

**BOURNS®**

## Features

- Bushing mount
- Optional center tap and rear shaft extension
- Optional AR lug feature
- Gangable with common or concentric shafts

- High torque available
- Optional 0.1 % linearity
- Non-standard features and specifications available

## 3540/3541 - Precision Potentiometer

### Electrical Characteristics<sup>1</sup> 3540 Wirewound Element 3541 Hybritron® Element

|   |  |                       |
|---|--|-----------------------|
| Standard Resistance Range   | 100 to 100 K ohms                                  | 1 K to 100 K ohms     |
| Total Resistance Tolerance  | ±5 %   | ±10 %                 |
| Independent Linearity   | ±0.25 %  | ±0.25 %               |
| Effective Electrical Angle  | 3600° +10°, -0°                                    | 3600° +10°, -0°       |
| Absolute Minimum Resistance/  | 1 ohm or 0.1 % maximum                             | 0.2 % maximum         |
| Minimum Voltage   | (whichever is greater)                             |                       |
| Noise/Output Smoothness   | 100 ohms ENR maximum                               | 0.1 % maximum         |
| Dielectric Withstanding Voltage (MIL-STD-202, Method 301)                         | 1,000 VAC minimum                                  |                       |
| Sea Level   | 1,000 VAC minimum                                  |                       |
| Power Rating (Voltage Limited By Power Dissipation or 447 VAC, Whichever Is Less) |  |                       |
| +70 °C  | 2 watts  | 2 watts               |
| +125 °C   | 0 watt   | 0 watt                |
| Insulation Resistance (500 VDC)   | 1,000 megohms minimum                              | 1,000 megohms minimum |
| Resolution  | See recommended part nos. ....Essentially infinite |                       |

### Environmental Characteristics<sup>1</sup>

|  |  |  |
|--|--|--|
| 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 <sup>2</sup>                     | ±50 ppm/°C maximum/unit                  | ±100 ppm/°C maximum/unit                 |
| Vibration  | 15 G                                     | 15 G                                     |
| Wiper Bounce   | 0.1 millisecond maximum                  | 0.1 millisecond maximum                  |
| Shock  | 50 G                                     | 50 G                                     |
| Wiper Bounce   | 0.1 millisecond maximum                  | 0.1 millisecond maximum                  |
| Load Life  | 1,000 hours, 2 watts                     | 1,000 hours, 2 watts                     |
| Total Resistance Shift                                     | ±2 %                                     | ±5 %                                     |
| Rotational Life (No Load)                                  | 1,000,000 shaft revolutions <sup>2</sup> | 5,000,000 shaft revolutions <sup>2</sup> |
| Total Resistance Shift                                     | ±5 % maximum                             | ±5 % maximum                             |
| Moisture Resistance (MIL-STD-202, Method 103, Condition B) |  |  |
| Total Resistance Shift                                     | ±2 % maximum                             | ±5 % maximum                             |
| IP Rating  | IP 40                                    | IP 40                                    |

### Mechanical Characteristics<sup>1</sup>

|                                  |  |
|----------------------------------|--|
| Stop Strength                    | 53 N-cm (75 oz-in.) minimum  |
| Mechanical Angle                 | 3600° +10°, -0°  |
| Torque (Starting & Running)      | 0.35 N-cm (0.5 oz-in.) max.  |
| Mounting                         | 170-200 N-cm (15-18 lb.-in.) max.  |
| Shaft Runout                     | 0.08 mm (0.003 in.) T.I.R.   |
| Lateral Runout                   | 0.13 mm (0.005 in.) T.I.R.   |
| Shaft End Play                   | 0.30 mm (0.012 in.) T.I.R.   |
| Shaft Radial Play                | 0.08 mm (0.003 in.) T.I.R.   |
| Pilot Diameter Runout            | 0.08 mm (0.003 in.) T.I.R.   |
| Backlash                         | 1.0° maximum   |
| Weight                           | Approximately 21 gm  |
| Terminals                        | Gold-plated solder lugs  |
| 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. |
| Marking                          | Manufacturer's name and part number, resistance value and tolerance, linearity tolerance, wiring diagram, and date code  |
| Ganging (Multiple Section Pots.) | 2 cups maximum   |
| Hardware                         | One lockwasher (H-37-2) and one mounting nut (H-38-2) is shipped with each potentiometer.  |

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

<sup>2</sup>Consult manufacturer for complete specification details.

