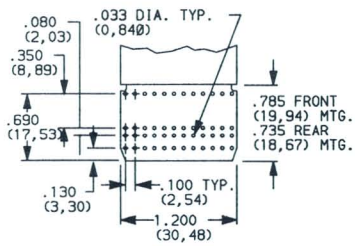
4



Signal traces cut except for common(s).

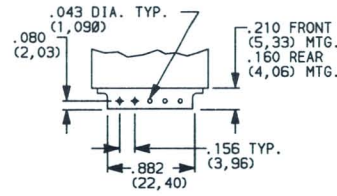
P.C. BOARD 1/32" (0,79) THK.

5

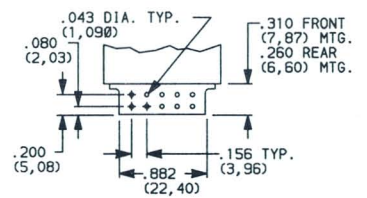


Signal traces cut except for common(s).

6

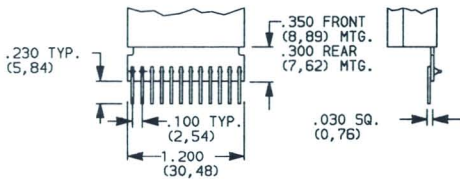


7

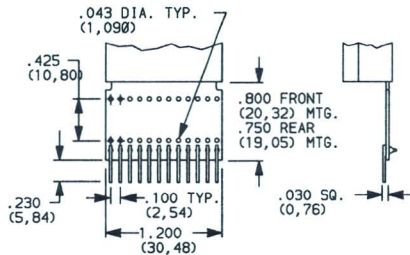


P.C. BOARD 1/32" (0,79) THK.

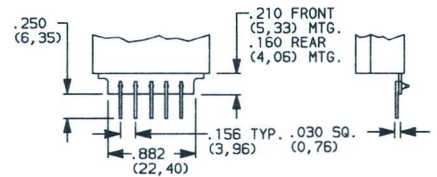
3 TYPE 0 WITH SOLDER PINS



A TYPE 1 WITH SOLDER PINS



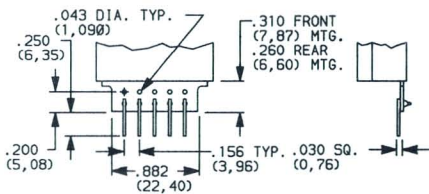
B TYPE 6 WITH SOLDER PINS



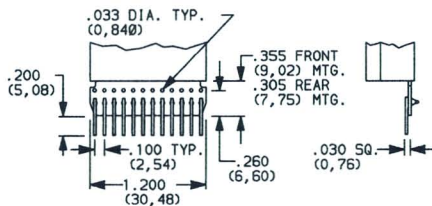
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

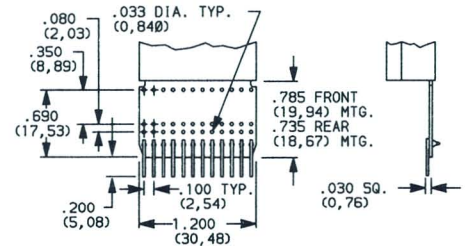
C TYPE 7 WITH SOLDER PINS



D TYPE 4 WITH SOLDER PINS



E TYPE 5 WITH SOLDER PINS



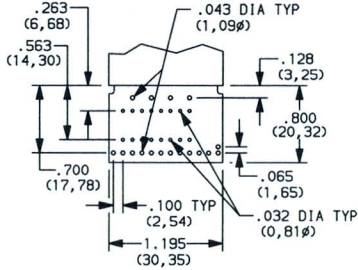
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

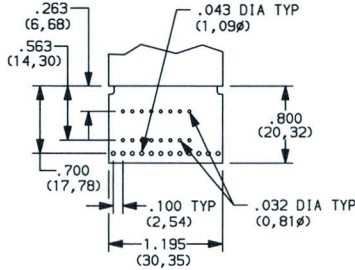
TERMINATIONS

NOTE: All terminal holes shown may not be present for all function codes, consult factory.

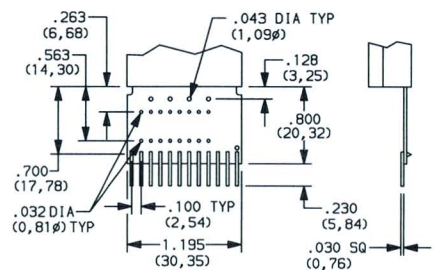
F FOR 58 CODE ONLY



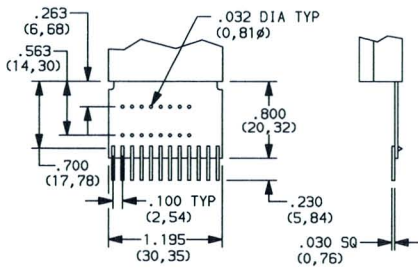
G FOR 59 CODE ONLY



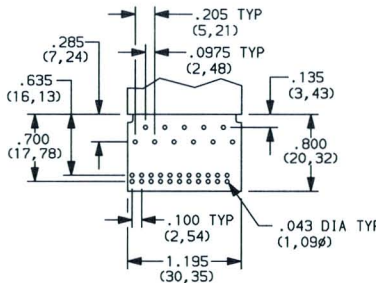
H TYPE F WITH SOLDER PINS FOR 58 CODE ONLY



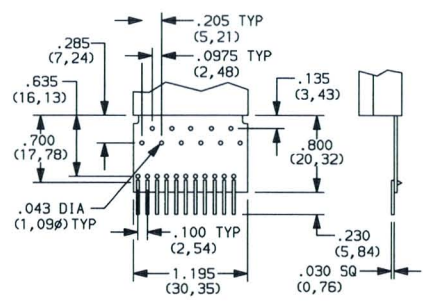
J TYPE G WITH SOLDER PINS FOR 59 CODE ONLY



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

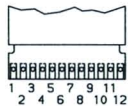


Fig. 1

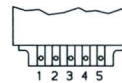


Fig. 2

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.

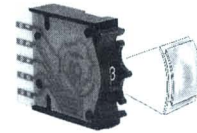
BODY—Black, Gray (matte finish).

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: 10⁵ detent operations between any two adjacent positions @ 25°C.

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

INSULATION RESISTANCE: 10⁹ 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.



3 Series

Thumbwheel Switches

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO.

3 [] [] [] [] [] [] [] [] [] []

C&K PART NUMBER

[] [] [] [] [] [] [] []

C&K PART NUMBER [] [] [] [] []

COMPANY NAME _____

REVISION: []

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

DETAILS: []

ORIGINATED BY _____ SALES REP. _____

THUMBWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE — TERMINATIONS — COLOR/MARKING/STOPS/SEAL — ILLUMINATION <small>ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-36).</small>	DESCRIBE IN APPROPRIATE ROW
1	1	3 - [] [] - - [] [] [] []	
2	2	3 - [] [] - - [] [] [] []	
3	3	3 - [] [] - - [] [] [] []	
4	4	3 - [] [] - - [] [] [] []	
5	5	3 - [] [] - - [] [] [] []	
6	6	3 - [] [] - - [] [] [] []	
7	7	3 - [] [] - - [] [] [] []	
8	8	3 - [] [] - - [] [] [] []	
9	9	3 - [] [] - - [] [] [] []	
10	10	3 - [] [] - - [] [] [] []	
11	11	3 - [] [] - - [] [] [] []	
12	12	3 - [] [] - - [] [] [] []	
13	13	3 - [] [] - - [] [] [] []	
14	14	3 - [] [] - - [] [] [] []	
15	15	3 - [] [] - - [] [] [] []	
16	16	3 - [] [] - - [] [] [] []	

