



# 9340 SERIES

## PRECISION DECADE RESISTANCE STANDARDS

Excellent for all Decade Resistance Applications whether Classical or Precision!



Available in Classic Gray (above) or our New "Precision" Red Style Case (7 Dial Model Shown Below)



### FEATURES

- Widest Available Resistance Range From 10 mΩ to 10 TΩ
- Lowest Available Temperature Coefficients (As low as 5 ppm/°C down to 0.01 Ω)
- Lowest Available Power Coefficients
- 12 Month Stabilities as Low as < 10 ppm (Near Standard Resistor Performance)
- Highest Current Handling Capabilities of Any Decade Standard (7 Amps)
- Smooth Dial Rotation with Stop Position at '10'; Each Dial has an Overlap Position at '10' Enabling Fine Tuning
- Special Values Available On Request
- Five Types Available from 3 Dials to 7 Dials; All Full Scale Resistance Values in the Range Available in All Dial Sizes

GUILDLINE INSTRUMENTS 9340 SERIES of precision DC Resistance Standards are a complete family of easy to use resistance standards offering the best combination of highest accuracy and widest range commercially available.

There are 5 standard types available from 3 dials to 7 dials. The smallest increment offered is 10 mΩ and the largest full-scale total resistance available is just over 10 TΩ. All resistance values are available in all the dial sizes.

**SIMPLY PUT – THE 9340 SERIES ARE THE MOST VERSATILE AND ACCURATE DECADE RESISTANCE STANDARD AVAILABLE FROM ANYONE TODAY!**

Accuracy of the 9340 Decade Resistance Boxes is better than  $\pm 0.01\%$  from mid range of 1 Ω to 10 MΩ. For lower ohmic values the 9340 Series performs better than the competition. For example, the 0.01 Decade at 1% absolute accuracy equates to only a 100 μΩ total error. This is 20 times more accurate than competitors which have a minimum 'floor' specification of 2 mΩ. Not only are the accuracies much better, other important specifications such as current handling capabilities, long term stability, temperature and power coefficients are also typically 5X to 10X better than the nearest competition. The 9340 truly set the highest standard for Decade Resistors.

The long-term stability is maintained by design techniques used for precision resistance standards, combined with the use of today's finest quality materials. The individual decade switches have multiple contacts made of solid silver, which minimizes contact resistance.

The design minimizes leakage effects by careful shielding and the use of high quality insulation materials. The dials have a smooth rotation from position to position and the switches are stopped at positions '10' to prevent the operator from accidentally switching directly from '10' to '0'. This is particularly critical when a decade box forms part of a circuit where there are devices present that cannot have current drawn from them.

Each dial has an overlap '10' position for fine-tuning a value without the need to reset all dials when passing through a decade point. The panel is clearly marked adjacent to each dial with the resistance per step and the current rating of that dial. The 9340 provides a modern compact design of high quality construction and high reliability for a modern version of the classical resistance decade standard.

# 9340 Series of Precision Decade Resistance Standards

## 9340 Series Specifications

Model Number	# of Decades	Minimum Step ( $\Omega$ 's)	Maximum Value( $\Omega$ 's)
9343/10	3	0.01	11.10
9343/100	3	0.1	111.0
9343/1k	3	1	1.110 k
9343/10k	3	10	11.10 k
9343/100k	3	100	111.0 k
9343/1M	3	1k	1.110 M
9343/10M	3	10k	11.10 M
9343/100M	3	100k	111.0 M
9343/1G	3	1M	1.110 G
9343/10G	3	10M	11.10 G
9343/100G	3	100M	111.0 G
9343/1T	3	1G	1.110T
9343/10T	3	10G	11.10 T

Model Number	# of Decades	Minimum Step ( $\Omega$ 's)	Maximum Value( $\Omega$ 's)
9344/100	4	0.01	111.1
9344/1k	4	0.1	1.111 k
9344/10k	4	1	11.11 k
9344/100k	4	10	111.1 k
9344/1M	4	100	1.111 M
9344/10M	4	1k	11.11 M
9344/100M	4	10k	111.1 M
9344/1G	4	100k	1.111 G
9344/10G	4	1M	11.11 G
9344/100G	4	10M	111.1 G
9344/1T	4	100M	1.111 T
9344/10T	4	1G	11.11 T

