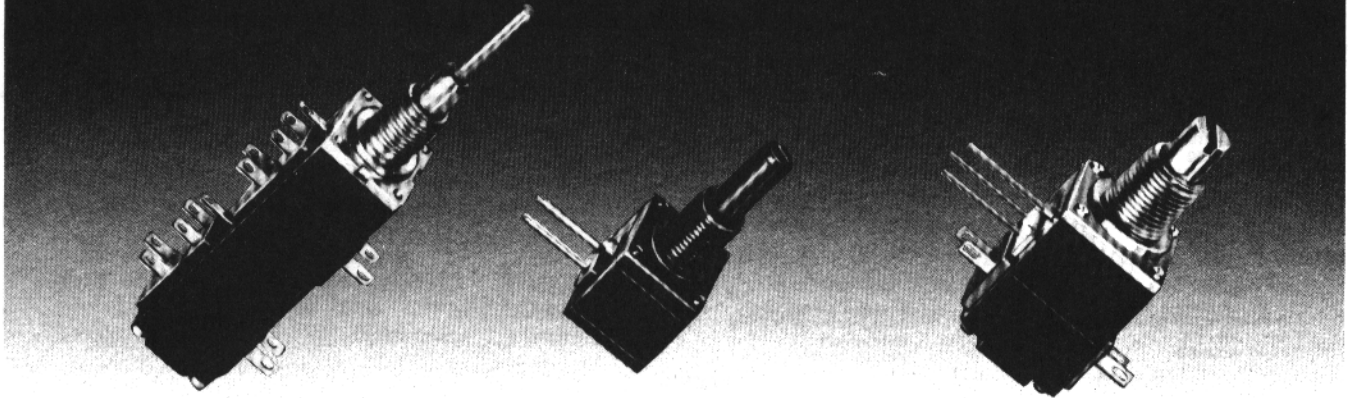
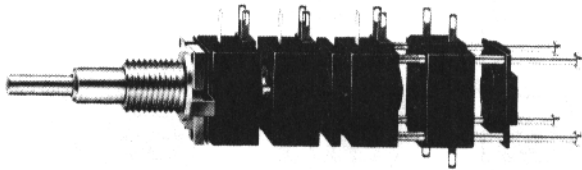


Series 70,72,73

## Conductive Plastic (CP), and Cermet Panel Potentiometers



### UNMATCHED FLEXIBILITY



Disc.

The MOD POT® Family includes:

Series 70 – Metal or Plastic Shaft – Metal Bushing.

Series 72 – Plastic or Metal Shaft – Plastic Bushing.

~~Series 73 – Metal or Plastic Shaft – Metal Bushing.~~

### Features

- Modular Construction .....
- Multiple Sections/Concentric Shafts .....
- Many Rotary and Push-Pull Switch Options
- Attenuators .....
- Linear and Non-Linear Tapers .....
- 50 Ohms to 10 Megohms .....
- 0.625 Inch (15,87 mm) Square .....
- Three Shaft Diameters .....
- Metal and Plastic Shafts .....

### Benefits

- Versatility
- Versatility
- Versatility
- Versatility
- Versatility
- Wide Resistance Range
- Moderate Size
- Versatility
- Versatility

### AVAILABILITY

#### Groupings

MOD POT® Panel Potentiometers are divided into two groups.

**Standard components**—These components listed in the tables on Page 246 and 247) are stocked at our Distributor MOD POT Assembly Centers and at our

manufacturing facilities. MOD POT Potentiometers made from these standard components are available at assembly lead times.

**Custom components**—All other components shown are available but do require **both** fabrication and assembly.

Available in standard values from stock at electronic distributors.

# SPECIFICATIONS

## General

### Versatile Panel Potentiometer

The MOD POT® concept consists of standardized potentiometer modules that can be mixed and matched in over a billion combinations. Now, you can be far more imaginative with potentiometers because you can get special combinations with the ease of standards.

Allen-Bradley originated the modular potentiometer concept in response to requests from design engineers who wanted virtually unlimited variety in variable resistors for greatly increased design freedom.

MOD POT® modules are 5/8 inch square by about 1/2 inch deep. This provides minimum center-to-center distance for compact panel mounting. You can gang resistance and switch modules in combinations of up to four modules. Select from a whole family of resistive elements, resistive values and tolerances, tapers, shafts, bushings, lug options and more. You get a virtually unlimited number of design options.

### TEMPERATURE RANGE

Series	Module Type	Maximum Temp. °C	Minimum Temp. °C
70	<del>Hot Molded</del> or Conductive Plastic	+120°	-55°
	Cermet	+150°	-55°
72	<del>Hot Molded</del> , Conductive Plastic or Cermet	+100°	-55°
73	<del>Hot Molded</del> , Conductive Plastic or Cermet	+120°	-55°
70, 72, 73	Vernier	+100°	-55°
70, 72, 73	Switches	+100°	-55°

**Hardware** – Hardware is: .250 inch (6,35 mm) diameter bushing: (1) M-4748, (1) M-4721, (1) M-4761 (M-4761 is supplied only with locking bushings).

.375 inch (9,52 mm) diameter bushing: (1) M-2898, (1) M-2786, (1) M-3638 (M-3638 is supplied only with locking bushings).

All hardware shipped in bulk – not assembled unless otherwise specified.

**Mounting torque (Series 72)** – Torque applied to the mounting nuts should not exceed 7 inch-pounds (790 mN-m) for the .250 inch (6,35 mm) diameter bushing or 14 inch-pounds (1580 mN-m) for the .375 inch (9,52 mm) diameter bushing.

**Turning torque** – Initially, at 25° C, the potentiometer torque will be 0.5 inch-ounce (3,5 mN-m) minimum while the maximum is:

Style	TORQUE INCH-OUNCES (mN-m)	
	<del>Hot Molded</del> Cermet and Elements	CP Elements
Single	3 (21)	1.5 (11)
Dual	6 (42)	2.5 (18)
Triple	8 (56)	3.5 (25)
Quad	10 (71)	4.5 (32)

The maximum additional torque required for the vernier drive is 10 inch-ounces (71 mN-m) on inner, coarse adjustment shaft.

**Stop torque** – Minimum of 4 inch-pounds (451 mN-m) except for the Series 72 with a .125 inch (3,18 mm) diameter shaft which is 2 inch-pounds (225 mN-m) minimum. Vernier drives have slip clutches.

### Rotation –

Shaft Operates	Rotation In Degrees	
	Total Mechanical ±5°	Electrical (Nominal)
Potentiometers	300	260
Potentiometers and Rotary Switch	300	260
Potentiometers and Push-Pull Switches	305	260
Rotary Switches	25	–
Rotary Switches and Push-Pull Switches	30	–

**Vernier drive** – Two vernier drive modules are available with hot-molded, cermet, and conductive plastic modules. Through a gearing arrangement, the total rotation will be changed to 16 turns or 4 turns. A ratchet clutch is provided in place of fixed stops for the fine adjustment shaft. Series 70 and 73 variable resistors may have concentric shafts. The inner concentric shaft (.078 inch [1,98 mm] diameter) may be used as a coarse adjustment shaft.

**Enclosure** – Dust and splash resistant. They are not immersion sealed.

**Materials** – Corrosion-resistant and essentially nonmagnetic. The shafts and bushings of the Series 72 are plastic.

**Standard Marking** – Clarostat part number and nominal total resistance are marked in two lines. Other marking possible. “MOD POT”® always included.

## Electrical

**Total resistance tolerances – Hot-Molded, CP:**  $\pm 10\%$  or  $\pm 20\%$ ; **Cermet –  $\pm 5\%$  or  $\pm 10\%$ .**

### POWER

Series	Power in Watts per Section		
	Hot-Molded at 70° C	Cermet at 70° C	CP at 70° C
70 (single)	1.0	2.0	.5
70 (multi-section)	.5	1.0	.25
72 (single)	.5	1.0	.25
72 (dual)	.5	.5	.25
73 (single)	1.0	2.0	.5
73 (multi-section)	.5	1.0	.25

**Power derating –** Derate power linearly from rated temperature to zero at maximum temperature. Derate power 50 percent for non-metallic mounting. Derate 60 percent for CP elements with "A" and "B" tapers. Derate 50 percent for hot-molded elements with "A", "B", "S", and "DB" tapers. For rheostat applications, derate power directly with shaft or actuator position.

## Operational

**Contact resistance variation – linear taper –** Maximum value is: Hot-Molded & Cermet - 1.5 percent of nominal resistance value or 1.5 ohms, whichever is greater. CP - 1.0 percent of nominal resistance value.

**Load life –** Maximum change in total resistance as a result of a 1000 hour test at rated power across entire element at +70° C (1.5 hours "ON", 0.5 hour "OFF") 5 percent for cermet element, 10 percent for hot-molded and CP elements.

## Environmental

**Vibration –** 2 percent maximum change in total resistance, 5 percent maximum change in resistance setting. (Tested per method 204, condition "C" of MIL-STD-202.)

**Shock –** 2 percent maximum change in total resistance, 5 percent maximum change in resistance setting. (Tested per method 213, condition "I" of MIL-STD-202.)

**Humidity –** Maximum change in total resistance as a result of 95 percent humidity at 40° C for 100 hours: 5 percent for cermet element, 10 percent for hot-molded and CP elements.

**Temperature cycling –** 3 percent maximum change in total resistance as a result of the temperature cycling test. (Five cycles at -55° C to the maximum temperature.)