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET ____ OF ____

SECTION G

MEMBRANE KEYPADS AND ROTARY SWITCHES

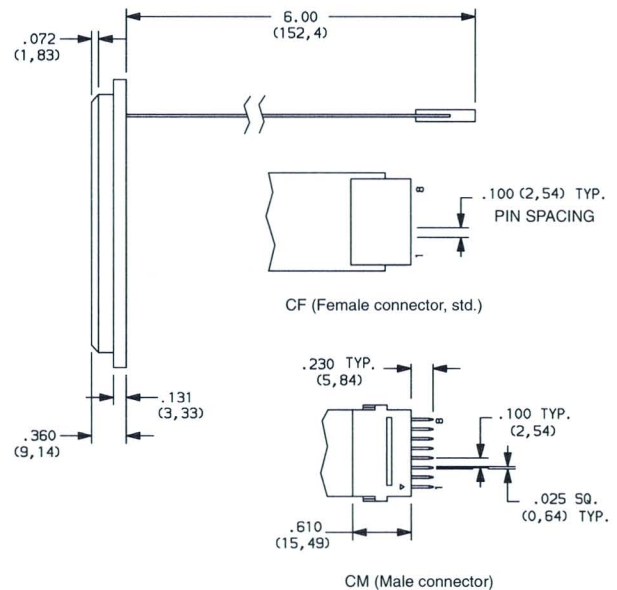
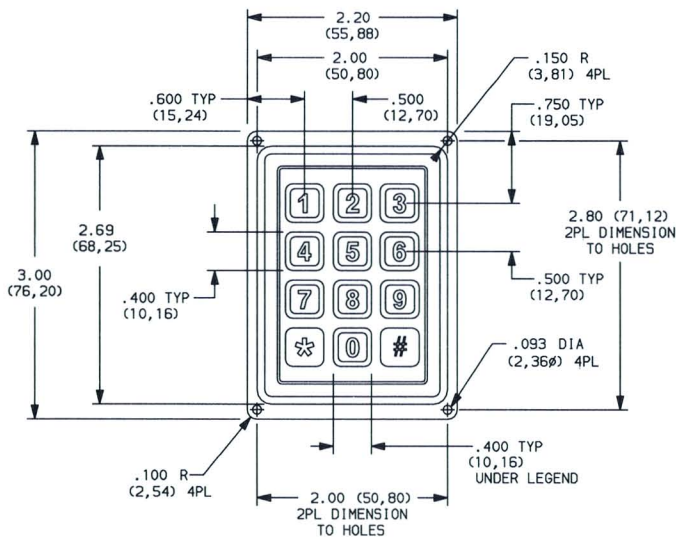


4000 Series Membrane Keypads G-2 thru G-3
M Series Half-Inch Rotary Switches G-4 thru G-10

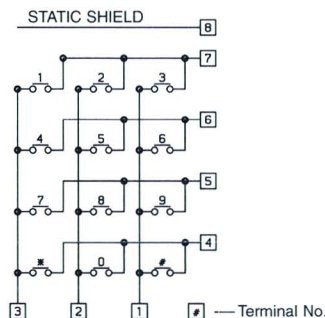


- LONG LIFE-UP TO FIVE MILLION CYCLES
- SEALED SWITCHES—SPLASHPROOF
- GRAPHIC OVERLAY RESISTS CHEMICALS
- CUSTOM DESIGN AND MANUFACTURING CAPABILITY
- BUILT-IN STATIC SHIELD—STANDARD
- 6 IN. FLEX TAIL WITH MALE OR FEMALE CONNECTOR
- DETENT AVAILABLE FOR TACTILE FEEDBACK

4A MODEL (3x4 ARRAY—12 KEYS)



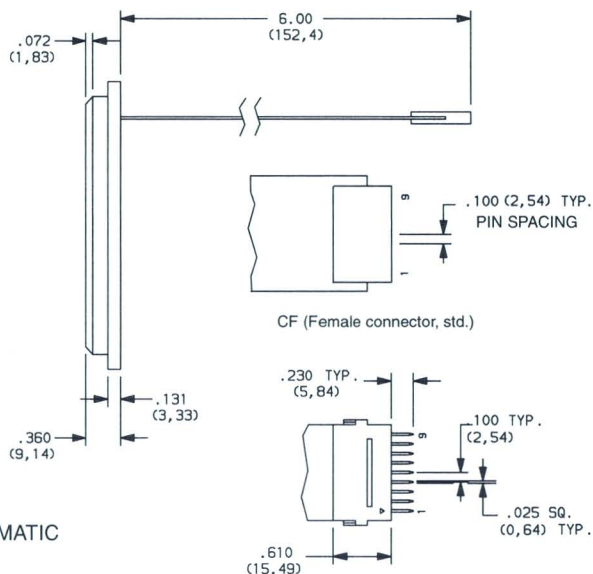
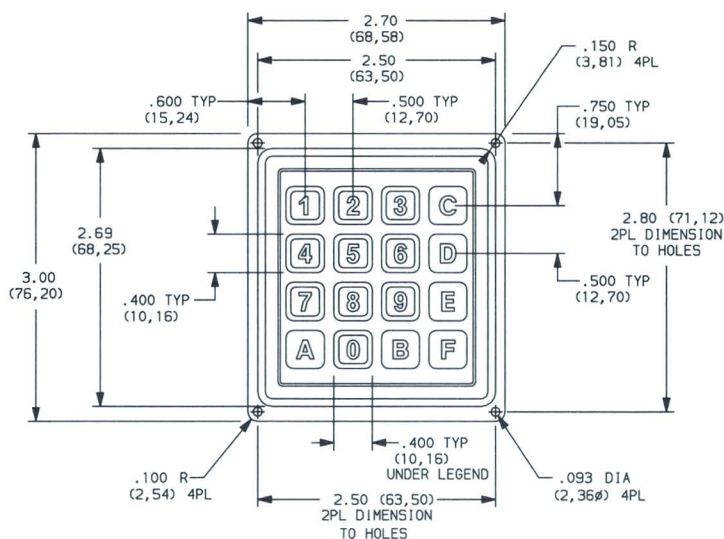
SCHEMATIC



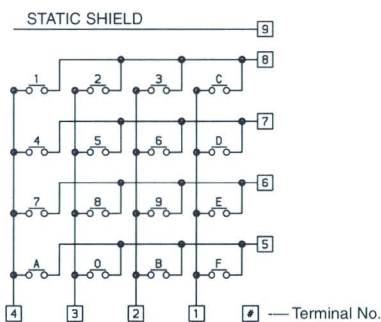
X-Y Matrix output circuit configuration with static shield. Switch function—SPST N.O. Momentary.

MODEL NO.	DETENT	CONNECTOR
4A01T322NCFQ	NO	FEMALE
4A01T322NCMQ	NO	MALE
4A01T322PCFQ	YES	FEMALE
4A01T322PCMQ	YES	MALE

4B MODEL (4x4 ARRAY—16 KEYS)



SCHMATIC



X-Y Matrix output circuit configuration with static shield. Switch function—SPST N.O. Momentary.

MODEL NO.	DETENT	CONNECTOR
4B01H322NCFQ	NO	FEMALE
4B01H322NCMQ	NO	MALE
4B01H322PCFQ	YES	FEMALE
4B01H322PCMQ	YES	MALE

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: 5×10^6 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.



models available, see page G-6.

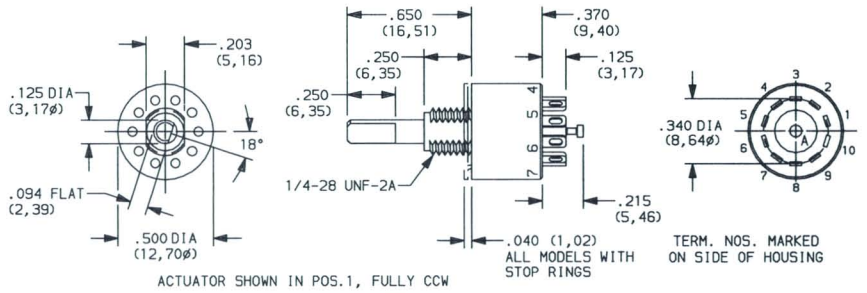
Easy Build-A-Switch:

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.

SWITCH FUNCTION	ACTUATOR	SHORT/ NON-SHORT	TERMINATIONS	CONTACT MATERIAL	SEAL
		Non-Shorting		Silver	None
MA00	ME00	L1	N	G	D
MA02	ME02	L2	S	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				