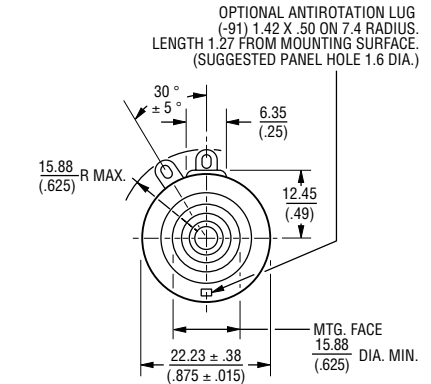
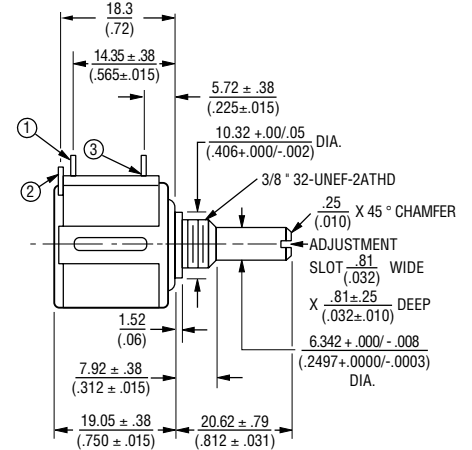
### Recommended Part Numbers

| Part Number | Resistance | Resolution |
|-------------|------------|------------|
| 3540S-1-201 | 200        | .042       |
| 3540S-1-501 | 500        | .031       |
| 3540S-1-102 | 1,000      | .027       |
| 3540S-1-202 | 2,000      | .021       |
| 3540S-1-502 | 5,000      | .021       |
| 3540S-1-103 | 10,000     | .019       |
| 3540S-1-203 | 20,000     | .014       |
| 3540S-1-503 | 50,000     | .011       |
| 3540S-1-104 | 100,000    | .008       |

| Part Number | Resistance |
|-------------|------------|
| 3541H-1-102 | 1,000      |
| 3541H-1-202 | 2,000      |
| 3541H-1-502 | 5,000      |
| 3541H-1-103 | 10,000     |
| 3541H-1-203 | 20,000     |
| 3541H-1-503 | 50,000     |
| 3541H-1-104 | 100,000    |

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

### 3540S-1/3541H-1

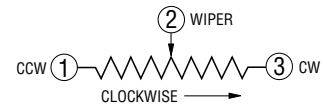


TOLERANCES: EXCEPT WHERE NOTED

DECIMALS: XX ± .25 (.010), XXX ± .13 (.005)

FRACTIONS: ±1/64

DIMENSIONS: MM (IN.)



**BOLDFACE LISTINGS ARE IN STOCK AND READILY AVAILABLE THROUGH DISTRIBUTION.**  
FOR SERVO MOUNT VERSION AND OTHER OPTIONS CONSULT FACTORY.

REV. 12/03

# MATERIAL DATA SHEET



Reliable Electronic Solutions

|                 |                 |  |
|-----------------|-----------------|--|
| Material #      | 3541H           |  |
| Product Line    | Precision       |  |
| Posted Date     | 03/02/2005      |  |
| Compliance Date | Since Inception |  |
| RoHS Compliant  | Yes             |  |

| No. | Construction element  | Material group      | Material weight [g] | Materials        | CAS<br>If applicable | Average mass [%] | Sum [%]  |
|-----|-----------------------|---------------------|---------------------|------------------|----------------------|------------------|----------|
| 1   | Ink - Printing        | Hybritron Ink       | 0.004               | Polyester Resin  | *****                | 100%             | 0.0176%  |
| 2   | Mandrel Wire          | Metal Alloy         | 2.252               | Copper           | 7440-50-8            | 92-99%           | 9.8966%  |
|     |                       |                     |                     | Organic coatings | *****                | 1-8%             |          |
| 3   | Resist Wire           | Nickel Copper Alloy | 0.5783              | Nickel           | 7440-02-0            | 2-47%            | 2.5414%  |
|     |                       |                     |                     | Copper           | 7440-50-8            | Balance          |          |
|     |                       |                     |                     | Iron             | 1300-37-1            | Max3%            |          |
|     |                       |                     |                     | Manganese        | 7439-96-5            | Max 3%           |          |
|     |                       |                     |                     | Cobalt           | 7440-48-4            | Max 0.5%         |          |
| 4   | Varnish               | Insulating Varnish  | 0.2002              | Phenolic Resin   | UNK00185             | 100%             | 0.8798%  |
| 5   | Terminal Cover Molded | PBT                 | 0.2905              | Carbon Black     | 1333-86-4            | 0.1-1            | 1.2766%  |
|     |                       |                     |                     | Glass            | 65997-17-3           | 10-30%           |          |
|     |                       |                     |                     | PBT              | *****                | 65-89%           |          |
|     |                       |                     |                     | Carbon Black     | 1333-86-4            | 0.1-1%           |          |
| 6   | Terminals             | Brass Alloy         | 0.0375              | Copper           | 7440-50-8            | 59-96%           | 0.1648%  |
|     |                       |                     |                     | Zinc             | 7440-66-6            | 4-41%            |          |
|     |                       |                     |                     | Lead             | 7439-92-1            | 0.03-0.3%        |          |
| 7   | Housing Molded        | PBT                 | 2.654               | Glass            | 65997-17-3           | 10-30%           | 11.6632% |
|     |                       |                     |                     | PBT              | *****                | 65-89%           |          |
|     |                       |                     |                     | Antimony Oxide   | 1309-64-4            | 1-5%             |          |