**Effect of soldering –** Maximum change in total resistance as a result of immersing the terminals in

**Voltage –** 350 volts maximum working voltage (RMS or DC), or as determined by  $E_{max} = \sqrt{PR}$ , whichever is less (at sea level).

### ATTENUATORS – HOT MOLDED

Series	Bridged-T	L	Bridged-H	Straight-T
70	A	A	A	A
72	A	A	NA	NA
73	A	A	A	A

Consult factory for further details.

A = Available.

NA = Not Available.

**Linearity –**  $\pm 5$  percent independent for linear tapers with a total resistance up to 1.0 megohm.

**Dielectric withstanding voltage -** Maximum continuous voltage, 350 volts (RMS) at sea level. Will withstand a one second test of 1000 volts (RMS) at sea level or 500 volts (RMS) at 3.4 inches (86,36) mercury.

**Insulation resistance -** 1000 megohms minimum for clean and dry conditions at +25° C.

**Rotational life –** 10 percent maximum change in total resistance as a result of a 100,000 mechanical cycle life test without load.

350° C solder to within 0.125 inch (3,18 mm) of the resistor body for 5 seconds: 1 percent for cermet element, 2 percent for hot-molded and CP elements.

**Low temperature operation –** Maximum change in total resistance as a result of the low temperature operation test (-55° C for two hours without load and 45 minutes with rated load) 2 percent for cermet element, 3 percent for hot-molded and CP elements.

**High temperature exposure –** Maximum change in total resistance as a result of the high temperature exposure test (maximum rated temperature for 1000 hours without load) 4 percent cermet element, 10 percent hot-molded and CP elements.

**Washability –** MOD POT® performance may be adversely affected if subjected to conventional after-solder boardwash processes.

## Environmental (continued)

**Temperature characteristics** – Maximum percent temporary total resistance change from the +25° C value. See chart below.

**Temperature coefficient** – For cermet linear taper elements, temperature coefficient less than ±100 ppm/°C.

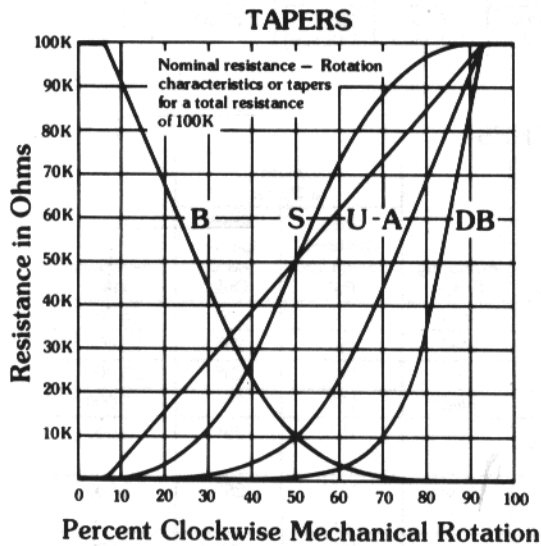
Nominal Resistance in Ohms	CP – "U" Linear Taper, ° C							
	-55°	-25°	0°	+25°	+55°	+85°	+100°	+120°
100	-9.0	-6.0	-3.0	0	+3.5	+6.5	+8.0	+10
1K	±5.5	±3.0	±1.5	0	±1.5	±3.0	±4.0	±5.0
10K	+5.0	+3.0	±1.5	0	±2.0	±2.0	±2.5	±3.0
100K	+5.0	+3.0	±1.5	0	±2.0	±2.0	±2.5	±3.0
1.0 Meg.	+6.0	+3.0	±2.0	0	±2.5	±3.0	±4.0	+5.0

Nominal Resistance in Ohms	HOT MOLDED – "U" Linear Taper, ° C							
	-55°	-25°	0°	+25°	+55°	+85°	+100°	+120°
100	+4.5	+2.5	+1.5	0	+1.0	±1.5	+2.0	+3.5
1K	+5.5	+3.0	+1.5	0	±1.0	±2.0	+2.5	+4.5
10K	+7.0	+3.5	+2.0	0	±1.0	±2.5	+3.0	+5.5
100K	+8.0	+4.0	+2.0	0	±1.5	±3.0	+3.5	+6.0
1.0 Meg.	+10.0	+5.0	+2.5	0	±1.5	±3.5	+5.0	+7.5

For "S", "A" and "DB" tapers multiply percentage figures shown above by 1.25.

## Tapers



Tapers A, DB, S and U are measured between the wiper and the counter-clockwise terminals; taper B is measured between the wiper and the clockwise terminals.

**Tapers** – Available in the following resistance ranges:

UNIT	TAPER	TOTAL RESISTANCE RANGE
<del>Hot Molded</del>	U	50 Ohms to 10.0 Megohms
	A, B, S & DB	250 Ohms to 10.0 Megohms
Cermet	U	100 Ohms to 5.0 Megohms
CP	U	100 Ohms to 1.0 Megohm
	A & B	250 Ohms to 1.0 Megohm

**End resistance** –

TAPER	Minimum Resistance Between Terminals:					
	<del>Hot Molded</del>		CP		Cermet	
	1 & 2	2 & 3	1 & 2	2 & 3	1 & 2	2 & 3
U	1	1	4	4	4	4
S	1	1	—	—	—	—
A	1	2	4	4	—	—
B	2	1	4	4	—	—
DB	3	2	—	—	—	—

- 1 Less than 0.004 percent of total resistance or less than 4 ohms, whichever is greater.
- 2 Less than 1 percent of total resistance or less than 4 ohms, whichever is greater.
- 3 Less than 4 ohms.
- 4 Less than 2 ohms.

**Taps** – A single electrical tap is available on hot-molded modules with lug terminals at 50 percent ±3 percent of mechanical rotation. Specified nominal tap resistance tolerance ±20 percent. Unless otherwise specified low series tap resistance is provided. See dimensions on Page 250.

# Switches

**Rotary Switch** – The rotary switch consists of two sets of contacts. See Part Number Explanation for available options. When supplied on the Series 72, the rotary switch must be used with a .250 inch (6,35 mm) diameter shaft.

**Push-pull switch** – A four pole switch that is operated by a .125 inch (3,18 mm) diameter solid shaft. An inner concentric shaft that operated the push-pull switch only may have a diameter of .125 inch (3,18 mm) or .078 inch (1,98 mm). Shaft lengths are measured from the bushing mounting surface to the free end of the shaft with the shaft in the extended position. Available only on Series 70 and 73.

**Momentary push switch** – A push-pull switch equipped with a return spring such that the switch will return to the extended position when the actuating force is removed. Available only on Series 70 and 73.

**Ambient temperature** –  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ .

**Life** – The switches will be electrically and mechanically operative after operational life test at rated current and voltage with a resistive load, per switch characteristics below.

**Terminals** – Switches are available with lug terminals only. They are not available with square terminals. On request, switches will be rotated  $90^{\circ}$  such that the switch terminals come out the sides of the control instead of the top and bottom.

## PUSH-PULL AND MOMENTARY PUSH SWITCHES

Switch Number	Type	Voltage in Volts at 60 Hz RMS	Current in Amps	Actuating Force	Length of Throw		Operational Life
					Shaft Operates Switch and Pot	Shaft Operates Switch Only	
3001	Push-Pull	125	2	7 ounces (1.9 N) Min. 19 ounces (5.3 N) Max.	.125 Inch (3.18 mm)	.125 Inch (3.18 mm)	25,000
3002	Momentary Push	125	2	20 ounces (5.6 N) Min. 30 ounces (8.3 N) Max.	.125 Inch (3.18 mm)	.125 Inch (3.18 mm)	25,000

## ROTARY SWITCHES

Switch Number	Detent at	In Detent		Voltage in Volts at 60 Hz RMS	Current in Amps	Actuating Torque	Length of Throw		Operational Life
		Terminals 1 and 2 are:	Terminals 3 and 4 are:				Shaft Operates Switch and Pot	Shaft Operates Switch Only	
1001	CCW end	Open	Closed	125	2	Med	$15^{\circ}$	$25^{\circ}$	25,000
1003	CCW end	Open	Open	125	2	Med	$15^{\circ}$	$25^{\circ}$	25,000
2001	CW end	Open	Closed	125	2	Med	$15^{\circ}$	$25^{\circ}$	25,000
2003	CW end	Open	Open	125	2	Med	$15^{\circ}$	$25^{\circ}$	25,000
1BT1 ■	CCW end	Open	Closed	125	.1	Low	$15^{\circ}$	$25^{\circ}$	5,000
				1	.01				
1BT3 ■	CCW end	Open	Open	125	.1	Low	$15^{\circ}$	$25^{\circ}$	5,000
				1	.01				
2BT1 ■	CW end	Open	Closed	125	.1	Low	$15^{\circ}$	$25^{\circ}$	5,000
				1	.01				
2BT3 ■	CW end	Open	Open	125	.1	Low	$15^{\circ}$	$25^{\circ}$	5,000
				1	.01				

Med Actuating Torque = Maximum of 20 inch-ounces (5,6 N).

Low Actuation Torque = Maximum of 7.5 inch-ounces (53 mN-m). Minimum of 3.5 inch-ounces (24,7 mN-m).

■ For use with conductive plastic element modules only.