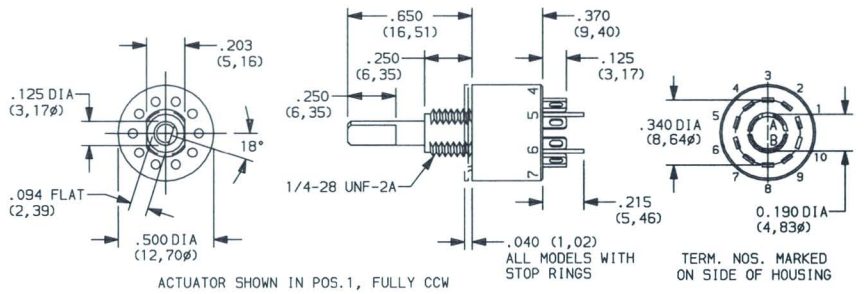
G

SWITCHES WITH STANDARD OPTIONS



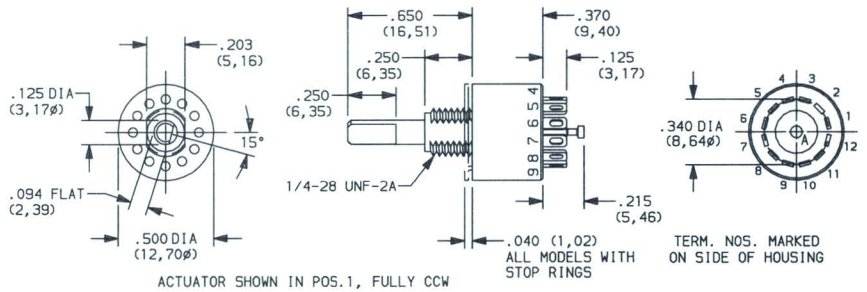
SP MODELS WITH 36° INDEXING

Part No. Shown: MA00L1NZQD



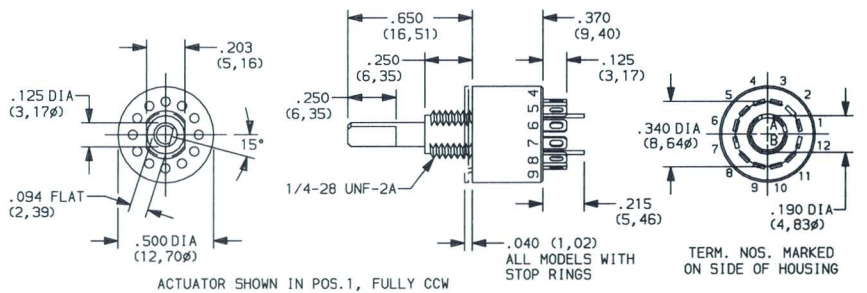
DP MODELS WITH 36° INDEXING

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.

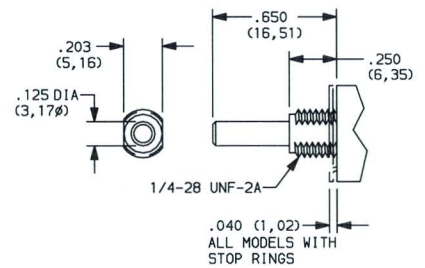
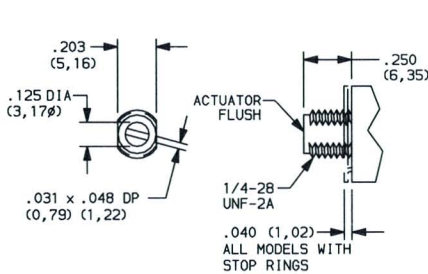
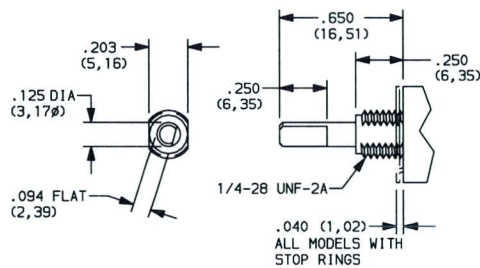
ACTUATORS (ZINC ALLOY)

All actuators shown in pos. 1.

L1 (STD.)

L2

L3

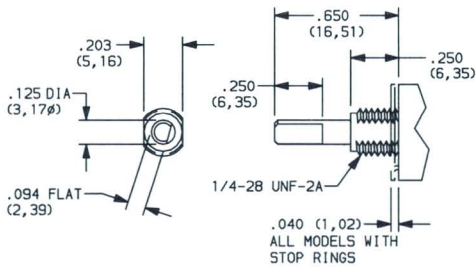


ACTUATORS (STAINLESS STEEL)

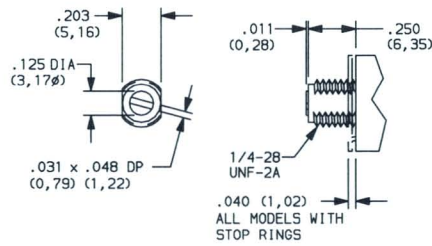


All actuators shown in pos. 1.

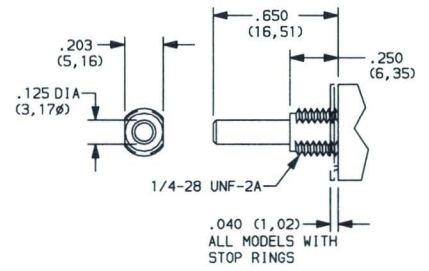
S1



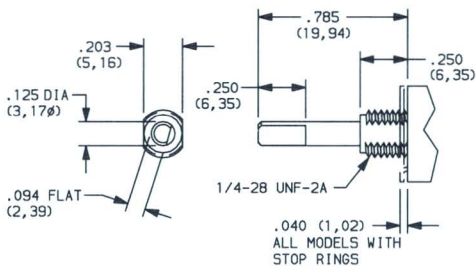
S2



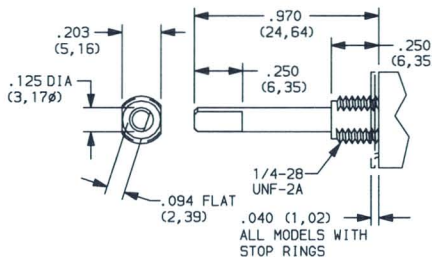
S3



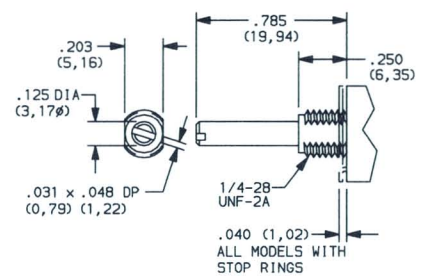
S4



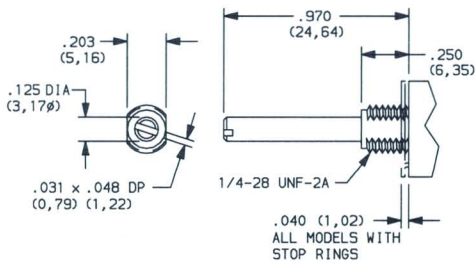
S5



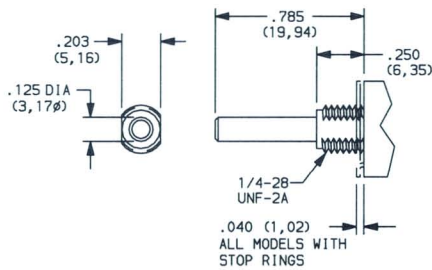
S6



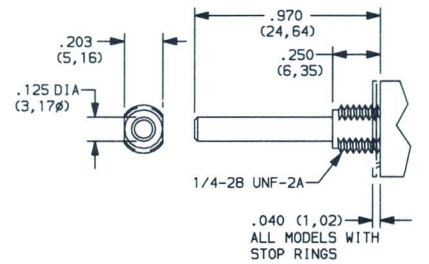
S7



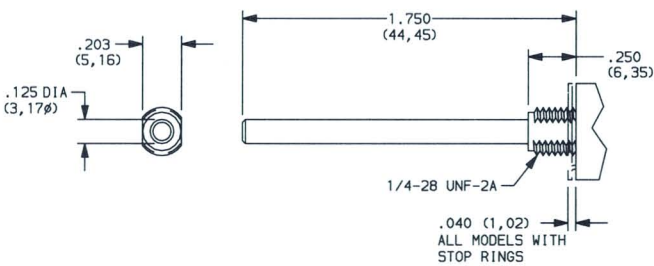
S8



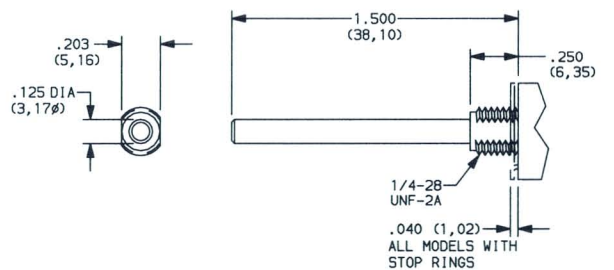
S9



SA



SB





SHORTING/NON-SHORTING CONTACTS

N (STD.)

S

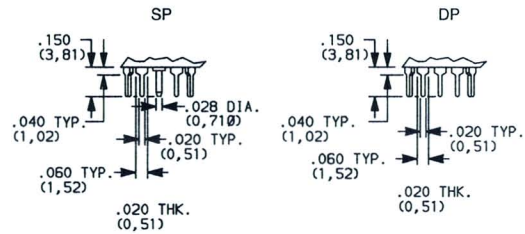
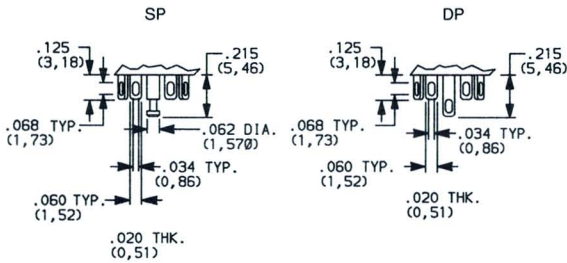
Non-Shorting contacts—break before make.

