Series 9330

Standard Resistors

Very High Stability High Value Calibration Laboratory Standards

Guildline series 9330 Standard Resistors contain hermetically sealed resistance elements. Its design is based on a thorough reappraisal of all earlier resistor designs, the aim of the program being the significant reduction of each “classical” source of error; temperature coefficients and variations therein; thermal as well as electrical time constants; thermal EMF’s; and voltage and power coefficients.

The resistance wire element is suspended in oil in a hermetically sealed case with a cover plate of low leakage acrylic. The connections to the resistance element are made in a four-terminal configuration, with the potential terminals mounted on the cover plate and the current terminals on the horns.

All terminals are solid thermal copper to reduce thermal EMF’s. Models 9330-10M & 100M have a cover plate made from Delrin acetyl thermoplastic and use a two-terminal configuration plus a ground terminal (no horns).

Values below 10M Ω are designed to be immersed in temperature controlled oil or air baths.

The 9330 Series hermetically sealed resistance element design is based on a thorough reappraisal of earlier designs.

9330 Features

- Stability < 3.5 ppm
- Low thermal EMF design
- Nominal Accuracy to < 2.5 ppm
- Report of Calibration traceable to NIST or NRCC included
- Available from 0.1 Ω through 100M Ω in decade values
- 4-terminal design up to 1M Ω
- Special values available on request
- Temperature Coefficient < 2 ppm/°C
- Hermetically sealed in oil
- Designed for use in temperature controlled oil baths
- Operating Range 18 °C to 40 °C
## 9330 Standard Resistors

### 9330 Series Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Resistance Value (Ohms)</th>
<th>Nominal Initial Tolerance (+/-ppm)</th>
<th>Calibration Uncertainty (+/-ppm) note 1</th>
<th>Stability 6 Months (+/-ppm)</th>
<th>Stability 12 Months (+/-ppm)</th>
<th>Temperature Coefficient (&lt;+/-ppm/C)</th>
<th>Maximum Current (mA)</th>
<th>Maximum Voltage (Volts)</th>
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</thead>
<tbody>
<tr>
<td>9330-0.1</td>
<td>0.1</td>
<td>5</td>
<td>1.5</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1000</td>
<td>0.1</td>
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<td>2.5</td>
<td>1</td>
<td>2.5</td>
<td>3.5</td>
<td>2</td>
<td>320</td>
<td>0.32</td>
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<td>2.5</td>
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<td>2.5</td>
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<td>2.5</td>
<td>3.5</td>
<td>2</td>
<td>3.2</td>
<td>32</td>
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<tr>
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<tr>
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<td>20</td>
<td>30</td>
<td>5</td>
<td>0.01</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Note 1:** Nominal initial tolerance is the maximum variation of resistance mean value as adjusted initially at the point of sale.

**Note 2:** Values below 10M Ω are calibrated in flowing oil at 25 °C, referred to the unit of resistance as maintained by the National Research Council of Canada (NRCC) or the National Institute of Standards and Technology (NIST) and expressed as a total uncertainty with a coverage factor of k=2. Values above 1M Ω are calibrated in air at 23 °C. A traceable calibration report stating the measured value and uncertainty is provided with each resistor.

**Note 3:** Special Values and calibration points available on request.

## General Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>9330-0.1 to 1M</th>
<th>9330-10M &amp; 100M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height:</td>
<td>81 mm (3.19 in)</td>
<td>115 mm (4.53 in)</td>
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<tr>
<td>Diameter:</td>
<td>90 mm (3.54 in)</td>
<td>53 mm (2.09 in)</td>
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<tr>
<td>Weight:</td>
<td>330 gms (.73 lbs)</td>
<td>350 gms (.77 lbs)</td>
</tr>
</tbody>
</table>

**Environment:**

- **Operating:** 18 °C to 28 °C < 70% RH, non-condensing
- **Operating:** 28 °C to 40 °C < 50% RH, non-condensing
- **Storage:** -20 °C to 60 °C 15 to 80% RH, non-condensing

## 9330 Ordering Information

- 4-terminal Standard Resistor
- Technical Manual (included)
- Certificate of Calibration (included)
- Report of Calibration (included)

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