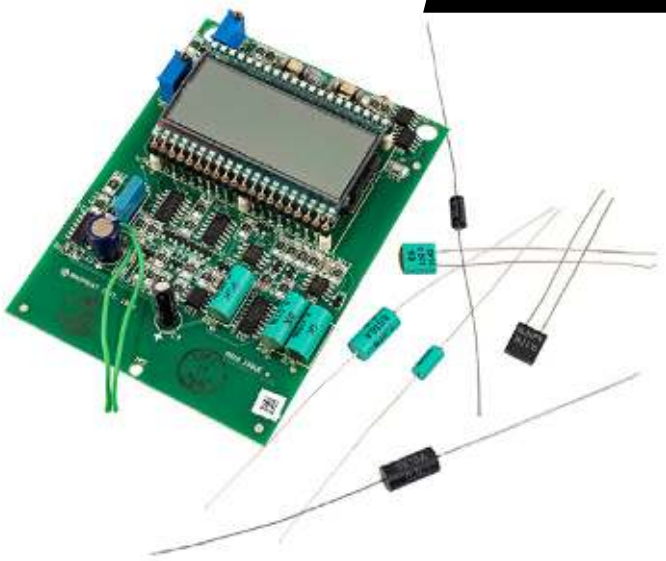
RHOPOINT COMPONENTS

GENERAL RESISTANCE
AUTHORISED PARTNER


www.rhopointcomponents.com sales@rhopointcomponents.com



## Precision wire wound resistor series from General Resistance

- Axial & Radial models
- 1Ω to 699kΩ resistance range
- TCR of ±5ppm/°C max.
- Standard tolerances of ±0.01% & ±0.1%
- Custom resistance values and RTD simulation values available

Rhopoint Components Ltd. are an authorised distributor for General Resistance

RHOPOINT COMPONENTS

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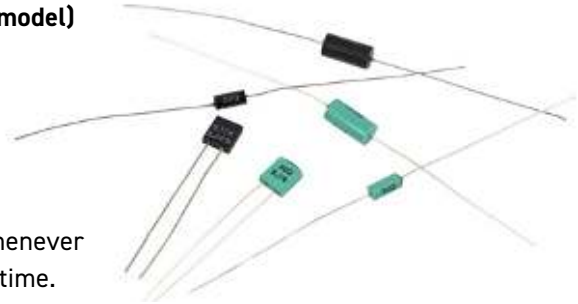
# Precision wire wound resistors

## Made by specialists in test and measurement technology.

- **Standard resistance range: any value from 1Ω to 699kΩ (depending on model)**
- **Standard tolerances: ±0.01% & ±0.1%**
- **Standard temperature coefficient: ±5ppm/°C max (-55°C to +125°C)**
- **Special order: virtually any accuracy, temperature coefficient, resistance value or ratio matching required by your specific application**



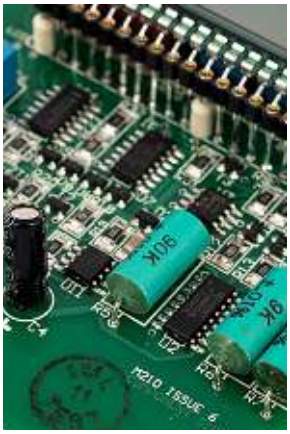
General Resistance precision wire wound resistors should be specified whenever precision circuit operation is to be maintained over a prolonged period of time.

These resistors provide a higher resistance stability and a higher initial calibration accuracy than any other class of resistor. They also offer excellent noise levels and lower temperature coefficients.

The highest quality materials are used in the manufacture of these essential circuit elements. General Resistance design engineers customarily employ high quality copper alloys such as Evanohm, Karma, Moleculoy, Stabilohm, Zeranin* and equivalent in order to achieve higher predictability and flatter temperature responses.

All critical manufacturing stages are conducted in environmentally controlled "clean rooms."

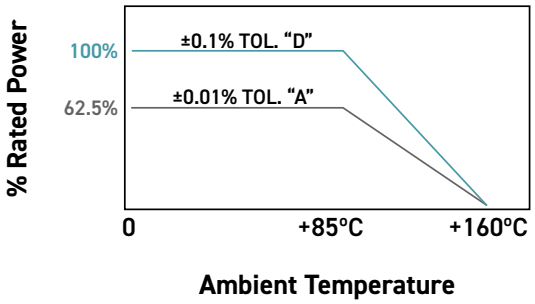
*Trade names of W.B.Driver Co., Driver-Harris Corp., Molecu Wire Corp., Johnson Matthey Metals Ltd. and Isabellenhütte Gmbh respectively



## Power Derating Curve

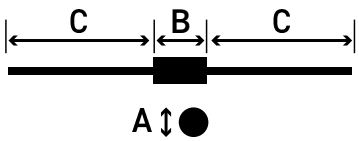
Power dissipation at ambient temperature: General Resistance resistors are designed to operate at a full load up to +85°C.