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|        |              |                       |        |                |            |         |          |
|--------|--------------|-----------------------|--------|----------------|------------|---------|----------|
| 8      | Shaft        | Brass Alloy           | 9.1625 | Copper         | 7440-50-8  | 70%     | 40.2654% |
|        |              |                       |        | Zinc           | 7440-66-6  | 30%     |          |
| 9      | C-Ring       | Stainless Steel Alloy | 0.009  | Iron           | 7439-89-6  | 48-89%  | 0.0396%  |
|        |              |                       |        | Chromium       | 7440-47-3  | 10-27%  |          |
|        |              |                       |        | Nickel         | 7440-02-0  | 0-22%   |          |
|        |              |                       |        | Manganese      | 7439-96-5  | 0-15%   |          |
|        |              |                       |        | Tungsten       | 7440-33-7  | 0-4%    |          |
|        |              |                       |        | Molybdenum     | 7439-98-7  | 0-4%    |          |
|        |              |                       |        | Aluminum       | 7429-90-5  | 0-2%    |          |
|        |              |                       |        | Copper         | 7440-50-8  | 0-4%    |          |
|        |              |                       |        | Silicon        | 7440-51-3  | 0-5%    |          |
|        |              |                       |        | Cobalt         | 7440-48-4  | 0-5%    |          |
| 10     | Bushing      | Aluminum Alloy        | 1.1765 | Aluminum       | 7429-90-5  | 100%    | 5.1702%  |
| 11     | Rotor Molded | PBT                   | 1.325  | Glass          | 65997-17-3 | 10-30%  | 5.8228%  |
|        |              |                       |        | PBT            | *****      | 65-89%  |          |
|        |              |                       |        | Antimony Oxide | 1309-64-4  | 1-5%    |          |
| 12     | Washer       | Stainless Steel Alloy | 0.008  | Iron           | 7493-89-6  | 52-78%  | 0.0352%  |
|        |              |                       |        | Chromium       | 7440-47-3  | 12-24%  |          |
|        |              |                       |        | Nickel         | 7440-02-0  | 6.0-19% |          |
|        |              |                       |        | Molybdenum     | 7439-98-7  | 0-5.0%  |          |
|        |              |                       |        | Silicon        | 7440-21-3  | 0-6%    |          |
|        |              |                       |        | Manganese      | 7439-96-3  | 0-2.0%  |          |
|        |              |                       |        | Tungsten       | 7440-33-7  | 0-1.8%  |          |
|        |              |                       |        | Aluminum       | 7429-90-5  | 0-1.5%  |          |
|        |              |                       |        | Columbium      | 7440-03-1  | 0-1.0%  |          |
|        |              |                       |        | Titanium       | 7440-32-6  | 0-0.7%  |          |
|        |              |                       |        | Copper         | 7440-50-8  | 0.075%  |          |
| Cobalt | 7440-48-4    | 0.1.0%                |        |                |            |         |          |
| 13     | Cover Molded | PBT                   | 0.7005 | Glass          | 65997-17-3 | 10-30%  | 3.0784%  |
|        |              |                       |        | PBT            | *****      | 65-89%  |          |
|        |              |                       |        | Antimony Oxide | 1309-64-4  | 1-5%    |          |