Shorting contacts—make before break.

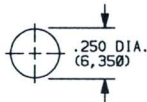
TERMINATIONS

Z (STD.)

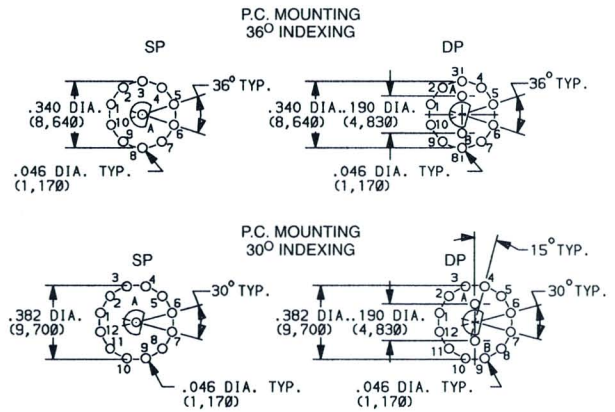
C



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	
Q	SILVER ^{1, 2}	SILVER ²	POWER	CARRY: 6 AMPS CONTINUOUS. SWITCH: 250 mA @ 125 V AC OR 28 V DC.
G	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.

¹ MOVABLE CONTACTS: Non-shortng: Copper alloy, silver plated. Shortng: Zinc alloy, silver plated.

² STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.

³ MOVABLE CONTACTS: Non-shortng: Copper alloy, with gold plate over nickel plate over silver plate.
 Shortng: Zinc alloy, with gold plate over nickel plate over silver plate.

⁴ 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.

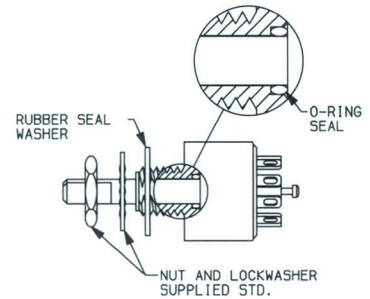
SEAL

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: 10¹⁰ 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:

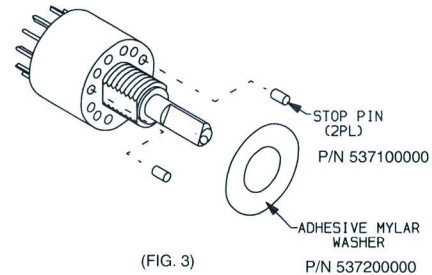
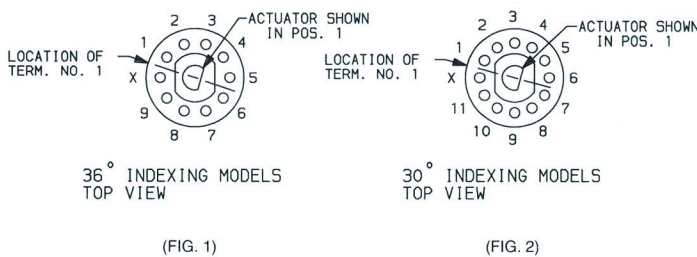
The number of switch positions or stops is adjustable by means of stop pins provided with each switch. Switches are normally shipped with stop pins and hardware in bulk, not installed. Without stop pins, switches have full 360° rotation and no stops. Note that all two pole models begin to repeat when 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.



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.

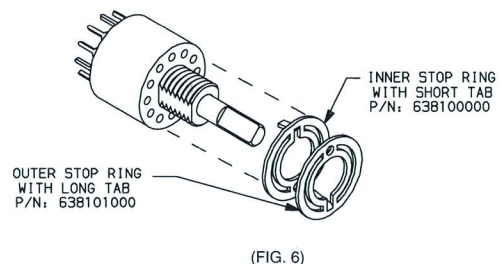
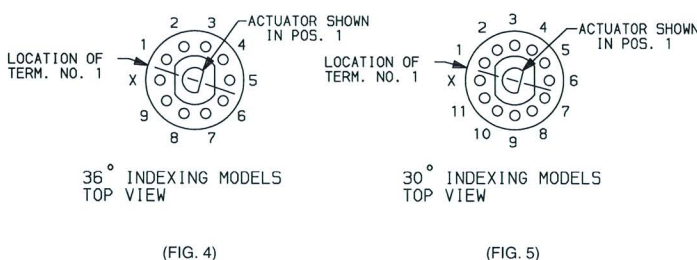
To set stops refer to figures 4 & 5. Orient switch so that terminal no. 1 is as shown. Turn actuator to pos. 1 using flats on bushing and terminal no. 1 as reference. See figure 6 and install inner stop ring with short tab in hole designated 'X'. Install outer stop ring with long tab in hole number corresponding 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.

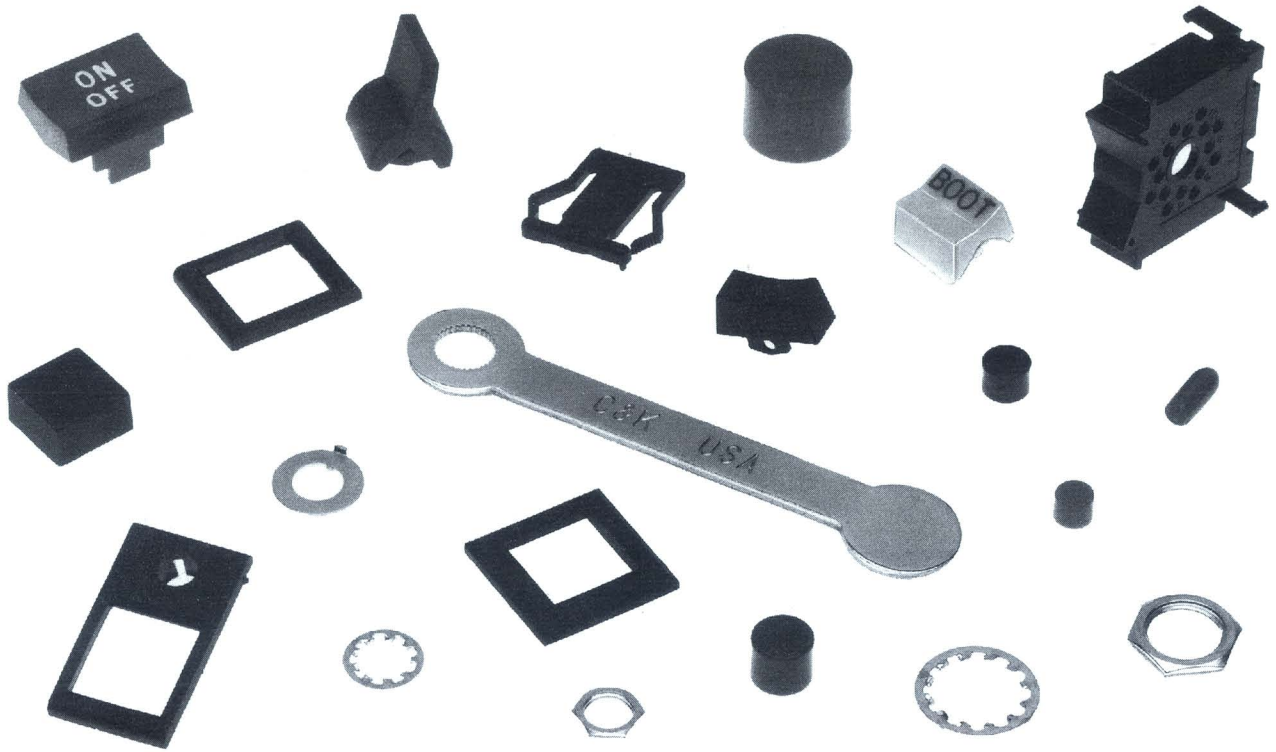
HARDWARE:

Two stop rings, mounting nut and lockwasher supplied standard.



SECTION H

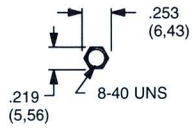
HARDWARE AND ACCESSORIES



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

HEX NUTS

8-40 THD.



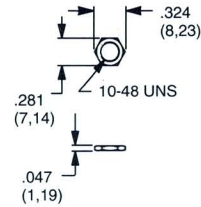
PART NO.

775200201 NICKEL PLATED
775200264 BLACK

FOR SERIES

8600

10-48 THD.