At temperatures in excess of +85°C, the derating curves must be observed. If power ratings are exceeded, the resistor may not perform at specified accuracy.

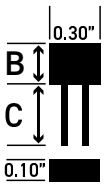



## Dimensions - Inches (mm)

Econistor & Mini-Ohm




Squaristor




| | Econistor | Squaristor | Mini-Ohm |
|---|---|---|---|
| **Model** | 8G16 | GG102 | 5G10 |
| **A-Diameter** | 0.25" (6.4) | - | 0.16" (4.0) |
| **B-Length** | 0.5" (12.7) | 0.32" (8.1) | 0.31" (7.9) |
| **C-Lead Length** | 1.5 typ. (38) | 1.0 typ. (25) | 1.5 typ. (38) |

# Selection guide

## RoHS Compliant

| | ECONISTOR (Axial Leads) | SQUARISTOR (Radial Leads) | MINI-OHM (Axial Leads) |
|---|---|---|---|
| **Model** | 8G16 | GG102 | 5G10 |
| **Resistance Range** | 1Ω to 699kΩ | 10Ω to 200kΩ | 10Ω to 200kΩ |
| **Power rating ±0.1% / ±0.01% (at +85°C)*** | 0.33W / 0.2W | 0.3W / 0.18W | 0.2W / 0.125W |
| **Maximum Voltage** | 200VDC (or AC pk.) | 150VDC (or AC pk.) | 175VDC (or AC pk.) |
| **Wire Gauge**** | 22 AWG (0.6mm) | 22 AWG (0.6mm) | 24 AWG (0.4mm) |
| **Temperature Coefficient** | ±5ppm/°C max. (-55°C to +125°C) | | |
| **Stability** | ±35ppm/yr. | ±35ppm/yr. | ±50ppm/yr. |

*For other tolerances please contact us.
**All leads are tinned copper.

## Non-RoHS Compliant

| | ECONISTOR (Axial Leads) | SQUARISTOR (Radial Leads) | MINI-OHM (Axial Leads) |
|---|---|---|---|
| **Model** | 8E16 | GR102 | 5E10 |
| **Resistance Range** | 1Ω to 699kΩ | 10Ω to 200kΩ | 10Ω to 200kΩ |
| **Power rating ±0.1% / ±0.01% (at +85°C)*** | 0.33W / 0.2W | 0.3W / 0.18W | 0.2W / 0.125W |
| **Maximum Voltage** | 200VDC (or AC pk.) | 150VDC (or AC pk.) | 175VDC (or AC pk.) |
| **Wire Gauge**** | 22 AWG (0.6mm) | 22 AWG (0.6mm) | 24 AWG (0.4mm) |
| **Temperature Coefficient** | ±5ppm/°C max. (-55°C to +125°C) | | |
| **Stability** | ±35ppm/yr. | ±35ppm/yr. | ±50ppm/yr. |

*For other tolerances please contact us.
**All leads are Lead/Tin (PbSn) plated copper.

### GENERAL SPECIFICATIONS

| Electrical | |
|---|---|
| **Standard tolerances* (at +25°C)** | ±0.01% or ±0.1% |
| **Voltage coefficient** | Essentially "zero" |
| **Thermal EMF** | 1.5uV/°C max. |
| **Lead resistance (at +20°C):** | |
| **24 AWG (0.4mm)** | 213.0μΩ/0.1" (84μΩ/mm) |
| **22 AWG (0.6mm)** | 134.5μΩ/0.1" (53μΩ/mm) |
| **Noise** | Immeasurable |

*±0.005% or ±0.025% available on special order
**General Electric™ for Room Temperature Vulcanizing silicone rubber

| Mechanical | |
|---|---|
| **Resistance wire** | Highest quality copper alloy drawn from melts of known resistivity and controlled temperature coefficient |
| **Winding** | Balanced multiple π for low reactance |
| **Protection** | Hand applied RTV** silicone coating |
| **Outer casing** | Molded shell sealed with epoxy |
| **Marking** | Permanent ink, direct reading |
| **Leads** | Axial & Radial, tinned copper |

