

## Features

- Conductive plastic or cermet
- Linear and audio tapers
- PC board and bushing mount
- Gangable
- Metal bushing and shaft
- Sealed for board washing

## 51/52/53 - Sealed 1/2" (12.5 mm) Square Control

Electrical Characteristics <sup>1</sup>	Conductive Plastic	Cermet
Standard Resistance Range		
Linear.....	1 K ohms to 1 megohm.....	150 ohms to 1 megohm
Audio.....	1 K ohms to 1 megohm.....	1 K ohms to 1 megohm
Total Resistance Tolerance		
Linear Tapers.....	±10 % or ±20 %.....	±10 % or ±5 %
Audio Tapers.....	±10 % or ±20 %.....	±10 %
Independent Linearity.....	±5 %.....	±5 %
Absolute Minimum Resistance.....	2 ohms maximum.....	2 ohms maximum
Effective Electrical Angle.....	270 ° ±5 °.....	270 ° ±5 °
Contact Resistance Variation.....	2 %.....	2 %
Dielectric Withstanding Voltage (MIL-STD-202 – Method 301)		
Sea Level.....	1,500 VAC minimum.....	1,500 VAC minimum
70,000.....	500 VAC minimum.....	500 VAC minimum
Insulation Resistance.....	1,000 megohms minimum.....	1,000 megohms minimum
Power Rating At 70 °C (Derate To 0 At 125 °C)		
(Voltage Limited By Power Dissipation or 350 VAC, Whichever Is Less)		
Linear Tapers.....	0.5 watt.....	1.0 watt
Audio Tapers.....	0.25 watt.....	0.5 watt
Theoretical Resolution.....	Essentially infinite.....	Essentially infinite
<b>Environmental Characteristics<sup>1</sup></b>		
Operating Temperature Range.....	+1 °C to +125 °C.....	+1 °C to +125 °C
Storage Temperature Range.....	-55 °C to +125 °C.....	-55 °C to +125 °C
Temperature Coefficient Over Storage Temperature Range.....	±1,000 ppm/°C.....	±150 ppm/°C
Vibration (Single Section).....	15 G.....	15 G
Total Resistance Shift.....	±2 % maximum.....	±2 % maximum
Voltage Ratio Shift.....	±5 % maximum.....	±5 % maximum
Shock (Single Section).....	30 G.....	30 G
Total Resistance Shift.....	±2 % maximum.....	±2 % maximum
Voltage Ratio Shift.....	±5 % maximum.....	±5 % maximum
Load Life.....	1,000 hours.....	1,000 hours
Total Resistance Shift.....	±10 % TRS maximum.....	±5 % TRS maximum
Rotational Life (No Load).....	50,000 cycles.....	25,000 cycles
Total Resistance Shift.....	±10 % TRS maximum.....	±10 % TRS maximum
Contact Resistance Variation @ 25,000 Cycles.....	±2 %.....	±4 %
Moisture Resistance (MIL-STD-303, Method 103, Condition B)		
Total Resistance Shift.....	±10 % TRS.....	±5 % TRS
IP Rating.....	IP 64.....	IP 64
<b>Mechanical Characteristics</b>		
Stop Strength.....		56 N-cm (5 lb.-in.)
Mechanical Angle.....		290 ° ±5 °
Torque		
Starting (All Sections).....		Running torque +0.35 N-cm (+0.5 oz.-in.) maximum
Running (Single Section).....		0.15 to 1.4 N-cm (0.2 to 2.0 oz.-in.)
Running (Dual or Triple Section).....		0.35 to 1.8 N-cm (0.5 to 2.5 oz.-in.)
Mounting (Torque on Bushing).....		1.7 to 2.0 N-m (15 to 18 lb.-in.) maximum
Weight (Single Section).....		5.5 grams
(Each Additional Section).....		3.0 grams
Terminals.....		PC pin or solder lug
Soldering Condition.....		Recommended hand soldering using Sn95/Ag5 no clean solder, 0.025" wire diameter. Maximum temperature 399 °C (750 °F) for 3 seconds. No wash process to be used with no clean flux. Part can be wave soldered at 260 °C (500 °F) for 5 seconds, no wash process with no clean flux.
Marking.....		Manufacturer's trademark, part number, resistance value and date code.
Ganging (Multiple Section Potentiometers).....		6 cups maximum
Hardware.....		One lockwasher and one mounting nut is shipped with each potentiometer, except where noted in the part number.