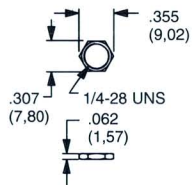
PART NO.

464900201 NICKEL PLATED
464900264 BLACK

FOR SERIES

T, TP

1/4-28 THD.



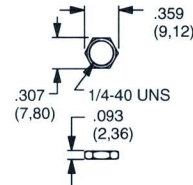
PART NO.

477100201 NICKEL PLATED

FOR SERIES

M

1/4-40 THD.



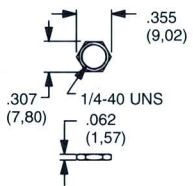
PART NO.

540400201 NICKEL PLATED
540400264 BLACK

FOR SERIES

E, E010

1/4-40 THD.



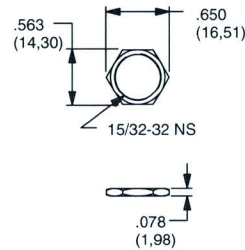
PART NO.

700201201 NICKEL PLATED
700201264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

15-32 THD.



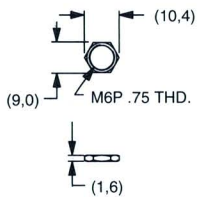
PART NO.

707100201 NICKEL PLATED
707100215 SATIN CHROME
707100264 BLACK

FOR SERIES

7000, 8500, 9000

METRIC



PART NO.

791600201 NICKEL PLATED
791600264 BLACK

FOR SERIES

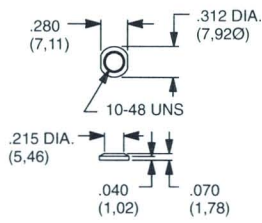
7000, 8020, 8060

MATERIAL

Brass, nickel plated std. Other finishes, consult factory

DRESS NUTS

10-48 THD.



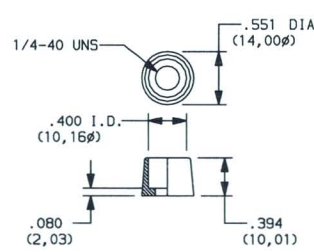
PART NO.

465701201 NICKEL PLATED
465701264 BLACK

FOR SERIES

T, TP

1/4-40 THD.



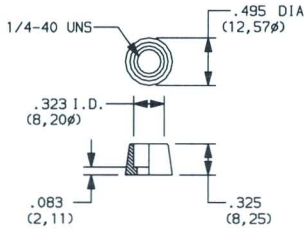
PART NO.

580700201 NICKEL PLATED

FOR SERIES

8020, 8060, 8500, TP

1/4-40 THD.



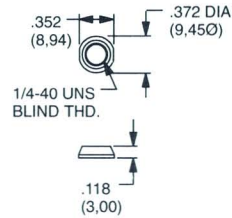
PART NO.

702501201 NICKEL PLATED
702501264 BLACK

FOR SERIES

8020, 8060, E010, TP

1/4-40 THD. - BLIND



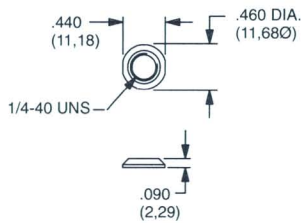
PART NO.

709901201 NICKEL PLATED
709901215 SATIN CHROME
709901264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



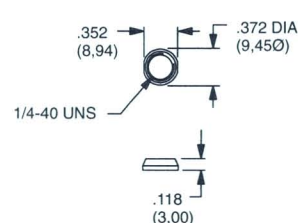
PART NO.

776001201 NICKEL PLATED
776002231 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



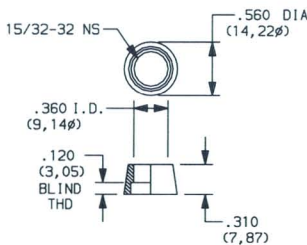
PART NO.

780701201 NICKEL PLATED
780701215 SATIN CHROME
780701264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

15/32 THD. - BLIND



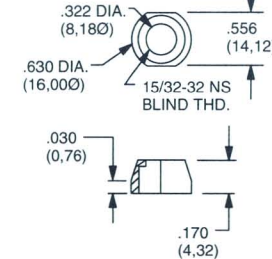
PART NO.

498800201 NICKEL PLATED

FOR SERIES

8500

15/32 THD. - BLIND



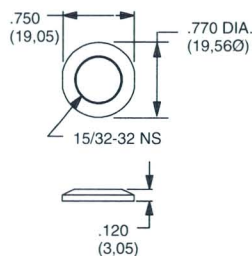
PART NO.

605300201 NICKEL PLATED

FOR SERIES

7000 (T2P ACTUATOR OPTION ONLY)

15/32 THD.



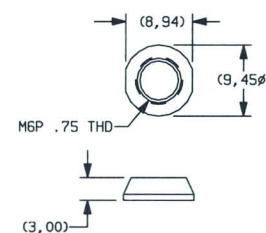
PART NO.

895101201 NICKEL PLATED
895101264 BLACK

FOR SERIES

7000, 8500, 9000

METRIC



PART NO.

709903201 NICKEL PLATED
709903264 BLACK

FOR SERIES

7000, 8020, 8060

MATERIAL

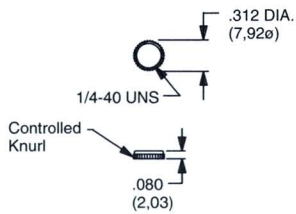
Brass, nickel plated std. Other finishes, consult factory



Hardware and Accessories

KNURLED NUTS

1/4-40 THD. - BLIND



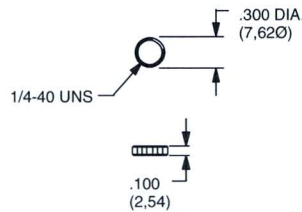
PART NO.

778000201 NICKEL PLATED
778000264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

1/4-40 THD.



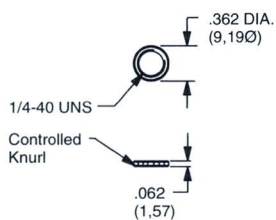
PART NO.

778600201 NICKEL PLATED
778600224 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD. - (FITS GULMITE #12 SOCKET)



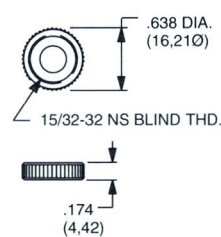
PART NO.

796901201 NICKEL PLATED
796901264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

15/32 THD.- BLIND



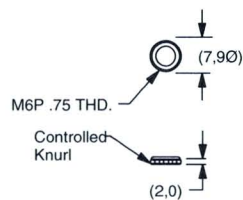
PART NO.

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.

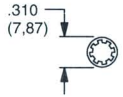
894200201

FITS NUT PART NUMBERS

7969XXXXX

LOCKWASHERS

FITS 10-48 BUSHING

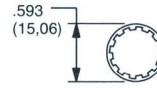


.018 THK.
(0,46)

PART NO.

465200202 NICKEL PLATED

FITS 15/32 BUSHING

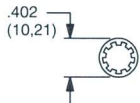


.021 THK.
(0,53)

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

.435 DIA.
(11,05Ø)



.029
(0,74)

PART NO.

465000201 NICKEL PLATED - FLAT

.435 DIA.
(11,05Ø)



.065
(1,65)

PART NO.

465101201 NICKEL PLATED - KEYWAY

FITS 1/4-40 BUSHING

.468 DIA.
(11,89)



.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

.718 DIA.
(18,24Ø)



.040
(1,02)

PART NO.

707200201 NICKEL PLATED - KEYWAY
707200264 BLACK - KEYWAY

.090
(2,29)

FITS METRIC BUSHING

.472 DIA.
(11,99Ø)



.034
(0,86)

PART NO.

791800201 NICKEL PLATED - KEYWAY
791800264 BLACK - KEYWAY

.065
(1,65)

.343 DIA.
(8,71Ø)



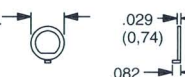
.029
(0,74)

PART NO.

757200201 NICKEL PLATED - FLAT
757200264 BLACK - FLAT

.065
(1,65)

.343 DIA.
(8,71Ø)



.029
(0,74)

PART NO.

