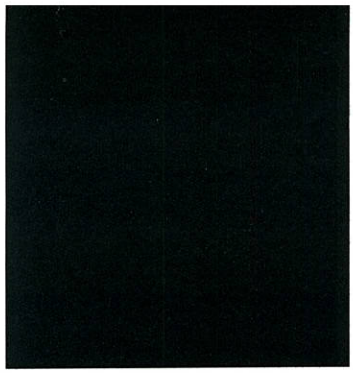
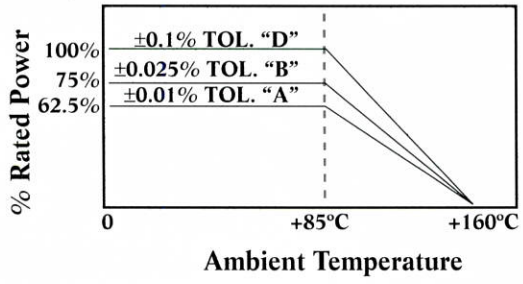
Precision Wirewound Resistors

Made by the specialists in test and measurement technology.



POWER DERATING CURVE:
All GR Precision Wirewound Resistors

Power dissipation at ambient temperature: GR resistors are designed to operate at full load up to +85°C. At temperatures in excess or +85°C derating curves must be observed. If power ratings are exceeded, the resistor may not perform at specified accuracy.



- Standard resistance range: any value from 1 ohm to 1.1 megohms.
- Standard accuracies: ±0.1%, ±0.025% and ±0.01%.
- Standard tempco: ±5ppm/°C max (-55°C to +125°C).
- Special order: virtually any accuracy, tempco, resistance value or ratio matching required by your specific application.

GR precision wirewound 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.

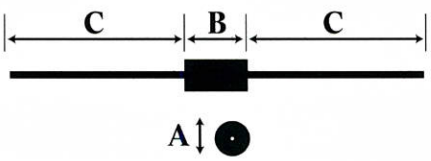
The highest quality materials are used in the manufacture of these essential circuit elements. General Resistance design engineers customarily employ high quality copper alloys such as Evanohm, Karma, Moleculoy, Stabilohm, Zeranin* and equivalent in order to achieve higher predictability. and flatter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

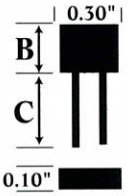
RoHS Compliant

DIMENSIONS
Inches (mm)

ECONISTOR, MINI-OHM



SQUARISTOR



	ECONISTOR	SQUARISTOR	MINI-OHM
Model	8G16/8G24	GG102	5G10
A-Diameter	.25" (6.4)	—	.16" (4.0)
B-Length	.5" (12.7)/.75" (19.1)	.32" (8.1)	.31" (7.9)
C-Lead Length	1.5 typ. (38)	1.0 typ. (25)	1.5 typ. (38)

SELECTION GUIDE–Table A
Individual Specifications: All GR Precision Wirewound Resistors

	ECONISTOR (Axial Leads)	SQUARISTOR (PC Mounting)	MINI-OHM (Axial Leads)
Model	8G16/8G24	GG102	5G10
Resistance Range (Ω)	1 to 1.1 Meg	1 to 200K	1 to 200K
Power rating* (±0.1% @ +85°C)	0.33W/0.40W	0.30W	0.2W
Max. Voltage	200VDC (or AC pk.)	150VDC (or AC pk.)	175VDC (or AC pk.)
Wire Gauge AWG (mm)**	22 (0.6)/20 (0.8)	22 (0.6)	24 (0.4)
Tempco	±5ppm/°C max. (-55°C to 125°C)		
Stability	±35ppm/yr.	±35ppm/yr.	±50ppm/yr.

† size for values of 700K and higher.
*For other tolerances consult factory. **All leads are tinned copper.

GENERAL RESISTANCE

Innovators and manufacturers of ultra-precision test instruments used as laboratory standards and for critical process monitoring.

GENERAL SPECIFICATIONS–Table B

Electrical

Standard accuracies (@ +25°C)*	±0.1%, ±0.025%, or ±0.01%
Voltage coefficient	Essentially "zero"
Thermal emf	1.5μV/°C typ.
Lead resistance (@ +20°C):	
24 AWG (0.4mm)	213.0μΩ/0.1 in. (84μΩ/mm)
22 AWG (0.6mm)	134.5μΩ/0.1 in. (53μΩ/mm)
20 AWG (0.8mm)	84.6μΩ/0.1 in. (33.3μΩ/mm)
Noise	Immeasurable

Mechanical

Resistance wire	Highest quality copper alloy drawn from melts of known resistivity and controlled Tempco
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, tinned copper

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

RESISTANCE VALUES–Table C

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 1,100,000Ω can be ordered to meet specific requirements.

Standard Resistance Values: Mil-R-93 Types (Ω):

10	200	1.0k	10k	100k
20	250	1.5k	20k	180k
30	300	2.0k	30k	200k
40	350	2.5k	40k	250k
50	400	3.0k	50k	30k
60	500	4.0k	60k	400k
70	600	5.0k	70k	500k
80	700	6.0k	80k	1 Meg
90	800	7.0k	90k	
100	900	8.0k		
120		9.0k		

SPECIFICATIONS: GR SPECS COMPARED TO MIL SPECS–Table D

		MIL-R-93 Limit	MIL-R-39005 Limit•	Gen. 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	△ R	±(.2% +50mΩ)	±(.05% +10mΩ)	±(.001% +5mΩ)
Short-term overload	△ R	±(.1% +50mΩ)	±(.01% +10mΩ)	±(.003% +5mΩ)
Moisture resistance	△ R	±(.1% +50mΩ)	±(.1% +10mΩ)	±(.001% +3mΩ)
Dielectric withstanding voltage @ atm. press.	Vrms	500	750	1000
Load life, full rated power @ 70°C	△ R	±(.5% +50mΩ)	—	±(.0035% +5mΩ)
High temp. exposure @ 150°C	△ R	±(.1% +50mΩ)	±(.1% +10mΩ)	±(.001% +5mΩ)
Low temp. operation	△ R	±(.25% +50mΩ)	±(.1% +10mΩ)	±(.001% +3mΩ)
Resistance to soldering heat	△ R	N/A	±(.01% +10mΩ)	±(.001% +3mΩ)
Shock & vibration (high frequency)	△ R	±(.1% +50mΩ)	±(.01% +10mΩ)	±(.001% +3mΩ)

Listing of all applicable MIL specifications:

MIL-R-93: Precision Wirewound Resistors
MIL-R-39005: High Reliability Wirewound 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

*Milliohm adder applies only to resistors <10Ω. **Depends on failure rate level.

GENERAL RESISTANCE
General Resistance
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