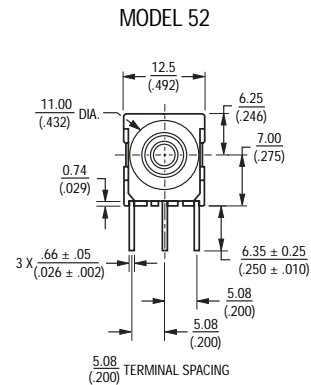
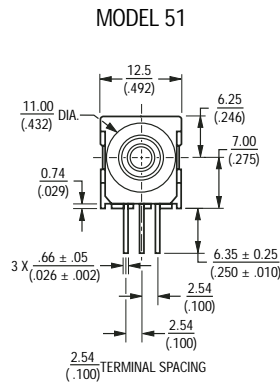
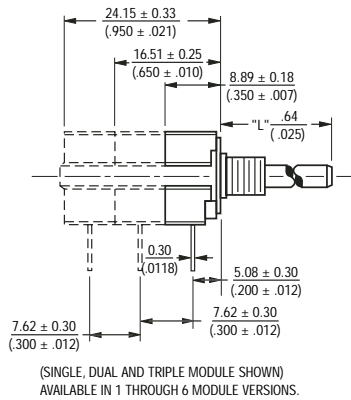
<sup>1</sup>At room ambient: +25 °C nominal and 50 % relative humidity nominal, except as noted.

# 51/52/53 - Sealed 1/2" (12.5 mm) Square Control

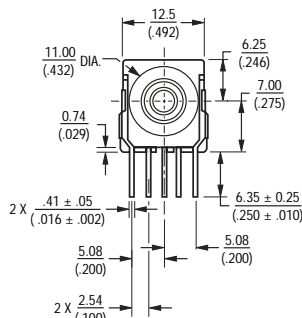
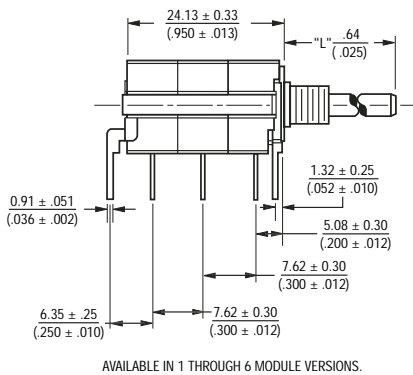
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## Product Dimensions

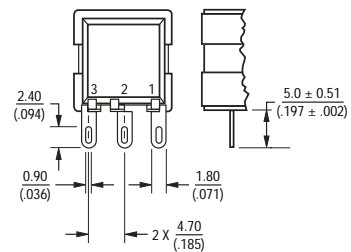
### PACKAGE DIMENSIONS



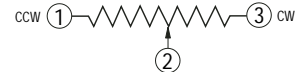
### PACKAGE DIMENSIONS PCB MOUNTING BRACKET



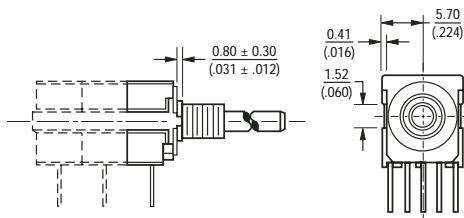
### SOLDER LUG TERMINALS MODEL 53



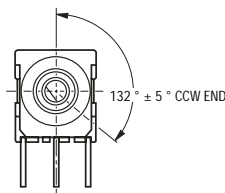
### ELECTRICAL SCHEMATIC



### ANTI-ROTATION LUG (Style "A", 90° CW Shown)

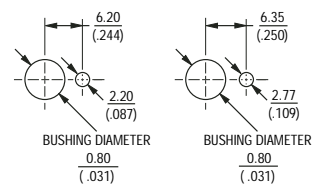


### SHAFT FLAT ORIENTATION



### SUGGESTED PANEL LAYOUTS

The Model 50 can be used with either of the two panel layouts shown below.



FOR TOLERANCES SHOWN: XX = ± .25 (.010)  
XXX = ± .13 (.005)  
SHAFT DIMENSIONS ± .80 (.1732)

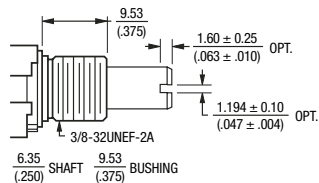
DIMENSIONS ARE:  $\frac{\text{MM}}{\text{(INCHES)}}$

Specifications are subject to change without notice. Customers should verify actual device performance in their specific applications.