|    |                      |                       |          |                                    |            |             |         |
|----|----------------------|-----------------------|----------|------------------------------------|------------|-------------|---------|
| 14 | Hex Nut              | Brass Alloy           | 1.179    | Copper                             | 7440-50-8  | 55.5-86%    | 5.1812% |
|    |                      |                       |          | Zinc                               | 7440-66-6  | 13.90-42.5% |         |
|    |                      |                       |          | Lead                               | 7439-92-1  | .00-3.7%    |         |
|    |                      |                       |          | Tin                                | 7440-31-5  | .00-1.2%    |         |
|    |                      |                       |          | Aluminum                           | 7429-90-5  | .00-2.3%    |         |
|    |                      |                       |          | Manganese                          | 7439-96-5  | .00-3.5%    |         |
|    |                      |                       |          | Silicon                            | 7440-21-3  | .00-1.5%    |         |
|    |                      |                       |          | Nickel                             | 7440-02-0  | .00-.02%    |         |
| 15 | Lock Washer          | Steel Alloy           | 0.2945   | Carbon                             | 7440-11-0  | 0.51%       | 1.2942% |
|    |                      |                       |          | Manganese                          | 7439-98-5  | 0.75%       |         |
|    |                      |                       |          | Phosphors                          | 7723-14-0  | 0.02%       |         |
|    |                      |                       |          | Sulfur                             | 7704-39-9  | 0.025%      |         |
|    |                      |                       |          | Iron                               | 7439-89-6  | 98.695%     |         |
|    |                      |                       |          | Chromium                           | 16065-83-1 | 0.1%        |         |
|    |                      | Zinc Plating          | 0.002975 | Tin                                | 7440-31-5  | 0.64%       | 0.0131% |
|    |                      |                       |          | Zinc                               | 7440-66-6  | 99.25%      |         |
| 16 | Lube                 | Fluorosilicate Grease | 0.00815  | Polysiloxane                       | *****      | 100%        | 0.0358% |
| 17 | Blue Epoxy           | PBT                   | 0.00563  | Bisphenol A Diglycidyl Ether Resin | 25068-38-6 | <50%        | 0.0247% |
|    |                      |                       |          | Silicon dioxide                    | 7440-21-3  | <20%        |         |
|    |                      |                       |          | Aluminum Silicate Hydroxide        | 1332-58-7  | <20%        |         |
|    |                      |                       |          | Antimony Trioxide                  | 1309-64-4  | <20%        |         |
| 18 | Slider Molded        | PBT                   | 0.193    | Glass                              | 65997-17-3 | 10-30%      | 0.8482% |
|    |                      |                       |          | PBT                                | *****      | 65-89%      |         |
|    |                      |                       |          | Antimony Oxide                     | 1309-64-4  | 1-5%        |         |
| 19 | Spring Contact Rough | Metal Alloy           | 0.006    | Silver                             | 7440-22-4  | 30.0%       | 0.0264% |
|    |                      |                       |          | Copper                             | 7440-50-8  | 14.0%       |         |
|    |                      |                       |          | Zinc                               | 7440-66-6  | 1.0%        |         |
|    |                      |                       |          | Platinum                           | 7440-06-4  | 10.0%       |         |
| 20 | Collector Bar        | Nickel Silver Alloy   | 0.065    | Copper                             | 7440-50-8  | 50-80%      | 0.2856% |
|    |                      |                       |          | Nickel                             | 7440-02-0  | 7-19.5%     |         |
|    |                      |                       |          | Lead                               | 7439-92-1  | 0-2.5%      |         |



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|  |  |  |  |      |           |           |  |
|--|--|--|--|------|-----------|-----------|--|
|  |  |  |  | Zinc | 7440-66-6 | Remainder |  |
|--|--|--|--|------|-----------|-----------|--|

|    |                 |              |           |        |           |             |          |
|----|-----------------|--------------|-----------|--------|-----------|-------------|----------|
| 21 | Strap           | Copper Alloy | 2.303     | Copper | 7440-50-8 | 53.5-71.0%  | 10.1207% |
|    |                 |              |           | Lead   | 7439-92-1 | 0.1         |          |
|    |                 |              |           | Nickel | 7439-02-0 | 21.0        |          |
|    |                 |              |           | Zinc   | 7440-66-6 | 13.24-32.0% |          |
| 22 | Terminals Wiper | Brass Alloy  | 0.3       | Copper | 7440-50-8 | 59-96%      | 1.3184%  |
|    |                 |              |           | Zinc   | 7440-66-6 | 4-41%       |          |
|    |                 |              |           | Lead   | 7439-92-1 | 0.03-0.3%   |          |
|    |                 | Total weight | 22.755255 |        |           |             |          |