### Rotary Switches

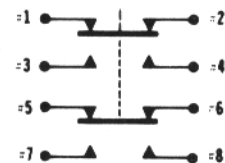


Switch Number  
1BT1, 1001, 2BT1 or 2001  
Shown in Detent



Switch Number  
1BT3, 1003, 2BT3 or 2003  
Shown in Detent

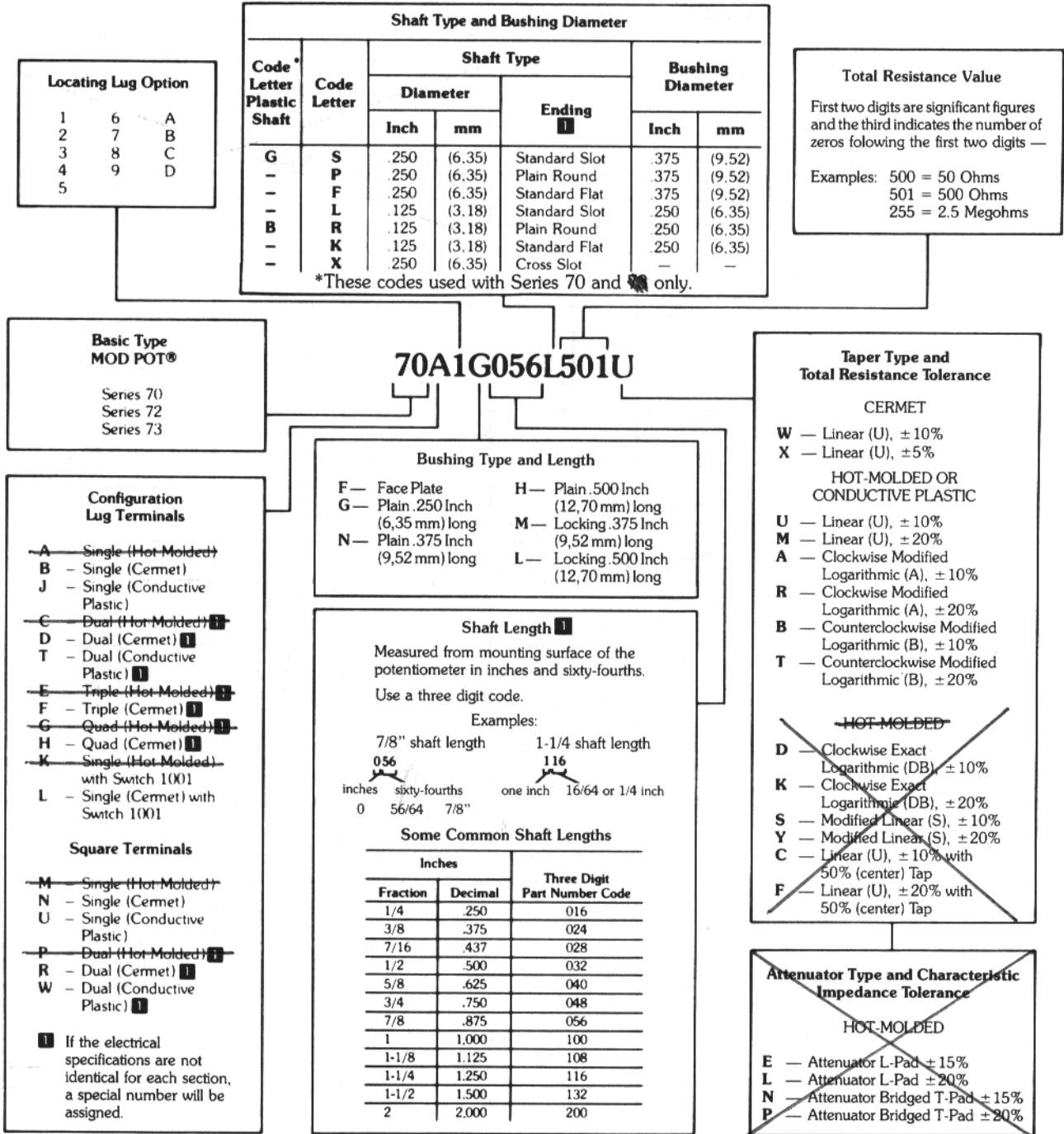
### Push-Pull or Momentary Push Switch



Switch Number  
3001 or 3002  
With Shaft Extended

~~DISCONTINUED~~ → ~~Hot-Molded Carbon,~~  
**Conductive Plastic (CP), and Cermet**  
**Panel Potentiometers**

**Explanation of Part Numbers**



**[1] CONCENTRIC AND SPECIAL SHAFTS REQUIRE SPECIAL PART NUMBER ISSUED BY THE FACTORY.**

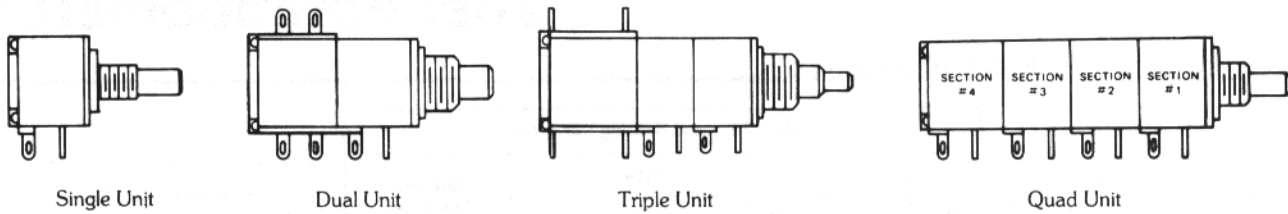
**CAUTION:** Not all part number combinations are valid. Check parameter limits in text.

**EXAMPLE:** 70A1N024P501U  
 Invalid Bushing/Shaft Combination  
 Plain .375 inch (9,52 mm) long bushing with  
 with plain .375 inch (9,52 mm) long shaft.

## Basic Combinations

The MOD POT® Potentiometer is available in single, dual, triple, and quadruple construction. This includes potentiometer, switch and vernier drive modules. The table below lists some of the options available for single

and multi-section controls. Because of the versatility of the MOD POT® Potentiometer, many other options are available. Momentary push switches may be used in place of push-pull switches in the listed combinations.



	Section #1	Section #2	Section #3	Section #4	Drawing ■	Series			See Note	
						70	72	73		
Single Unit	Potentiometer				1A	A	A	A		
	Rotary Switch				2A	A	A	A	4	
	Push-Pull Switch				3A	A	NA	A		
Dual Unit Single Shaft	Potentiometer	Potentiometer			4A	A	A	A		
		Rotary Switch			5A	A	A	A	4	
		Push-Pull Switch			5B	A	NA	A		
Dual Unit Concentric Shaft	Potentiometer	Potentiometer			7A	A	NA	A		
		Push-Pull Switch			8A	A	NA	A		
		Rotary Switch			9A	A	NA	A		
	Vernier Drive	Potentiometer			10A	A	NA	A	3	
Triple Unit Single Shaft	Potentiometer	Potentiometer	Potentiometer		12A	A	NA	A		
			Push-Pull Switch		12B	A	NA	A		
		Rotary Switch	Push-Pull Switch		12C	A	NA	A		
		Potentiometer	Rotary Switch		13A	A	NA	A		
		Rotary Switch			13B	A	NA	A		
	Triple Unit Concentric Shaft	Potentiometer	Potentiometer	Potentiometer		15A	A	NA	A	
				Rotary Switch		16A	A	NA	A	
Push-Pull Switch					17A	A	NA	A		
Vernier Drive		Potentiometer	Potentiometer		19A	A	NA	A	1 or 3	
	Rotary Switch			20A	A	NA	A	1		
Quad Unit Single Shaft	Potentiometer	Potentiometer	Potentiometer	Potentiometer	23A	A	NA	A		
			Push-Pull Switch		23B	A	NA	A		
			Rotary Switch		23C	A	NA	A		
	Vernier Drive	Potentiometer	Potentiometer	Potentiometer	25A	A	NA	A		
Quad Unit Concentric Shaft	Potentiometer	Potentiometer	Potentiometer	Potentiometer	26A	A	NA	A		
				Rotary Switch		27A	A	NA	A	
		Rotary Switch		28A	A	NA	A	1		
	Potentiometer	Rotary Switch	Rotary Switch	Rotary Switch	29A	A	NA	A		
			Push-Pull Switch		30A	A	NA	A		
	Vernier Drive	Potentiometer	Potentiometer	Potentiometer	Potentiometer	31A	A	NA	A	
Rotary Switch					32A	A	NA	A	1, 2 or 3	
				Rotary Switch	33A	A	NA	A	1 or 2	

■ "Drawing" refers to dimensional reference drawings on Pages 249, 250, 251.

A – Available  
NA – Not Available

### NOTES:

1. The outer shaft operates Sections #1 and #2.
2. The outer shaft operates Sections #1, #2 and #3.
3. The inner shaft (.078 inch [1.98mm] diameter) is for the coarse adjustment, the outer shaft for the fine adjustment.
4. Series 72 must have .250 inch (6.35 mm) diameter shaft.

## Standard Components

## STANDARD RESISTANCE MODULES – LINEAR TAPER

Element Type		Hot-Molded Carbon		Cermet		Conductive Plastic			
Resistance Tolerance		10% or 20%		10%		10%		20%	
Taper		(U) or (M)		(W)		(U)		(M)	
Terminal Type		Lug	Pin	Lug	Pin	Lug	Pin	Lug	Pin
Resistance (ohms)	Code								
100	101	A	—	A	A	—	—	—	—
1,000	102	A	A	A	A	A	A	A	A
10,000	103	A	A	A	A	A	A	A	A
100,000	104	A	A	A	A	A	A	A	A
1,000,000	105	A	A	A	A	A	—	A	—
10,000,000	106	A	—	*	*	*	*	*	*
200	201	A	—	A	—	—	—	—	—
2,000	202	A	A	A	A	—	—	—	—
20,000	203	A	A	A	A	A	A	A	A
200,000	204	A	A	A	A	—	—	—	—
250	251	A	—	A	A	—	—	—	—
2,500	252	A	—	A	A	A	—	A	—
25,000	253	A	A	A	A	A	A	A	A
250,000	254	A	A	A	A	—	—	—	—
2,500,000	255	A	A	A	—	*	*	*	*
50	500	A	A	*	*	*	*	*	*
500	501	A	A	A	A	—	—	—	—
5,000	502	A	A	A	A	A	A	A	A
50,000	503	A	A	A	A	A	A	A	A
500,000	504	A	A	A	A	—	—	—	—
5,000,000	505	A	—	—	—	*	*	*	*

A = Available from Distributor Stock.