# 51/52/53 - Sealed 1/2" (12.5 mm) Square Control

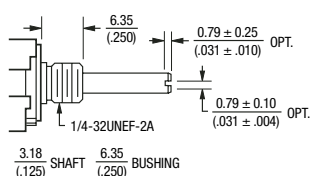
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## Shaft/Bushing Styles



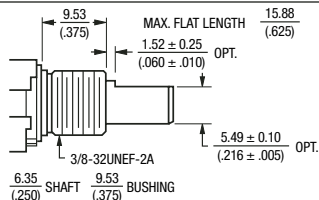
**A Style Bushing**

STD. LENGTH 'L'	
.500	(12.7)
.625	(15.88)
.750	(19.05)
.875	(22.23)
1.000	(25.4)



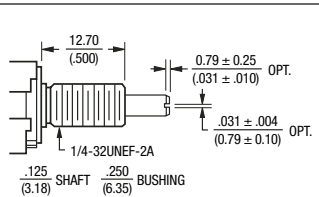
**C Style Bushing**

STD. LENGTH 'L'	
.375	(9.53)
.500	(12.7)
.625	(15.88)
.750	(19.05)
.875	(22.23)
1.000	(25.4)



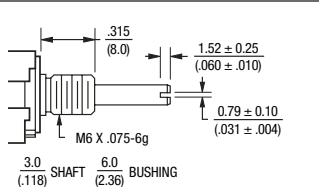
**A Style Bushing - Flatted Shaft**

STD. LENGTH 'L'	
.625	(15.88)
.750	(19.05)
.875	(22.23)
1.000	(25.4)



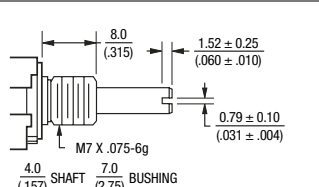
**F Style Bushing**

STD. LENGTH 'L'	
.625	(15.88)
.750	(19.05)
.875	(22.23)
1.000	(25.4)



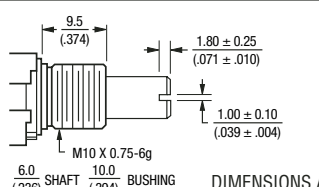
**S Style Bushing**

STD. LENGTH 'L'	
.394	(10.0)
.512	(13.0)
.630	(16.0)
.866	(22.0)
.984	(25.0)



**U Style Bushing**

STD. LENGTH 'L'	
.394	(10.0)
.512	(13.0)
.630	(16.0)
.866	(22.0)
.984	(25.0)



**R Style Bushing**

STD. LENGTH 'L'	
.512	(13.0)
.630	(16.0)
.866	(22.0)
.984	(25.0)

DIMENSIONS ARE:  $\frac{\text{MM}}{\text{(INCHES)}}$

## How To Order

51 A A D - B 28 - A 15

MOUNTING BRACKET/ ANTI-ROTATION LUG	
Code	Description
A	AR Lug 90° CW
C	AR Lug 270° CW
D	No AR Lug or Bracket
L	Front Bracket
M	Rear Bracket
N	Front and Rear Bracket

# SECTIONS/DETENTS	
Code	Description
A	Single No Detent
B	Double No Detent
C	Triple No Detent
D	Quad No Detent
E	Single w/Center Detent
F	Double w/Center Detent
G	Triple w/Center Detent
H	Quad w/Center Detent
J	Five Section
K	Six Section
L	Five Section w/Detent
M	Six Section w/Detent

BUSHING CONFIGURATION	
Code	Description
A	3/8" D x 3/8" L
C	1/4" D x 1/4" L
F	1/4" D x 1/2" L
R	10 mm D x 9.5 mm L
S	6 mm D x 8 mm L
U	7 mm D x 8 mm L

MODEL	
Code	Description
51	PC Pins (.100" centers)
52	PC Pins (.200" centers)
53	Solder Lugs