757300201 NICKEL PLATED - SMALL FLAT
757300264 BLACK - SMALL FLAT

.082
(2,08)

MATERIAL

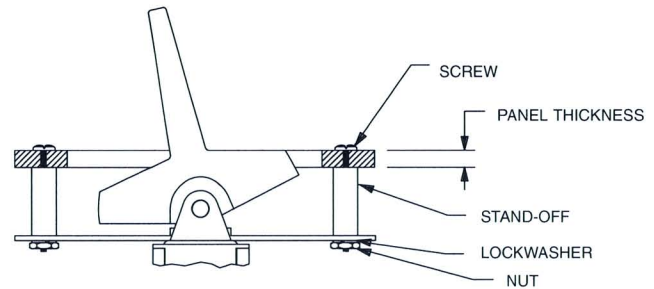
Brass, nickel plated std. Other finishes, consult factory.



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

PART NO.	PANEL THK.	STANDOFF LENGTH
761101000	1/16 IN. (1,59)	.295 (7,49)
761102000	3/32 IN. (2,38)	.264 (6,71)
761103000	1/8 IN. (3,18)	.233 (5,92)

FOR J1, J2, J3, J50, J60, J90 ACTUATORS – 9000 SERIES
FOR J3 ACTUATORS – 7000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
770601000	1/16 IN. (1,59)	.295 (7,49)
770602000	3/32 IN. (2,38)	.264 (6,71)
770603000	1/8 IN. (3,18)	.233 (5,92)

FOR J4, J5 ACTUATORS – 7000 & 9000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
775001000	1/16 IN. (1,59)	.375 (9,53)
775002000	3/32 IN. (2,38)	.344 (8,74)
775003000	1/8 IN. (3,18)	.312 (7,92)

FOR J10 ACTUATOR – 7000 & 9000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
770701000	1/16 IN. (1,59)	.295 (7,49)
770702000	3/32 IN. (2,38)	.264 (6,71)
770703000	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



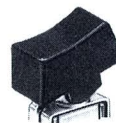
PART NO.	COLOR
538501000	WHITE
538502263	BLACK
538503000	RED
538504000	ORANGE
538505000	YELLOW
538506000	GREEN
538507000	BLUE
538508000	BROWN
538509000	GRAY

FOR SERIES

ET

Material: Nylon. Finish: Matte.

J1



PART NO.	COLOR
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.

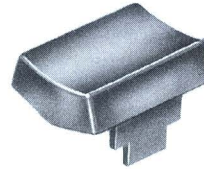
598001000 WHITE
598002263 BLACK
598003000 RED
598004000 ORANGE
598005000 YELLOW
598006000 GREEN
598007000 BLUE
598008000 BROWN
598009000 GRAY

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

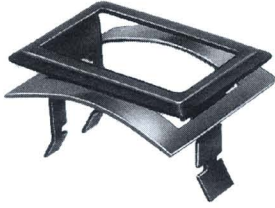
7000, 9000

Material: Nylon. Finish: Matte.

FRAMES

Special colors, custom markings available, consult factory.

FOR J11, J21 ACTUATORS



PART NO.

764500223 BRIGHT CHROME
764500252 SATIN CHROME
764500746 BLACK ENAMEL
764500747 WHITE ENAMEL

FOR SERIES

7000

Material: Spring Steel.

FOR J16, J26 ACTUATORS



PART NO.

459101000 WHITE
459102000 BLACK
459103000 RED
459104000 ORANGE
459105000 YELLOW
459106000 GREEN
459107000 BLUE
459108000 BROWN
459109000 GRAY

FOR SERIES

7000

Material: Nylon. Finish: Matte.

FOR J19 ACTUATOR



PART NO.

781000223 BRIGHT CHROME
781000252 SATIN CHROME
781000746 BLACK ENAMEL
781000747 WHITE ENAMEL

FOR SERIES

7000, 9000

Material: Spring Steel.

FOR J37, J47, J57 ACTUATORS



PART NO.

445400223 BRIGHT CHROME
445400252 SATIN CHROME
445400746 BLACK ENAMEL
445400747 WHITE ENAMEL

FOR SERIES

7000, 9000

Material: Spring Steel.

FOR J51, J61, J81, J83, J85, J86, J91 ACTUATORS



PART NO.

615601000 WHITE
615602263 BLACK
615603000 RED
615604000 ORANGE
615605000 YELLOW
615606000 GREEN
615607000 BLUE
615608000 BROWN
615609000 GRAY

FOR SERIES

7000

Material: Nylon. Finish: Matte.

FOR J52, J62, J82, J84, J92 ACTUATORS



PART NO.

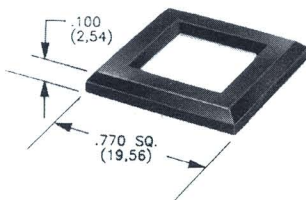
613301000 WHITE
613302263 BLACK
613303000 RED
613304000 ORANGE
613305000 YELLOW
613306000 GREEN
613307000 BLUE
613308000 BROWN
613309000 GRAY

FOR SERIES

7000

Material: Nylon. Finish: Matte.

SQUARE FRAME



MATTE FINISH GLOSS FINISH

PART NO.

PART NO.

486701000 **486801000**
486702000 **486802000**
486703000 **486803000**
486704000 **486804000**
486705000 **486805000**
486706000 **486806000**
486707000 **486807000**
486708000 **486808000**
486709000 **486809000**

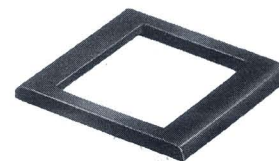
WHITE
BLACK
RED
ORANGE
YELLOW
GREEN
BLUE
BROWN
GRAY

FITS

FOR J50, J60, J80, J83, J90 ACTUATORS

Material: Nylon. Finish: Matte or Gloss.

5000 & 5600 SERIES FRAME



PART NO.

788801000 WHITE
788802000 BLACK
788803000 RED
788804000 ORANGE
788805000 YELLOW
788806000 GREEN
788807000 BLUE
788808000 BROWN
788809000 GRAY

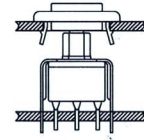
Material: Nylon. Finish: Matte.

SEPARATE SNAP-IN FRAMES

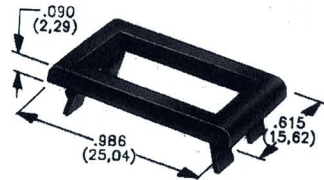
Special colors, custom markings available, consult factory.

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

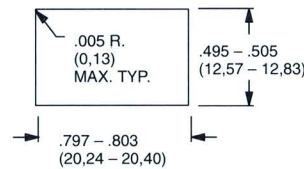


	.047 (1,19) PANEL THK.	.062 (1,57) PANEL THK.	.090 (2,29) PANEL THK.	.125 (3,18) PANEL THK.	
	PART NO.	PART NO.	PART NO.	PART NO.	COLOR
	452901000	452701000	452801000	452601000	WHITE
	452902263	452702263	452802263	452602263	BLACK
	452903000	452703000	452803000	452603000	RED
	452904000	452704000	452804000	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

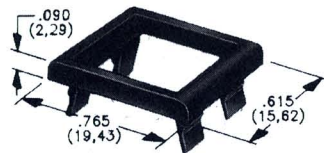
FOR SERIES

7000, E

PANEL MOUNTING



FOR J50, J60, J80, J90 ACTUATORS

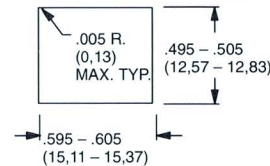


	.047 (1,19) PANEL THK.	.062 (1,57) PANEL THK.	.090 (2,29) PANEL THK.	.125 (3,18) PANEL THK.	
	PART NO.	PART NO.	PART NO.	PART NO.	COLOR
	432501000	432601000	432701000	432801000	WHITE
	432502263	432602263	432702263	432802263	BLACK
	432503000	432603000	432703000	432803000	RED
	432504000	432604000	432704000	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

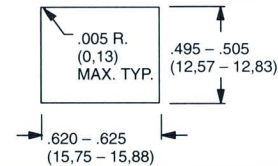
FOR SERIES

7000, E, 8020, 8060, 8500, E010, E020, TP

PANEL MOUNTING - 4325, 4326



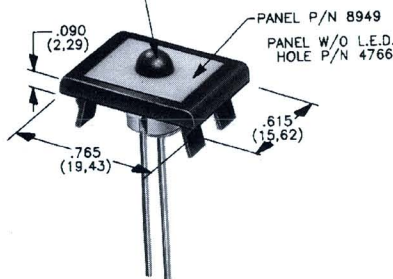
PANEL MOUNTING - 4327, 4328



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. (5,080)) 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

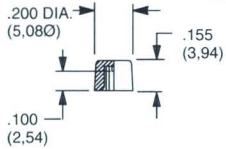
PUSHBUTTON CAPS

Special colors, custom marking available, consult factory. Material: Nylon. Finish: Round caps—gloss, Square caps—matte or gloss.

FOR .100 DIA. PLUNGERS

PART NO.