— = Special Order only. Contact factory for information.

\* = Not Available.

## STANDARD RESISTANCE MODULES – NON-LINEAR TAPER

Element Type		Hot-Molded Carbon		Conductive Plastic		Hot-Molded Carbon		Conductive Plastic	
Resistance Tolerance		10%		10%		10%		10%	
Taper		(A)		(A)		(B)		(B)	
Terminal Type		Lug	Pin	Lug	Pin	Lug	Pin	Lug	Pin
Resistance (ohms)	Code								
100	101	*	*	*	*	*	*	*	*
1,000	102	A	A	—	—	A	—	—	—
10,000	103	A	A	A	A	A	A	A	—
100,000	104	A	A	—	—	A	—	A	—
1,000,000	105	A	A	A	—	A	—	—	—
200	201	*	*	*	*	*	*	*	*
2,000	202	—	—	—	—	—	—	—	—
20,000	203	A	A	—	—	—	—	—	—
200,000	204	A	—	—	—	—	—	—	—
250	251	—	—	—	—	—	—	—	—
2,500	252	—	—	—	—	A	—	—	—
25,000	253	A	A	—	—	A	A	—	—
250,000	254	A	—	A	—	—	—	—	—
2,500,000	255	—	—	*	*	A	—	*	*
500	501	A	—	—	—	—	—	—	—
5,000	502	A	A	A	—	A	—	—	—
50,000	503	A	A	—	—	A	A	A	A
500,000	504	A	A	A	—	A	—	—	—
5,000,000	505	A	—	*	*	A	—	*	*

A = Available from Distributor Stock.

— = Special Order only. Contact factory for information.

\* = Not Available.

## Standard Components

## STANDARD SHAFTS

Shaft Type	Used With	FMS Shaft Length	Shaft Ending	
			Plain	Slotted
Metal .250 (6,35 mm) Dia. Solid	.375 (9,52 mm) Dia. Bushing Series 70; 73	.375 (9,52 mm)	70	70
		.500 (12,70 mm)	70	B
		.625 (15,88 mm)	70	B
		.750 (19,05 mm)	70	B
		.875 (22,22 mm)	70	B
		1.000 (25,40 mm)	—	73
Metal .125 (3,18 mm) Dia. Solid	.250 (6,35 mm) Dia. Bushing Series 70; 73	.375 (9,52 mm)	70	70
		.500 (12,70 mm)	70	B
		.625 (15,88 mm)	70	B
		.750 (19,05 mm)	70	B
		.875 (22,22 mm)	70	B
		1.000 (25,40 mm)	—	73
		2.500 (63,50 mm)	—	70
Plastic .250 (6,35 mm) Dia. Solid	.375 (9,52 mm) Dia. Bushing Series 70; 72; 73	.375 (9,52 mm)	—	—
		.500 (12,70 mm)	—	—
		.625 (15,88 mm)	—	—
		.750 (19,05 mm)	—	A
		.875 (22,22 mm)	—	A
Plastic .125 (3,18 mm) Dia. Solid	.250 (6,35 mm) Dia. Bushing Series 70; 72; 73	.375 (9,52 mm)	—	—
		.500 (12,70 mm)	A	—
		.625 (15,88 mm)	A	—
		.750 (19,05 mm)	A	—
		.875 (22,22 mm)	—	—
Metal Outer Concentric	.375 (9,52 mm) Dia. Bushing Series 70; 73	.625 (15,88 mm)	B	—
		.750 (19,05 mm)	B	—
Metal Outer Concentric	.250 (6,35 mm) Dia. Bushing Series 70; 73	.625 (15,88 mm)	B	—
Metal Inner Concentric Standard for Dual Deck Constructions only	.250 (6,35 mm) Dia. Bushing or .375 (9,52 mm) Dia. Bushing Series 70; 73	1.125 (28,58 mm)	B	—

A = Available on Series 70,72,73      70 = Available on Series 70 only.  
 B = Available on Series 70,73      73 = Available on Series 73 only.  
 — = Available as a Special Order only. Consult factory for information.

## STANDARD SWITCHES

Switch Part Number	1001	1003	2001	2003	1BT1	1BT3	2BT1	2BT3	3001	3002
Type	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Push Pull	Momentary Push

## STANDARD BUSHINGS

Diameter	Type	Length		Series		
		Inches	Millimeters	70	72	73
.250 Inch (6,35 mm)	Bushingless	See Note ■		NA	A	NA
		Plain	.250	6.35	A	A
	Locking	.375	9.52	A	NA	A
		.375	9.52	A	NA	NA
		.500	12.70	A	NA	NA
		.500	12.70	A	NA	NA
.375 Inch (9,52 mm)	Plain	.250	6.35	A	NA	A
		.375	9.52	A	A	A
	Locking	.500	12.70	A	NA	A
		.375	9.52	A	NA	NA
		.375	9.52	A	NA	NA
		.500	12.70	A	NA	NA

Mounting bushings are supplied with 32-NEF-2A thread. All bushing lengths are measured from the mounting face to the end of the bushing.

A = Available. NA = Not Available.

STANDARD  
SHAFT AND BUSHING COMBINATIONS

Shaft Type	Shaft Diameter in Inches	
	.375 (9,52 mm) Dia. Bushing	.250 (6,35 mm) Dia. Bushing
Solid or Outer Concentric	.250 (6,35 mm)	.125 (3,18 mm)
Inner Concentric	.125 (3,18 mm) Verniers (.078 (1,98 mm))	.078 (1,98 mm)

Series 72 shafts and bushings are plastic.

Series 73 bushings and standard shafts are die-cast alloy.

■ No mounting bushing. Shaft is cross slotted for screwdriver actuation and is flush with faceplate. See dimensions on Page 251.

## Ordering Information

1. Basic type (Series 70, Series 72 or Series 73).
2. Type of element (cermet, hot molded or conductive plastic [CP]).
3. Type of terminals (resistor element only).
4. Number of sections.
5. Taper (each element on multi-section controls).
6. Total resistance value (each element on multi-section controls) in ohms.
7. Tolerance (each element on multi-section controls) percent.
8. Bushing type (plain or locking).
9. Bushing length in inches or millimeters.
10. Bushing diameter .375 inch (9,52 mm) or .250 inch (6,35 mm).
11. Shaft ending (plain, slotted or flatted).
12. Shaft length from mounting surface in inches or millimeters.
13. Shaft material: plastic or metal.
14. Switch type.
15. Vernier drive.
16. Locating lug option.
17. Mounting hardware (A-B standard or other).
18. Your part number, if any.
19. Marking required on the part.
20. Special features.\*

\*Forward complete detailed specifications to the factory.

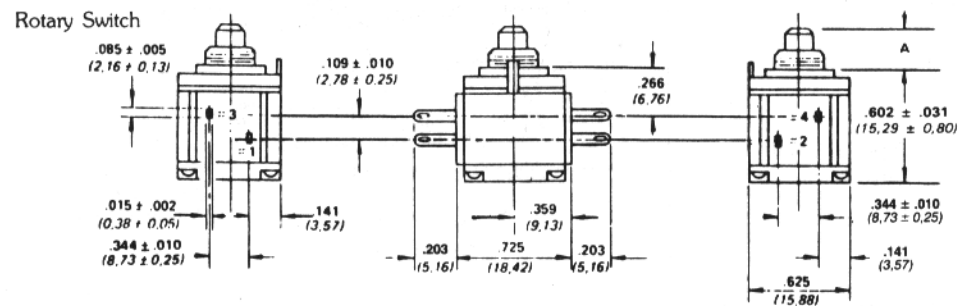
## Cross-Reference Guide

Description	MOD POT®			BOURNS	
	Series 70	Series 72	Series 73	Model 80	Model 90
Multiple Sections	to 4 sections	to 2 sections	to 4 sections	to 4 sections	to 2 sections
Concentric Shafts	■	■ ■	■	■	
Rotary Switches	■	■	■	■	■
Push Switches	■	■ ■	■		
Hot Molded Carbon Element	■	■	■		
Conductive Plastic Element	■	■	■	■	■
Cermet Element	■	■	■	■	■
All-Plastic Construction		■			
Vernier Drive Mechanism	■	■	■		
Attenuators	■	■	■	■	

■ = Available.  
 ■ = Available only with metal shafts.

## DIMENSIONS

### Switches and Potentiometers – Lug Terminals



Basic dimensions in inches.

Dimensions in parentheses are in millimeters.

#### TOLERANCE

Dimensional Tolerance  
 $\pm .016$  (0,40)  
 Except as Specified

Terminal numbers for reference ONLY.  
 Module letters for reference ONLY.