Code	Description	ELEMENT TAPER TYPE/TOLERANCE		RESISTANCE (CODE)	
		Value	Tolerance	Value	Code
(A) (H)	Linear Cermet ±10 % Linear Cermet ±5 %	(28) - 150	(14) - 7.5 K	(10) - 1 K	(18) - 50 K
		(06) - 200	(15) - 10 K	(12) - 2.5 K	(20) - 100 K
		(07) - 250	(30) - 15 K	(13) - 5 K	(22) - 250 K
		(08) - 500	(16) - 20 K	(14) - 10 K	(23) - 500 K
		(09) - 750	(17) - 25 K	(15) - 10 K	(25) - 1 M
		(10) - 1 K	(18) - 50 K	(16) - 20 K	
		(11) - 2 K	(19) - 75 K	(17) - 25 K	
		(12) - 2.5 K	(20) - 100 K		
		(13) - 5 K	(21) - 150 K		
		(14) - 7.5 K	(22) - 250 K		
(B) (E)	Linear C-P ±20 % Linear C-P ±10 %	(10) - 1 K	(18) - 50 K	(10) - 1 K	(18) - 50 K
		(12) - 2.5 K	(20) - 100 K	(12) - 2.5 K	(20) - 100 K
		(13) - 5 K	(22) - 250 K	(13) - 5 K	(22) - 250 K
		(14) - 7.5 K	(23) - 500 K	(14) - 7.5 K	(23) - 500 K
		(15) - 10 K	(24) - 750 K	(15) - 10 K	(24) - 750 K
		(16) - 20 K	(25) - 1 M	(16) - 20 K	(25) - 1 M
		(17) - 25 K		(17) - 25 K	
(C) (F)	CW Audio Cermet ±10 % CCW Audio Cermet ±10 %	(10) - 1 K	(18) - 50 K	(10) - 1 K	(18) - 50 K
		(12) - 2.5 K	(20) - 100 K	(12) - 2.5 K	(20) - 100 K
		(13) - 5 K	(22) - 250 K	(13) - 5 K	(22) - 250 K
		(14) - 7.5 K	(23) - 500 K	(14) - 7.5 K	(23) - 500 K
		(15) - 10 K	(24) - 750 K	(15) - 10 K	(24) - 750 K
		(16) - 20 K	(25) - 1 M	(16) - 20 K	(25) - 1 M
(D) (S)	CW Audio C-P ±20 % CW Audio C-P ±10 %	(10) - 1 K	(18) - 50 K	(10) - 1 K	(18) - 50 K
		(12) - 2.5 K	(20) - 100 K	(12) - 2.5 K	(20) - 100 K
		(13) - 5 K	(22) - 250 K	(13) - 5 K	(22) - 250 K
		(14) - 7.5 K	(23) - 500 K	(14) - 7.5 K	(23) - 500 K
		(15) - 10 K	(24) - 750 K	(15) - 10 K	(24) - 750 K
		(16) - 20 K	(25) - 1 M	(16) - 20 K	(25) - 1 M
(G) (T)	CCW Audio C-P ±20 % CCW Audio C-P ±10 %	(10) - 1 K	(18) - 50 K	(10) - 1 K	(18) - 50 K
		(12) - 2.5 K	(20) - 100 K	(12) - 2.5 K	(20) - 100 K
		(13) - 5 K	(22) - 250 K	(13) - 5 K	(22) - 250 K
		(14) - 7.5 K	(23) - 500 K	(14) - 7.5 K	(23) - 500 K
		(15) - 10 K	(24) - 750 K	(15) - 10 K	(24) - 750 K
		(16) - 20 K	(25) - 1 M	(16) - 20 K	(25) - 1 M
(Y)	CW Dual Audio Taper C-P ±20 %	(10) - 1 K	(18) - 50 K	(10) - 1 K	(18) - 50 K
		(12) - 2.5 K	(20) - 100 K	(12) - 2.5 K	(20) - 100 K
		(13) - 5 K	(22) - 250 K	(13) - 5 K	(22) - 250 K
		(14) - 7.5 K	(23) - 500 K	(14) - 7.5 K	(23) - 500 K
		(15) - 10 K	(24) - 750 K	(15) - 10 K	(24) - 750 K
		(16) - 20 K	(25) - 1 M	(16) - 20 K	(25) - 1 M

SHAFT LENGTH (FMS)		AVAILABLE ONLY IN BUSHING	
Code	Description	Code	Description
12	3/8"	B, C	
16	1/2"	A, C	
20	5/8"	A, C, F	
24	3/4"	A, C, F	
28	7/8"	A, C, F	
32	1"	A, C, F	
Metric			
10	10 mm	R, S, U, T	
13	13 mm	R, S, U, T	
16	16 mm	R, S, U, T	
22	22 mm	R, S, U, T	
25	25 mm	R, S, U, T	

SHAFT TYPE		AVAILABLE ONLY IN BUSHINGS	
Code	Description	Code	Description
A	Single Plain 1/4" D	A	20,24,28,32
B	Single Slotted 1/4" D	A	12,16,20,24,28,32
C	Single Flatted 1/4" D	A	20,24,28,32
D	Single Plain 1/8" D	C, F	16,20,24,28,32
E	Single Slotted 1/8" D	C, F	12,16,20,24,28,32
R	Single Slotted 6 mm D	R	10,13,16,22,25
T	Single Slotted 4 mm D	U	10,13,16,22,25
U	Single Slotted 3 mm D	S	10,13,16,22,25

Backface features are Bourns standard options. All others are available with higher minimum order quantities.