## RESISTANCE VALUES

The "standard" resistance values listed in the table below are normally immediately available from stock in reasonable quantities. It should be stressed, however, that any resistance value from 1Ω to 699KΩ can be ordered to meet specific requirements (depending on model). We also stock RTD values which have been listed in the table below.

| Standard Resistance Values: Mil-R-93 Types | | | | |
|---|---|---|---|---|
| 10Ω | 200Ω | 1.0kΩ | 10kΩ | 100kΩ |
| 20Ω | 250Ω | 1.5kΩ | 20kΩ | 180kΩ |
| 30Ω | 300Ω | 2.0kΩ | 30kΩ | 200kΩ |
| 40Ω | 350Ω | 2.5kΩ | 40kΩ | 250kΩ |
| 50Ω | 400Ω | 3.0kΩ | 50kΩ | 300kΩ |
| 60Ω | 500Ω | 4.0kΩ | 60kΩ | 400kΩ |
| 70Ω | 600Ω | 5.0kΩ | 70kΩ | 500kΩ |
| 80Ω | 700Ω | 6.0kΩ | 80kΩ | |
| 90Ω | 800Ω | 7.0kΩ | 90kΩ | |
| 100Ω | 900Ω | 8.0kΩ | | |
| 120Ω | | 9.0kΩ | | |

All standard resistance values are stocked at Rhopoint Components across the various models, where available, in certain tolerances.

| RTD Values | | | |
|---|---|---|---|
| 60.25Ω | (-100°C) | 127.07Ω | (70°C) |
| 84.27Ω | (-40°C) | 130.89Ω | (80°C) |
| 92.16Ω | (-20°C) | 134.7Ω | (90°C) |
| 100Ω | (100°C) | 138.5Ω | (100°C) |
| 103.9Ω | (10°C) | 157.31Ω | (150°C) |
| 107.79Ω | (20°C) | 175.84Ω | (200°C) |
| 109.73Ω | (25°C) | 194.07Ω | (250°C) |
| 111.67Ω | (30°C) | 212.02Ω | (300°C) |
| 115.54Ω | (40°C) | 229.67Ω | (350°C) |
| 119.4Ω | (50°C) | 247.04Ω | (400°C) |
| 123.24Ω | (60°C) | | |

(Rhopoint Components stocked RTD values using the Econister model at 0.01% tolerance).

## SPECIFICATIONS: GENERAL RESISTANCE SPECS COMPARED TO MIL SPECS

| | | MIL-R-93 Limit | MIL-R-39005 Limit | General Resistance (typical) |
|---|---|---|---|---|
| **Minimum insulation resistances Dry/Wet** | | $>10^9\Omega$ / $>10^8\Omega$ | $>10^9\Omega$ / $>10^8\Omega$ | $>10^{10}\Omega$ / $>10^9\Omega$ |
| **Temperature cycling** | Δ R | ±(0.2% +50mΩ) | ±(.05% + 10mΩ) | ±(0.001% +5mΩ) |
| **Short-term overload** | Δ R | ±(0.1% +50mΩ) | ±(0.01% +10mΩ) | ±(0.003% +5mΩ) |
| **Moisture resistance** | Δ R | ±(0.1% +50mΩ) | ±(0.1% +10mΩ) | ±(0.001% +3mΩ) |
| **Dielectric withstanding voltage at atm. press.** | Vrms | 500 | 750 | 1000 |
| **Load life, full rated power (at 70°C)** | Δ R | ±(0.5% +50mΩ) | - | ±(0.0035% +5mΩ) |
| **High temp. exposure (at 150°C)** | Δ R | ±(0.1% +50mΩ) | ±(0.1% +10mΩ) | ±(0.001% +5mΩ) |
| **Low temp. operation** | Δ R | ±(0.25% +50mΩ) | ±(0.1% +10mΩ) | ±(0.001% +3mΩ) |
| **Resistance to soldering heat** | Δ R | N/A | ±(0.01% +10mΩ) | ±(0.001% +3mΩ) |
| **Shock & vibration (high frequency)** | Δ R | ±(0.1% +50mΩ) | ±(0.01% +10mΩ) | ±(0.001% +3mΩ) |