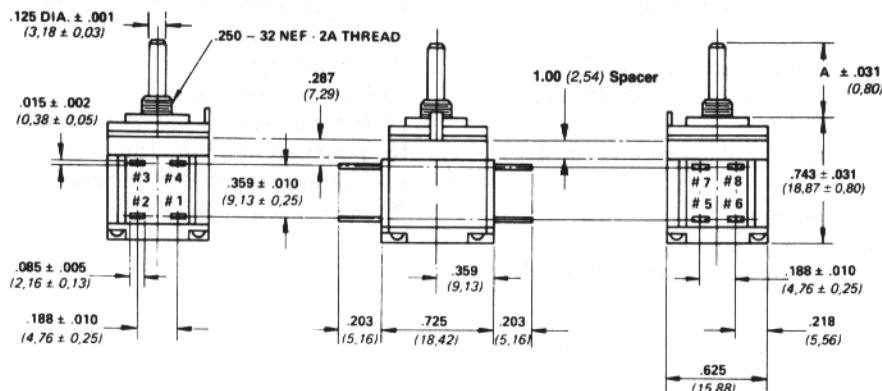
NOT TO SCALE

2A

# DIMENSIONS

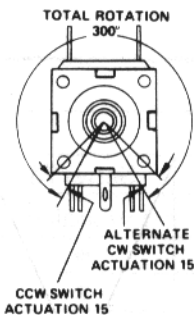
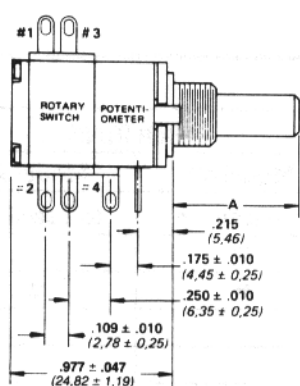
## Switches and Potentiometers – Lug Terminals (continued)

3A



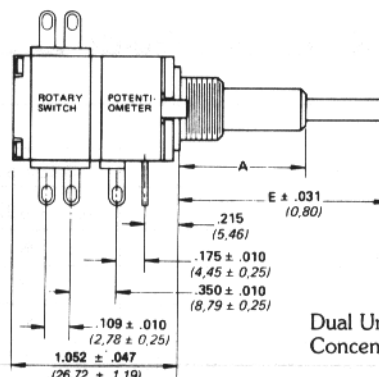
Push-Pull or Momentary Push Switch

5A



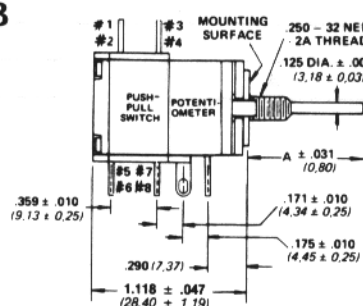
Dual Unit With Single Shaft

9A



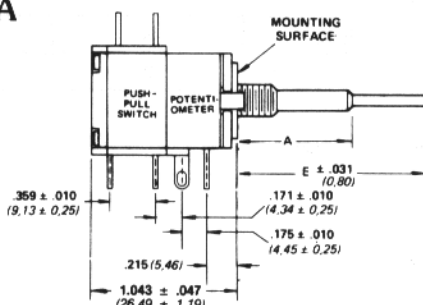
Dual Unit With Concentric Shaft

5B



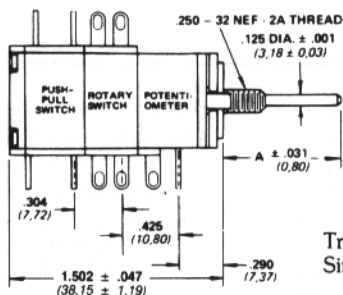
Dual Unit With Single Shaft

8A

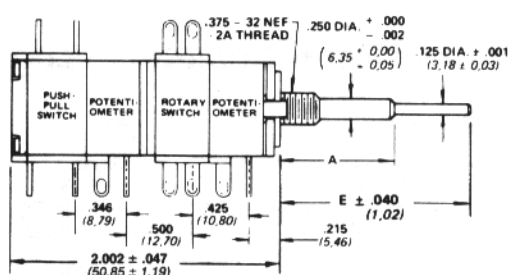


Dual Unit With Concentric Shaft

12C



Triple Unit With Single Shaft



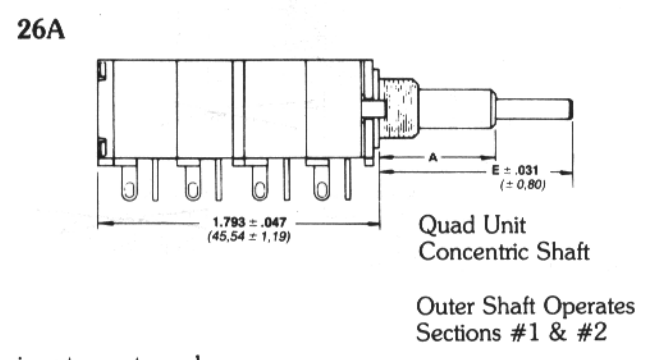
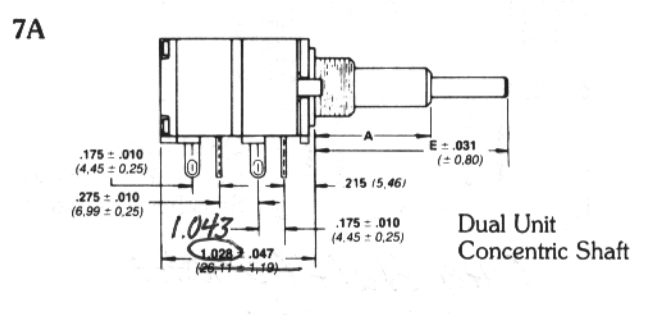
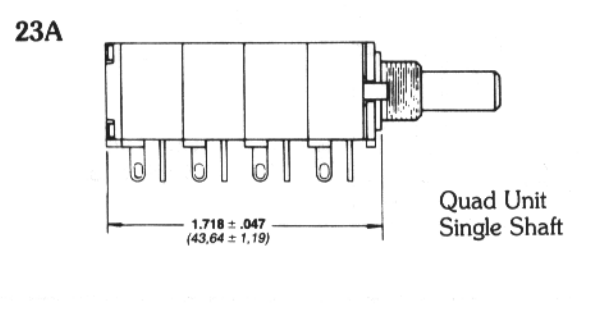
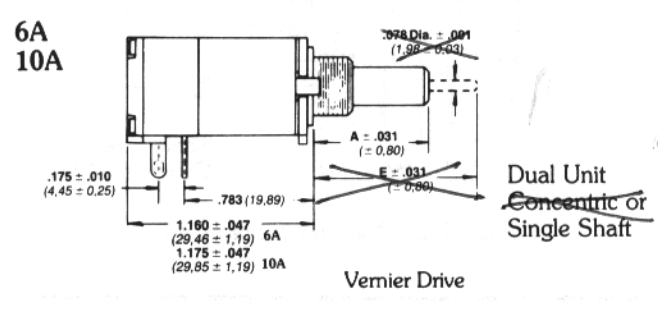
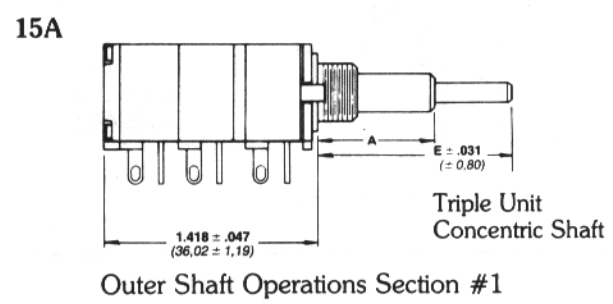
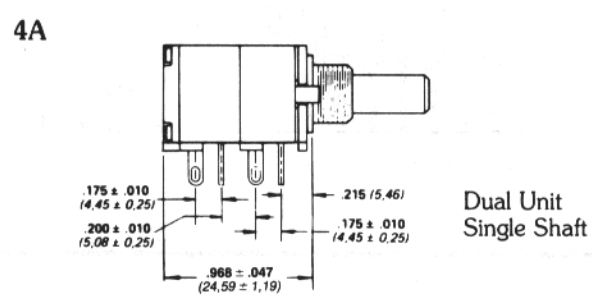
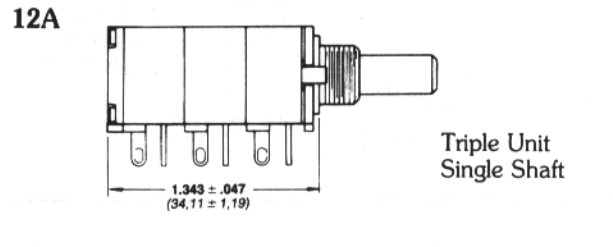
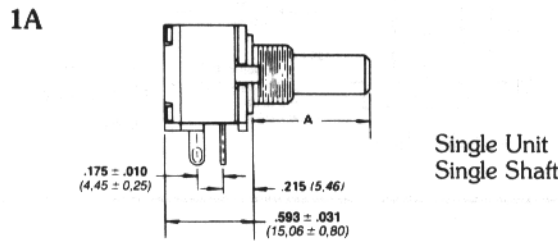
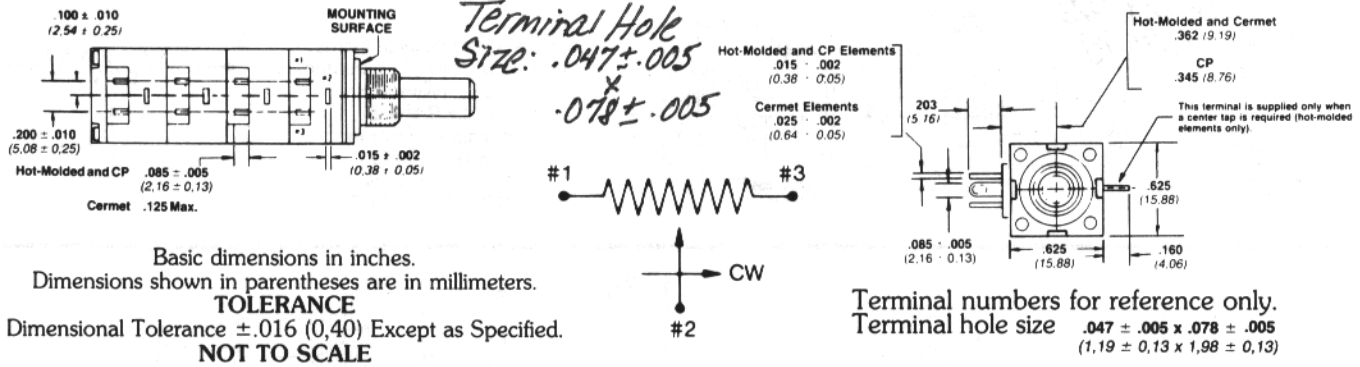
Outer Shaft Operates Sections #1 and #2

Quad Unit With Concentric Shaft

Drawing numbers used for reference to a type of buildup only. This is not a part number.