508101000 WHITE
508102000 BLACK
508103000 RED
508104000 ORANGE
508105000 YELLOW
508106000 GREEN
508107000 BLUE
508108000 BROWN
508109000 GRAY

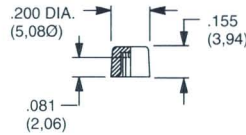


FOR SERIES

EP, TP

PART NO.

538701000 WHITE
538702000 BLACK
538703000 RED
538704000 ORANGE
538705000 YELLOW
538706000 GREEN
538707000 BLUE
538708000 BROWN
538709000 GRAY

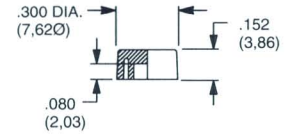


FOR SERIES

TP (RECOMMENDED FOR S9 PLUNGER OPTION)

PART NO.

465801000 WHITE
465802000 BLACK
465803000 RED
465804000 ORANGE
465805000 YELLOW
465806000 GREEN
465807000 BLUE
465808000 BROWN
465809000 GRAY



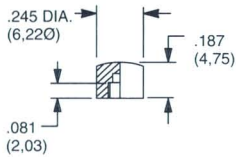
FOR SERIES

EP, TP

FOR .106 DIA. PLUNGERS

PART NO.

785101000 WHITE
785102000 BLACK
785103000 RED
785104000 ORANGE
785105000 YELLOW
785106000 GREEN
785107000 BLUE
785108000 BROWN
785109000 GRAY



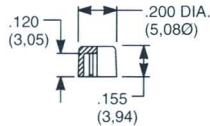
FOR SERIES

8600

FOR .122 DIA. PLUNGERS

PART NO.

708901000 WHITE
708902000 BLACK
708903000 RED
708904000 ORANGE
708905000 YELLOW
708906000 GREEN
708907000 BLUE
708908000 BROWN
708909000 GRAY

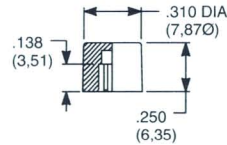


FOR SERIES

8020, 8060, E010, E020, TP

PART NO.

801801000 WHITE
801802000 BLACK
801803000 RED
801804000 ORANGE
801805000 YELLOW
801806000 GREEN
801807000 BLUE
801808000 BROWN
801809000 GRAY

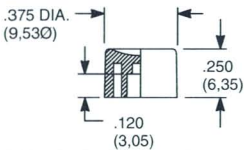


FOR SERIES

8020, 8060, E010, E020, TP

PART NO.

752701000 WHITE
752702000 BLACK
752703000 RED
752704000 ORANGE
752705000 YELLOW
752706000 GREEN
752707000 BLUE
752708000 BROWN
752709000 GRAY



FOR SERIES

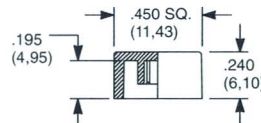
8020, 8060, E010, E020, TP

MATTE GLOSS

PART NO.

PART NO.

798201000 **484601000** WHITE
798202000 **484602000** BLACK
798203000 **484603000** RED
798204000 **484604000** ORANGE
798205000 **484605000** YELLOW
798206000 **484606000** GREEN
798207000 **484607000** BLUE
798208000 **484608000** BROWN
798209000 **484609000** GRAY



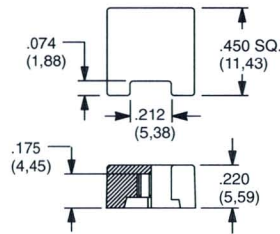
FOR SERIES

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



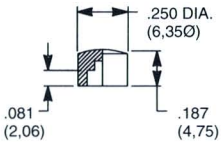
MATTE	GLOSS
PART NO.	PART NO.

459701000	476801000	WHITE
459702000	476802000	BLACK
459703000	476803000	RED
459704000	476804000	ORANGE
459705000	476805000	YELLOW
459706000	476806000	GREEN
459707000	476807000	BLUE
459708000	476808000	BROWN
459709000	476809000	GRAY

FOR SERIES

8020, 8060

FOR .157 DIA. PLUNGERS



PART NO.

479601000	WHITE
479602000	BLACK
479603000	RED
479604000	ORANGE
479605000	YELLOW
479606000	GREEN
479607000	BLUE
479608000	BROWN
479609000	GRAY

FOR SERIES

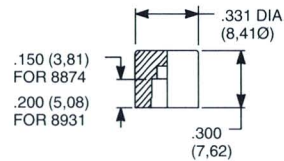
8500 (NOT AVAIL. WITH 85X1 MODELS)

PART NO.

448901000	WHITE
448902000	BLACK
448903000	RED
448904000	ORANGE
448905000	YELLOW
448906000	GREEN
448907000	BLUE
448908000	BROWN
448909000	GRAY

FOR SERIES

8500



PART NO.

887401000	893101000	WHITE
887402000	893102000	BLACK
887403000	893103000	RED
887404000	893104000	ORANGE
887405000	893105000	YELLOW
887406000	893106000	GREEN
887407000	893107000	BLUE
887408000	893108000	BROWN
887409000	893109000	GRAY

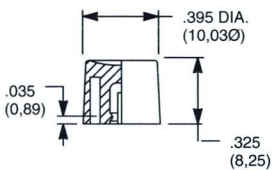
FOR SERIES

8500 (T OPTION W/ 85X2 AND 85X4 MODELS)

FOR SERIES

8500 (T OPTION W/ 85X2 AND 85X4 MODELS & T1 OPTION W/ ALL MODELS)

FOR SNAP-FITTING PLUNGERS

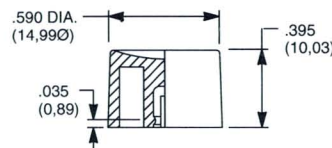


PART NO.

894101000	WHITE
894102000	BLACK
894103000	RED
894104000	ORANGE
894105000	YELLOW
894106000	GREEN
894107000	BLUE
894108000	BROWN
894109000	GRAY

FOR SERIES

8020, 8060, E010, E020



PART NO.

894001000	WHITE
894002263	BLACK
894003000	RED
894004000	ORANGE
894005000	YELLOW
894006000	GREEN
894007000	BLUE
894008000	BROWN
894009000	GRAY

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 (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
412706000	1 – 2	1	1	1 – 2	1
412701000	3 – 4	2 – 3	2	3	2
412702000	5 – 7	4 – 5	3 – 4	4 – 6	3 – 4
412703000	8 – 10	6 – 8	5 – 6	7 – 9	5 – 6
412704000	11 – 13	9 – 10	7 – 8	10 – 12	7 – 8
412705000	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



2127



2290
W/RIB

BLANK SECTION
.315 THK.

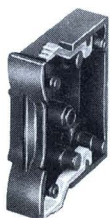
PART NO.

212702000 PLAIN—BLACK
229002000 W/RIB—BLACK

SF/SR SERIES



2126
W/RIB

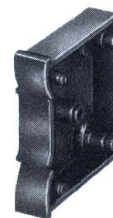


2348
W/RIB &
SPRINGS

FRONT MOUNT—STYLE SF
.312 THK.

PART NO.

212602000 W/RIB—BLACK
234802000 W/RIB & SPRINGS—BLACK



FRONT MOUNT—STYLE SF
.312 THK.

PART NO.

212402000 PLAIN—BLACK



2121



2123
W/RIB

REAR MOUNT—STYLE SR
.312 THK.

PART NO.

212102000 PLAIN—BLACK
212302000 W/RIB—BLACK

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

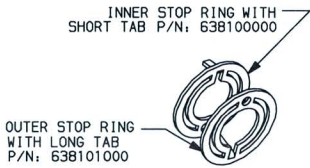


PART NO.

40460000

Fits 0, 1, 4, 5 terminations only.

STOP RINGS—M SERIES



PART NO.

- 63810000** INNER—WITH SHORT TAB
- 63810100** 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
- 53720200** 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.

- 70620100** WHITE
- 70620200** BLACK
- 70620300** RED
- 70620400** ORANGE
- 70620500** YELLOW
- 70620600** GREEN
- 70620700** BLUE
- 70620800** BROWN
- 70620900** 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
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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



United States Distributors

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



United States Distributors

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
Heiland 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
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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	Trevese	(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
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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
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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
Mexitronics 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
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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
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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
Ferrotronics	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



ARGENTINA

Reycom Electronica SA

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Fax: (02)6339137

AUSTRIA

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A-1160 Wien

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Fax: (0222)457743

BELGIUM

Elproma b.v.b.a.

Ninoofsesteenweg 155
1750 Schepdaal

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Fax: (02)5697018

BRAZIL

Hitech Electronica Industrial Comm. Ltda.

