



## Features

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



## 51/53 - 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)<br>(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  |

| Environmental Characteristics <sup>1</sup>                   | Conductive Plastic      | Cermet            |
|--|-------------------------|-------------------|
| 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-202, Method 103, Condition B)   |                         |                   |
| Total Resistance Shift.....                                  | ±10 % TRS.....          | ±5 % TRS          |
| IP Rating.....   | IP 64 .....             | IP 64             |

| Mechanical Characteristics                     | Conductive Plastic  | Cermet |
|--|---|--------|
| 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.<br>Maximum temperature 399 °C (750 °F) for 3 seconds. No wash process to be used with no clean flux.<br>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.

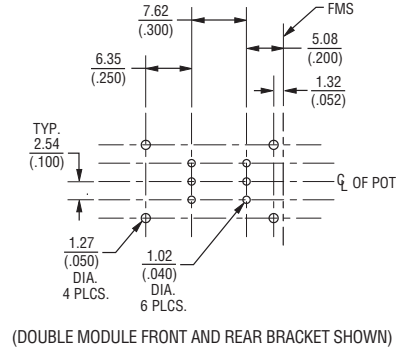
\*RoHS Directive 2002/95/EC Jan 27 2003 including Annex  
Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.

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

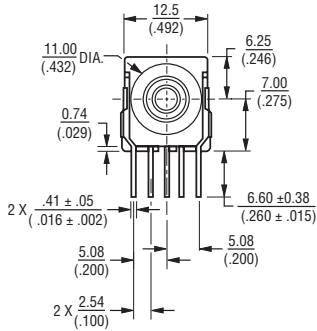
**BOURNS®**

## Product Dimensions

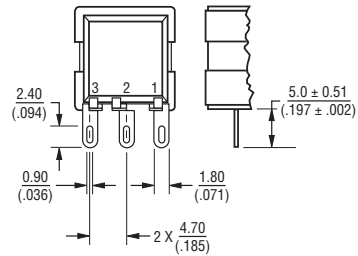
### PACKAGE DIMENSIONS



### PACKAGE DIMENSIONS PCB MOUNTING BRACKET



### SOLDER LUG TERMINALS MODEL 53



### ELECTRICAL SCHEMATIC



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



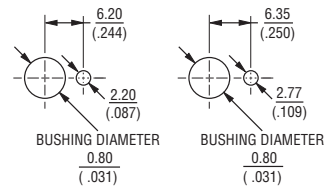
DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

### 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 =  $\pm \frac{.25}{(.010)}$   
XXX =  $\pm \frac{.13}{(.005)}$   
SHAFT DIMENSIONS  $\pm \frac{.80}{(1/32)}$

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

# BOURNS®

## 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)    |



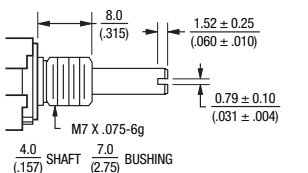
**F Style Bushing**

| 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:  $\frac{\text{MM}}{\text{(INCHES)}}$

## How To Order

51 A A D - B 28 - A 15 L

| MOUNTING BRACKET/<br>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) |
| 53    | Solder Lugs              |

| Code | SHAFT TYPE<br>Description | AVAILABLE ONLY IN |                        |
|------|---------------------------|-------------------|------------------------|
|      |                           | BUSHINGS<br>Code  | LENGTHS<br>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 mmD      | R                 | 10,13,16,22,25         |
| T    | Single Slotted 4 mmD      | U                 | 10,13,16,22,25         |
| U    | Single Slotted 3 mmD      | S                 | 10,13,16,22,25         |

| RoHS IDENTIFIER |             |
|-----------------|-------------|
| Code            | Description |
| L               | Compliant   |

| Code | ELEMENT TAPER<br>TYPE/TOLERANCE<br>Description | RESISTANCE<br>(CODE)<br>VALUE IN OHMS |              |
|------|--|---------------------------------------|--------------|
|      |  | (28) - 150                            | (14) - 7.5 K |
| (A)  | Linear Cermet ±10 %                            | (06) - 200                            | (15) - 10 K  |
| (H)  | Linear Cermet ±5 %                             | (07) - 250                            | (30) - 15 K  |
|      |  | (08) - 500                            | (16) - 20 K  |
|      |  | (09) - 750                            | (17) - 25 K  |
|      |  | (10) - 1 K                            | (18) - 50 K  |
|      |  | (29) - 1.5 K                          | (19) - 75 K  |
|      |  | (11) - 2 K                            | (20) - 100 K |
|      |  | (12) - 2.5 K                          | (23) - 500 K |
|      |  | (13) - 5 K                            | (25) - 1 M   |
| (B)  | Linear C-P ±20 %                               | (10) - 1 K                            | (18) - 50 K  |
| (E)  | Linear C-P ±10 %                               | (12) - 2.5 K                          | (20) - 100 K |
|      |  | (13) - 5 K                            | (22) - 250 K |
|      |  | (15) - 10 K                           | (23) - 500 K |
|      |  | (16) - 20 K                           | (25) - 1 M   |
|      |  | (17) - 25 K                           |              |
| (C)  | CW Audio Cermet<br>±10 %                       | (10) - 1 K                            | (18) - 50 K  |
| (F)  | CCW Audio Cermet<br>±10 %                      | (12) - 2.5 K                          | (20) - 100 K |
|      |  | (13) - 5 K                            | (23) - 500 K |
|      |  | (15) - 10 K                           | (25) - 1 M   |
|      |  | (17) - 25 K                           |              |
| (D)  | CW Audio C-P ±20 %                             | (10) - 1 K                            | (18) - 50 K  |
| (S)  | CW Audio C-P ±10 %                             | (12) - 2.5 K                          | (20) - 100 K |
|      |  | (13) - 5 K                            | (22) - 250 K |
|      |  | (15) - 10 K                           | (23) - 500 K |
|      |  | (17) - 25 K                           | (25) - 1 M   |
| (G)  | CCW Audio C-P<br>±20 %                         | (10) - 1 K                            | (18) - 50 K  |
| (T)  | CCW Audio C-P<br>±10 %                         | (12) - 2.5 K                          | (20) - 100 K |
|      |  | (13) - 5 K                            | (22) - 250 K |
|      |  | (15) - 10 K                           | (23) - 500 K |
|      |  | (17) - 25 K                           | (25) - 1 M   |
| (Y)  | CW Dual Audio<br>Taper C-P ±20 %               | (10) - 1 K                            | (18) - 50 K  |
|      |  | (12) - 2.5 K                          | (20) - 100 K |
|      |  | (13) - 5 K                            | (22) - 250 K |
|      |  | (15) - 10 K                           | (23) - 500 K |
|      |  | (17) - 25 K                           | (25) - 1 M   |

| SHAFT LENGTH<br>(FMS) |             | AVAILABLE<br>ONLY IN<br>BUSHING |
|-----------------------|-------------|---------------------------------|
| Code                  | Description | Code                            |
| 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                      |

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

REV. 09/22/10

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