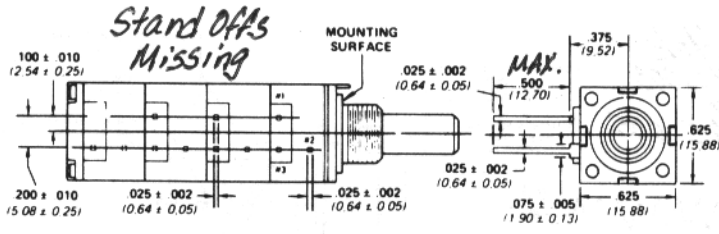
# DIMENSIONS

## Potentiometers – Lug Terminals

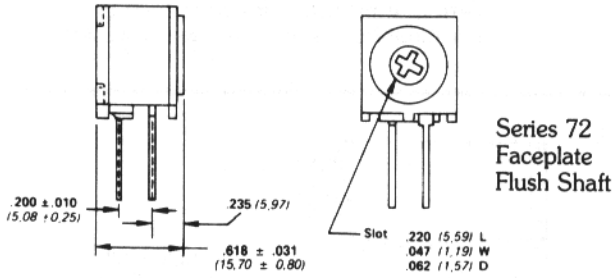
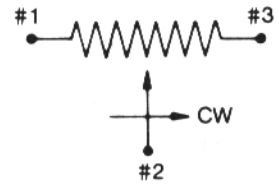


# DIMENSIONS

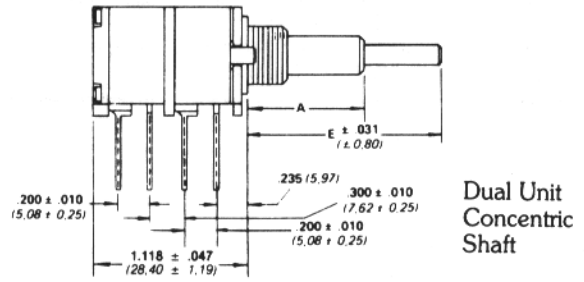
## Potentiometers – Square Terminals



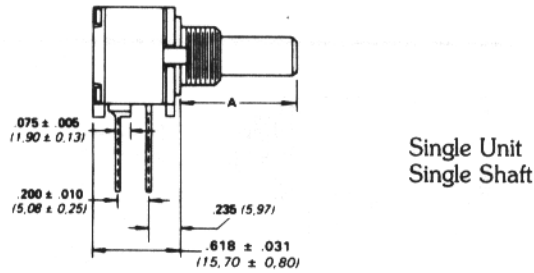
Basic dimensions in inches.  
Dimensions shown in parentheses  
are in millimeters.  
**TOLERANCE**  
Dimensional Tolerance  
±.016 (0,40)  
Except as Specified.  
**NOT TO SCALE**



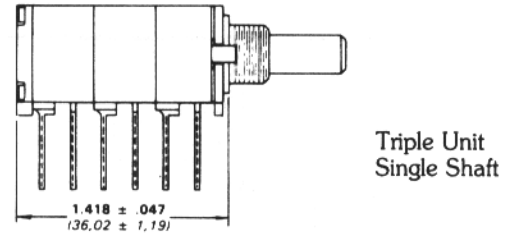
7A



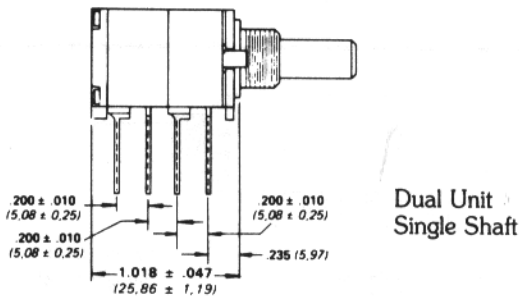
1A



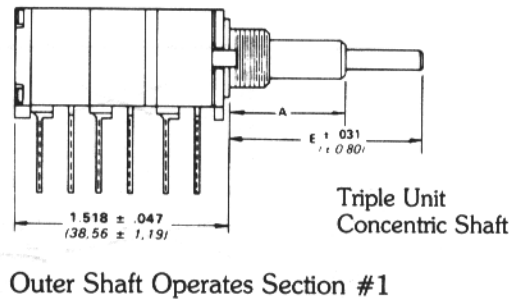
12A



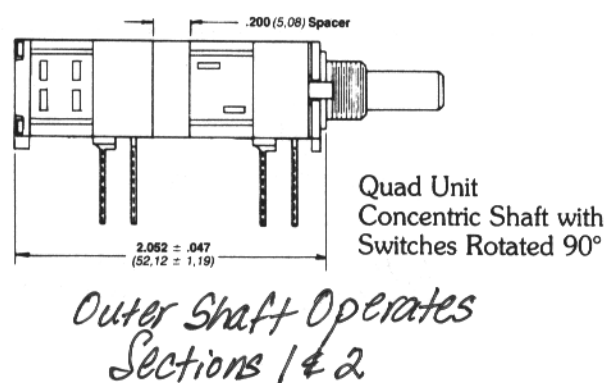
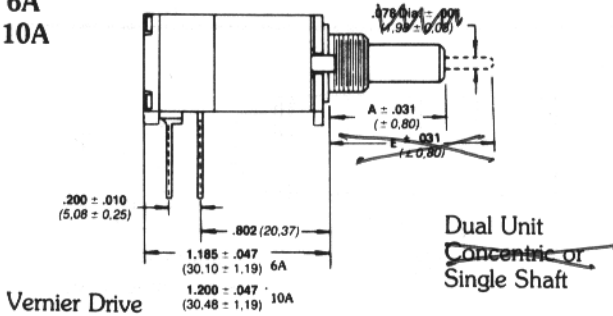
4A



15A



6A  
10A



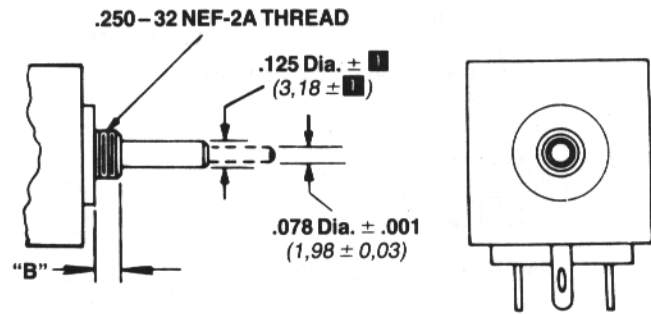
Drawing numbers used for reference to a type of buildup only. This is not a part number.

# DIMENSIONS

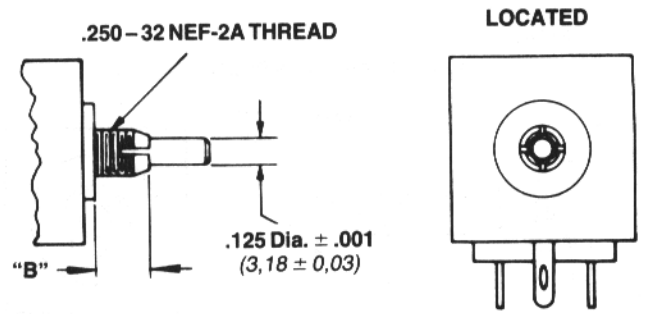
## Bushing, Shaft and Hardware Dimensions

### .250 (6,35) DIAMETER BUSHINGS

#### Plain Bushing



#### Locking Bushing



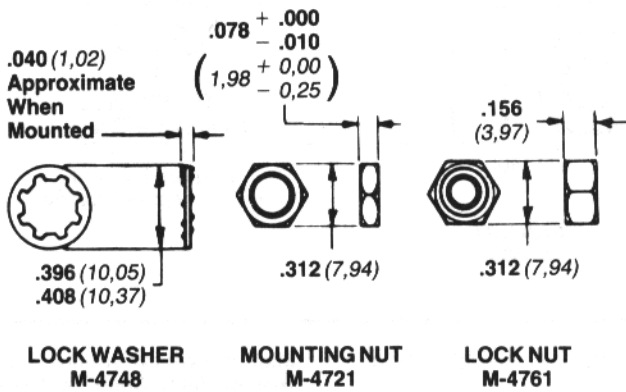
"B" STANDARD BUSHING LENGTHS .250 - .375 (6,35 - 9,53)