Av Eng. Luis Carlos Berrini
801-120 Andar 04571-901
Brooklin, Sao Paulo SP

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Fax: (11)2402650

CHINA

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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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Conelec as

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DK-2605 Brondby

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Fax: (43)432322

EASTERN EUROPE

Compex Ges.m.b.H.

Wurlitzergasse, 10/3
A-1160, Wien (Austria)

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P.O.Box 58/Tammisalontie
400830 Helsinki

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Fax: (0)788256

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82058 Neuried bei Munchen

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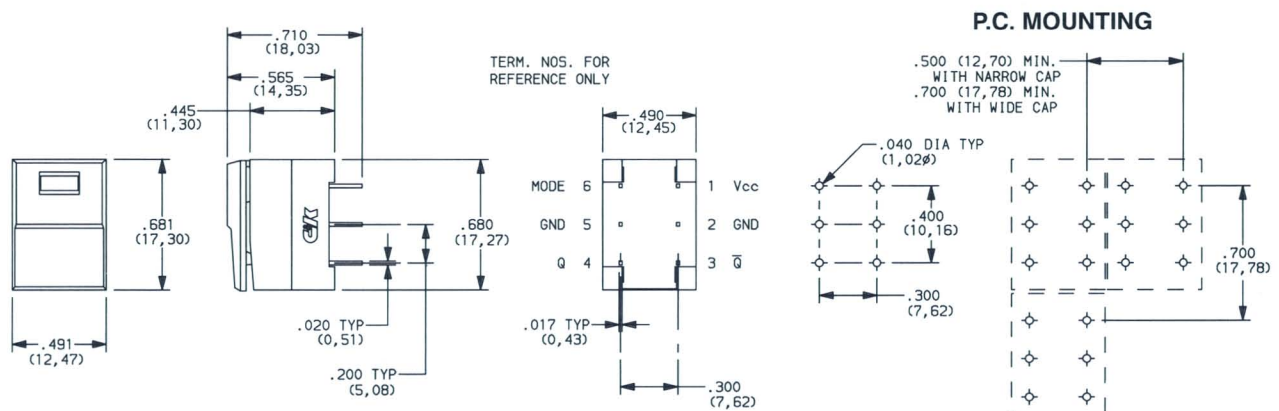
Telephone: (0724)281770

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



Part No. Shown: SS01R223

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 'Q-bar' 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.

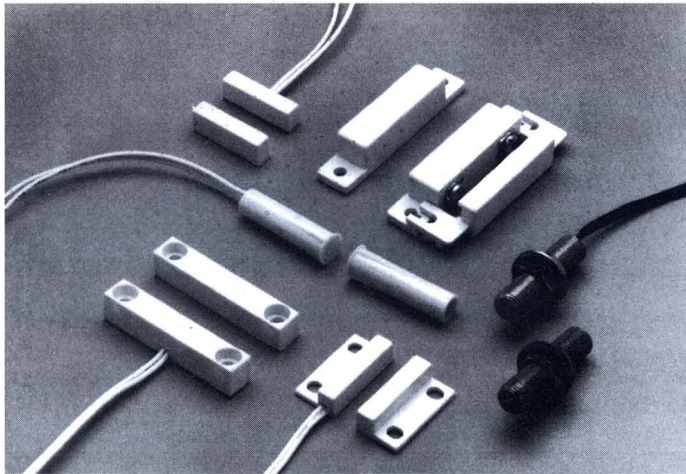
SPECIFICATIONS

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 CO₂ 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.

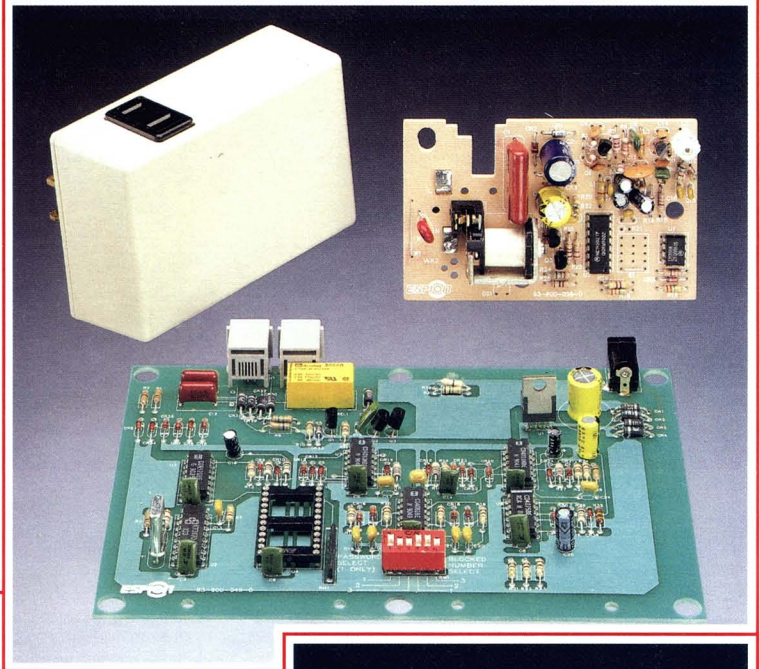
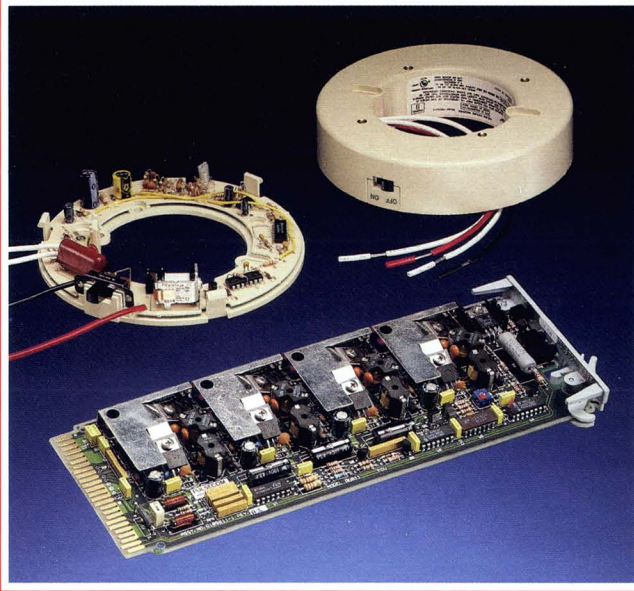
OPERATING TEMPERATURE: -40°F to 140°F (-40°C to 60°C).

MATERIALS

REED SWITCH: Sputtered ruthenium contacts, bifurcated. Laser sealed glass capsule with dry nitrogen atmosphere.

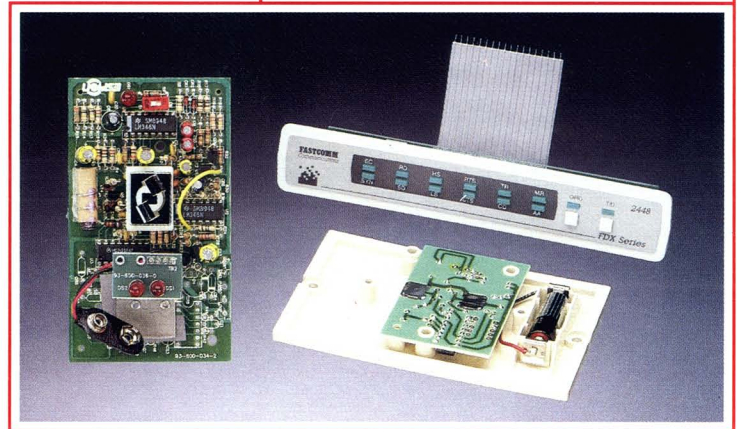
WIRE LEADS: UL 1007, 22 AWG, 12" length standard.

HOUSING: All models except PS15-ABS (UL 94V-0), brown standard. PS15 model—Brass, zinc chromate plated.



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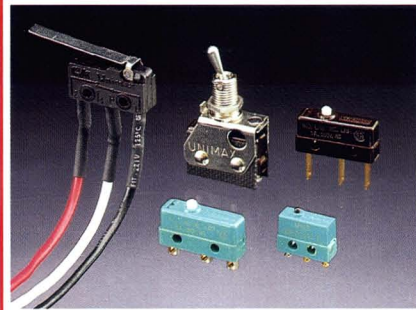


C&K Clayton / Unimax Division manufactures and sells a complete line of switchlocks, slide, rotary, rocker, pushbutton, Unimax precision snap-acting and metal cased switches. The ultra-modern facility in Clayton, North Carolina features extensive automation and flexible cellular manufacturing methods 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



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
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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.



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