**Listing of all applicable MIL specifications:**

- MIL-R-93: Precision Wire Wound Resistors
- MIL-R-39005: High Reliability Wire Wound Resistors
- MIL-STD-883, Method 2003: Solderability
- MIL-STD-202, Method 208: Solderability
- MIL-STD-202, Method 210A, Cond. C: Resistance to Soldering Heat
- MIL-STD-202, Method 215: Marking Resistance to Solvents
- MIL-STD-202, Method 106D: Moisture Resistance
- MIL-STD-202, Method 102A, Cond. C: Temperature cycling
- MIL-STD-202, Method 301: Dielectric Withstanding
- MIL-STD-202, Method 302, Cond.A or B: Insulation Resistance
- MIL-STD-202, Method 205D, Cond. C: Shock
- MIL-STD-202, Method 204B, Cond. D: Vibration
- MIL-STD-202, Method 211A, Cond. A and D: Terminal Strength

# RoHS compliant changes

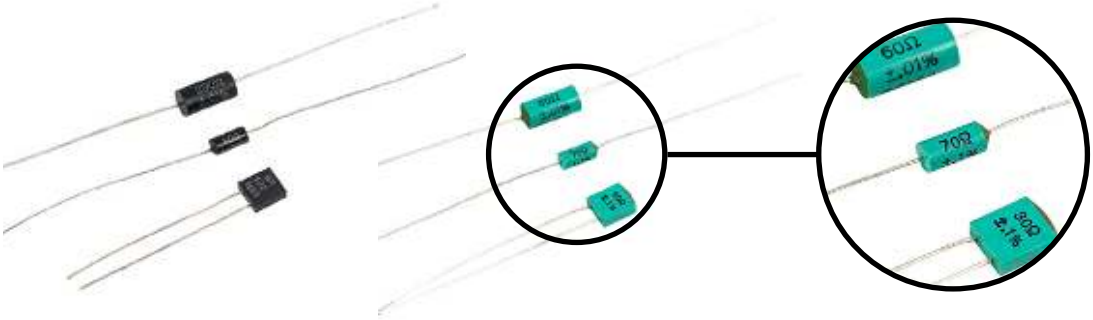
The following document highlights the important changes from Non-RoHS compliant to RoHS compliant product with the Econistor, Mini-Ohm & Squaristor precision wire-wound resistor series from General Resistance.

## Affected Series are the following:

- 8E16 Econistor Series
- 5E10 Mini-Ohm Series
- GR102 Squaristor Series

These resistor series are being replaced with new RoHS compliant versions and will be stocked in the RoHS compliant versions as the parts become available. Non-RoHS compliant stock may still be available, please contact us and we can confirm availability.

The compliant version is easily identified by the new green colour as seen in the image below.




Series colour is now green

**To help distinguish between the compliant and not compliant variants, ordering codes and markings on the parts have also changed to the following:**

| RoHS Compliant Part Numbering | | | | Non-RoHS Compliant Part Numbering | | | |
|---|---|---|---|---|---|---|---|
| **Model** | **Resistance Value** | **Tolerance** | | **Model** | **Resistance Value** | **Tolerance** | |
| 8G16A | 1Ω up to 699kΩ | ±0.01% | View online > | 8E16A | 1Ω up to 699kΩ | ±0.01% | View online > |
| 8G16D | 1Ω up to 699kΩ | ±0.1% | View online > | 8E16D | 1Ω up to 699kΩ | ±0.1% | View online > |
| 5G10A | 10Ω up to 200kΩ | ±0.01% | View online > | 5E10A | 10Ω up to 200kΩ | ±0.01% | View online > |
| 5G10D | 10Ω up to 200kΩ | ±0.1% | View online > | 5E10D | 10Ω up to 200kΩ | ±0.1% | View online > |
| GG102A | 10Ω up to 200kΩ | ±0.01% | View online > | GR102A | 10Ω up to 200kΩ | ±0.01% | View online > |
| GG102D | 10Ω up to 200kΩ | ±0.1% | View online > | GR102D | 10Ω up to 200kΩ | ±0.1% | View online > |

All other specifications of the part including the electrical performance of these new parts in unaltered.

bsi ISO 9001 Quality Management Systems CERTIFIED FS 695373

Rhopoint Components
Rhopoint House, Imberhorne Lane,
East Grinstead, RH19 1QZ, UK
T: +44 (0) 1342 330470
E: sales@rhopointcomponents.com
www.rhopointcomponents.com

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