"B" STANDARD BUSHING LENGTHS .375 - .500 (9,53 - 12,70)

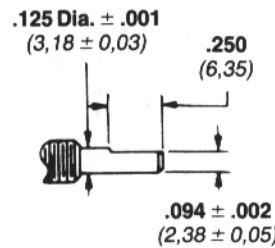
Tolerance - Series 70,73:  $\pm .001$  ( $\pm 0,03$ )  
Series 72:  $+.001$  ( $0,03$ ),  $-.003$  ( $0,08$ )

MAXIMUM MOUNTING PANEL THICKNESS .062 - .188 (1,59 - 4,76)  
when used with one standard M-4748 Lock Washer  
and one standard M-4721 Mounting Nut

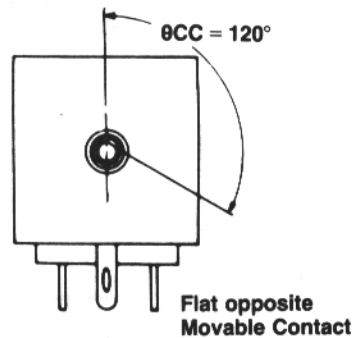
#### Hardware



#### Standard Flatted Shaft



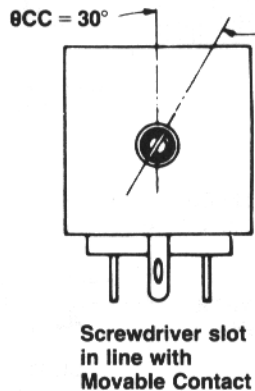
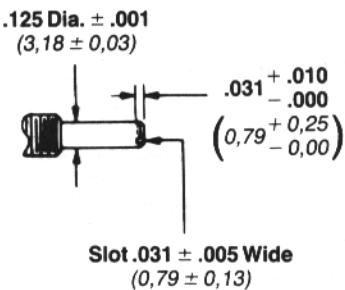
Shaft in extreme counterclockwise position. Angle applies to potentiometers only.



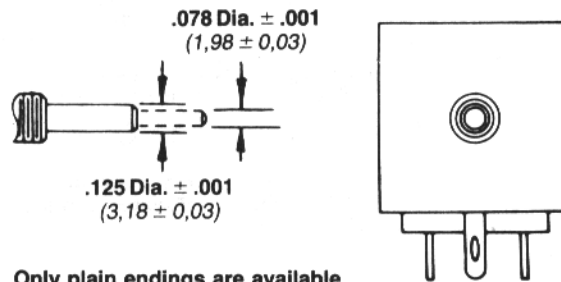
Flat will extend to within .031 (0,79) of mounting bushing where shaft length will not permit standard flat.

#### Standard Slotted Shaft

Shaft in extreme counterclockwise position. Angle applies to potentiometers only.



#### Concentric Shafts - Plain Ending



Only plain endings are available on these concentric shafts.

Basic dimensions in inches.  
Dimensions shown in parentheses are in millimeters.

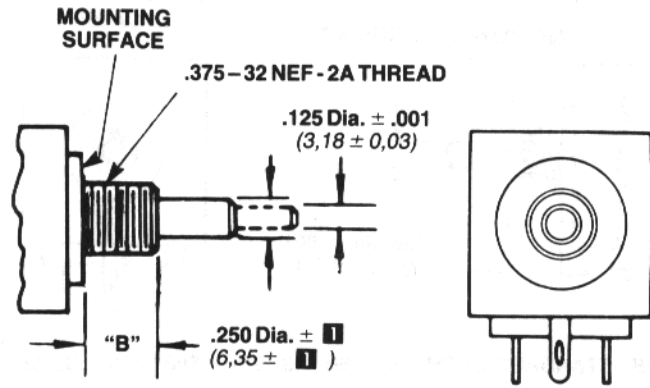
**TOLERANCE**  
Dimensional Tolerance  $\pm .016$  (0,40)  
Angular Tolerance  $\pm 5^\circ$ , Except as Specified.

# DIMENSIONS

## Bushing, Shaft and Hardware Dimensions

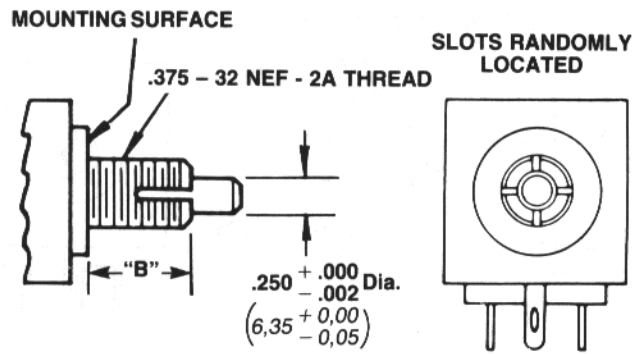
### .375 (9,53) DIAMETER BUSHINGS

#### Plain Bushing



"B" STANDARD BUSHING LENGTHS .250 - .375 (6,35 - 9,53)

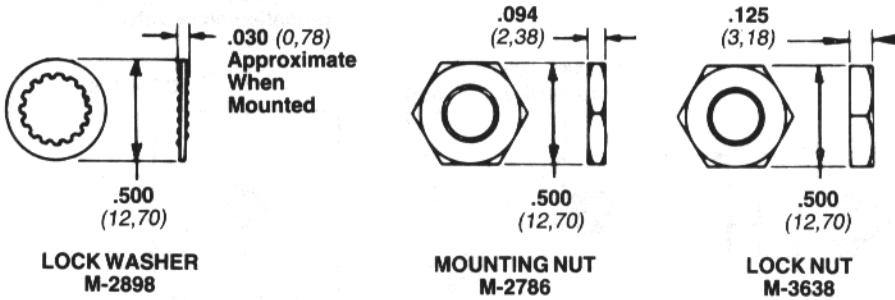
#### Locking Bushing



"B" STANDARD BUSHING LENGTHS .375 - .500 (9,53 - 12,70)

MAXIMUM MOUNTING PANEL THICKNESS .062 - .188 (1,59 - 4,76) when used with one standard M-2898 Lock Washer and one standard M-2786 Mounting Nut

#### Hardware

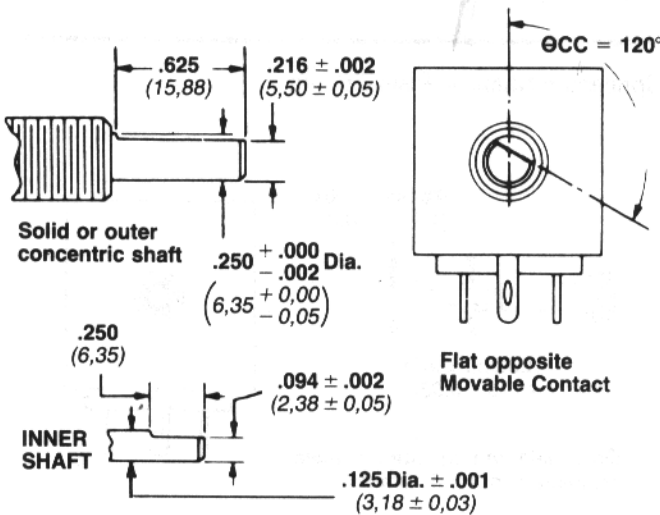


Basic dimensions in inches  
Dimensions shown in parentheses are in millimeters.

**TOLERANCE**  
Dimensional Tolerance  $\pm .016$  (0,40)  
Angular Tolerance  $\pm 5^\circ$ , Except as Specified.

#### Standard Flatted Shaft

Shaft in extreme counterclockwise position. Angle applies to potentiometers only.

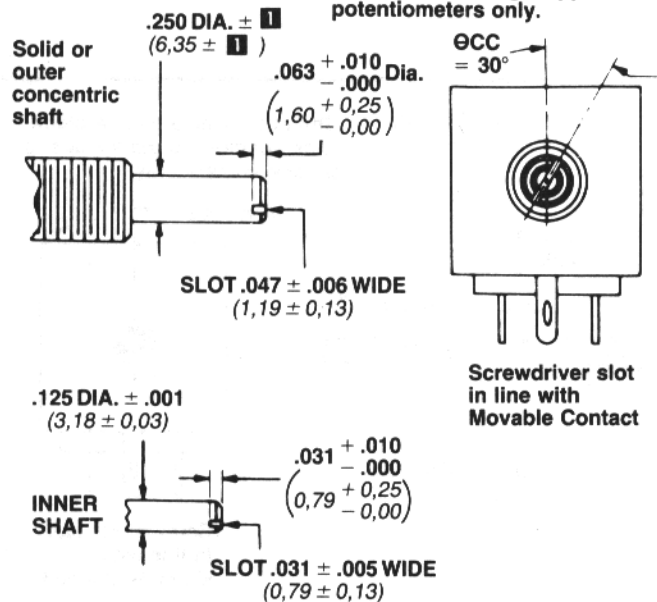


Flat will extend to within .031 (0,79) of mounting bushing where shaft length will not permit standard flat.

■ Tolerance - Series 70,73:  $+.000$  (0,00),  $-.002$  (0,05)  
Series 72:  $+.001$  (0,03),  $-.006$  (0,15)

#### Standard Slotted Shaft

Shaft in extreme counterclockwise position. Angle applies to potentiometers only.

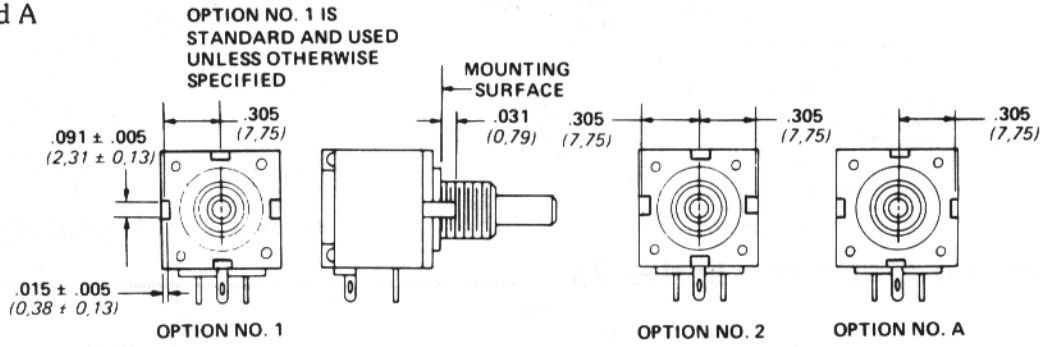


Screwdriver slot in line with Movable Contact

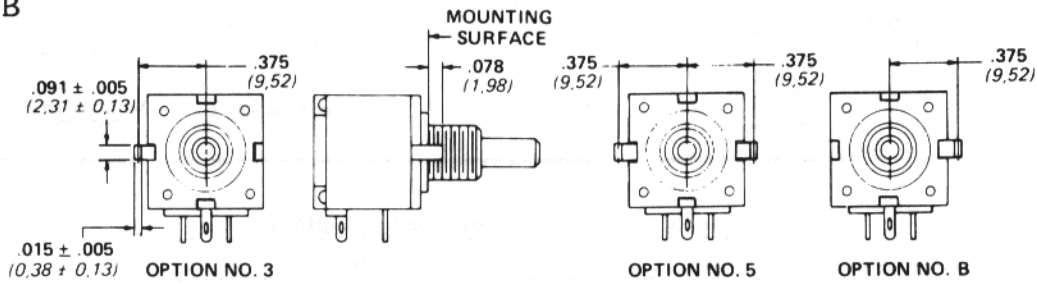
# DIMENSIONS

## Locating Lug Options – Series 70 ■

Options 1, 2 and A

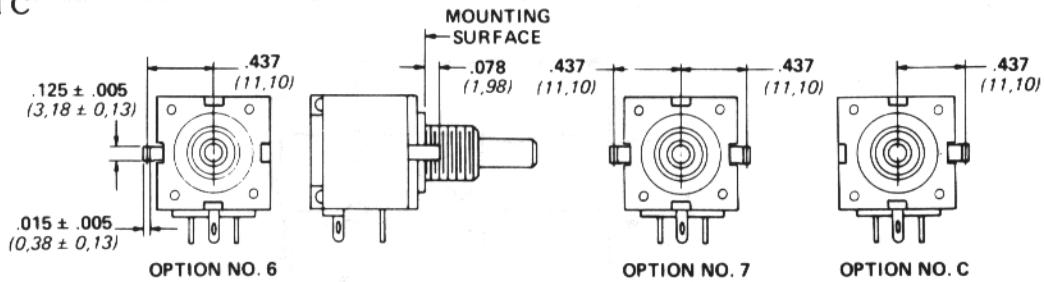


Options 3, 5 and B



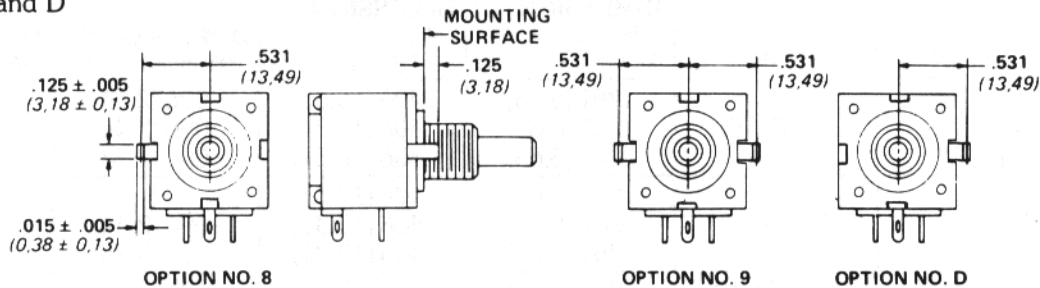
Locating Lugs Compatible With RV5

Options 6, 7 and C



Locating Lugs Compatible With RV2

Options 8, 9 and D



Locating Lugs Compatible With RV4

Series	Available Lug Options
70 ■	1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D

■ Series 70 Option No. 4: No Locating Lug.

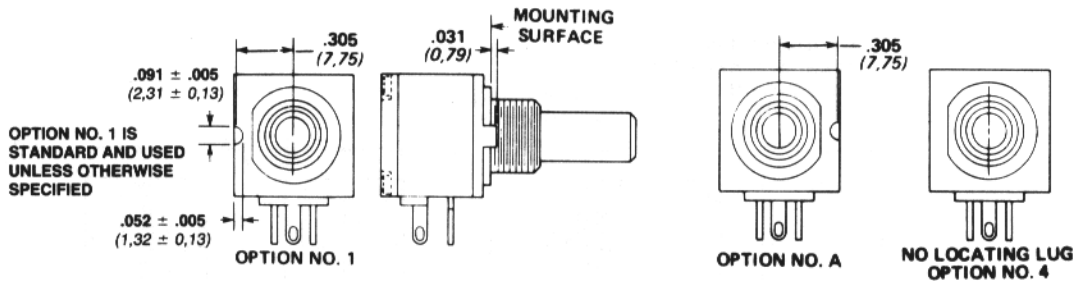
Basic dimensions in inches.  
Dimensions shown in parentheses are in millimeters.

**TOLERANCE**  
Dimensional Tolerance  $\pm .016$  (0,40)  
Except as Specified.

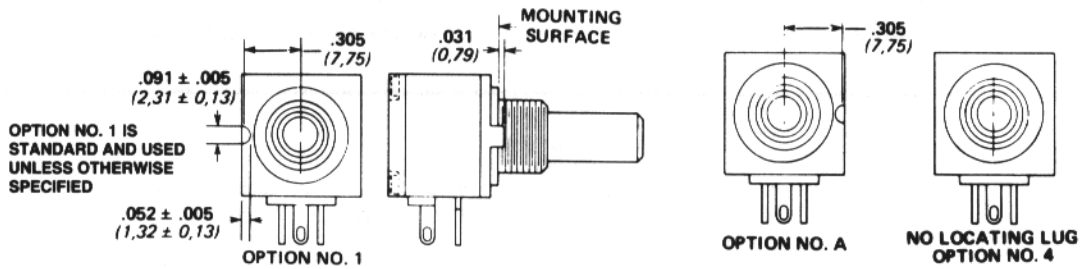
**NOT TO SCALE**

# DIMENSIONS

## Locating Lug Options – Series 72

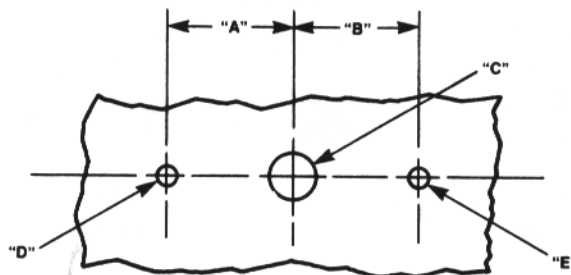


## Locating Lug Options – Series 73



Series	Available Lug Options
72	1, 4, A
73	1, 4, A

## Mounting Holes



LUG OPTION	DIMENSION "A"	DIMENSION "B"	DIMENSION "C" Minimum hole dia. for 1/4" dia. bushing	DIMENSION "C" Minimum hole dia. for 3/8" dia. bushing	DIMENSION "D" Minimum hole dia.	DIMENSION "E" Minimum hole dia.
1	.305 (7,75)	*	.261 (6,63)	.406 (10,31)	.096 (2,44)	*
2	.305 (7,75)	.305 (7,75)	.261 (6,63)	.406 (10,31)	.096 (2,44)	.096 (2,44)
3	.375 (9,52)	*	.261 (6,63)	.406 (10,31)	.096 (2,44)	*
4	*	*	.261 (6,63)	.406 (10,31)	*	*
5	.375 (9,52)	.375 (9,52)	.261 (6,63)	.406 (10,31)	.096 (2,44)	.096 (2,44)
6	.437 (11,10)	*	.261 (6,63)	.406 (10,31)	.128 (3,25)	*
7	.437 (11,10)	.437 (11,10)	.261 (6,63)	.406 (10,31)	.128 (3,25)	.128 (3,25)
8	.531 (13,49)	*	.261 (6,63)	.406 (10,31)	.128 (3,25)	*
9	.531 (13,49)	.531 (13,49)	.261 (6,63)	.406 (10,31)	.128 (3,25)	.128 (3,25)
A	*	.305 (7,75)	.261 (6,63)	.406 (10,31)	*	.096 (2,44)
B	*	.375 (9,52)	.261 (6,63)	.406 (10,31)	*	.096 (2,44)
C	*	.437 (11,10)	.261 (6,63)	.406 (10,31)	*	.128 (3,25)
D	*	.531 (13,49)	.261 (6,63)	.406 (10,31)	*	.128 (3,25)

Dimensional tolerance ±.016 (0,40) except as specified.

\* = Not Required.