Model Number	# of Decades	Minimum Step ( $\Omega$ 's)	Maximum Value( $\Omega$ 's)
9345/1k	5	0.01	1.1111 k
9345/10k	5	0.1	11.111 k
9345/100k	5	1	111.11 k
9345/1M	5	10	1.1111 M
9345/10M	5	100	11.111 M
9345/100M	5	1k	111.11 M
9345/1G	5	10k	1.1111 G
9345/10G	5	100k	11.111 G
9345/100G	5	1M	111.11 G
9345/1T	5	10M	1.1111 T
9345/10T	5	100M	11.111 T

Model Number	# of Decades	Minimum Step ( $\Omega$ 's)	Maximum Value( $\Omega$ 's)
9346/10k	6	0.01	11.111 1 k
9346/100k	6	0.1	111.111 k
9346/1M	6	1	1.111 11 M
9346/10M	6	10	11.111 1 M
9346/100M	6	100	111.111 M
9346/1G	6	1k	1.111 11 G
9346/10G	6	10k	11.111 1 G
9346/100G	6	100k	111.111 G
9346/1T	6	1M	1.111 11 T
9346/10T	6	10M	11.111 1 T

Model Number	# of Decades	Minimum Step ( $\Omega$ 's)	Maximum Value( $\Omega$ 's)
9347/100k	7	0.01	111.111 1 k
9347/1M	7	0.1	1.111 111 M
9347/10M	7	1	11.111 11 M
9347/100M	7	10	111.111 1 M
9347/1G	7	100	1.111 111 G
9347/10G	7	1k	11.111 11 G
9347/100G	7	10k	111.111 1 G
9347/1T	7	100k	1.111 111 T
9347/10T	7	1M	11.111 11 T

## Model Size and Weight

Model Number	Dimensions (H x L x W)	Weight
9343	11.8 x 23.3 x 10.3 cm	2.7 kg
	4.6 x 9 x 4 inches	6.1 lbs
9344	11.8 x 29 x 10.3 cm	3.25 kg
	4.6 x 11.5 x 4 inches	7.2 lbs
9345	11.8 x 34.7 x 10.3 cm	3.9 kg
	4.6 x 13.5 x 4 inches	8.6 lbs
9346	11.8 x 40.5 x 10.3 cm	4.4 kg
	4.6 x 16 x 4 inches	9.8 lbs
9347	11.8 x 46.1 x 10.3 cm	5.1 kg
	4.6 x 18 x 4 inches	11.3 lbs

# 9340 Series of Precision Decade Resistance Standards

## Model Specifications

Decade Resistance (Ohms)	Step Resistance (Ohms) <sup>1</sup>	Step Accuracy (±%) <sup>2</sup>	Stability <sup>1</sup> (± ppm/yr)	Temperature Coefficient (± ppm/C) <sup>1</sup>	Power Coefficient <sup>1</sup> (± ppm/mW)	Maximum Power (W/step) <sup>1</sup>	Maximum Current <sup>1</sup> (amperes)	Maximum Voltage <sup>3</sup> (volts/step)
0.1	0.01	1	500	5	0.2	0.5	7	0.07
1	0.1	0.1	50	5	0.2	0.5	2	0.2
10	1	0.01	20	5	0.2	0.5	0.7	0.7
100	10	0.01	10	5	0.2	0.5	0.2	2
1K	100	0.01	10	5	0.2	0.5	0.07	7
10K	1K	0.01	10	5	0.2	0.5	0.02	20
100K	10K	0.01	10	5	0.2	0.5	0.007	70
1M	100K	0.01	10	5	0.2	0.5	0.002	200
10M	1M	0.01	10	5	0.2	0.5	0.7mA	700
100M	10M	0.1	20	20	1	0.1	0.1mA	1000
1G	100M	0.1	50	20	50	0.01	0.01mA	1000
10G	1G	1	500	100	1*	0.001	1.5uA	1500
100G	10G	2	1000	250	1*	0.0001	0.15uA	1500
1T	100G	5	2000	-250	-85*	N/A	0.015uA	1500
10T	1T	6	3000	-2500	-110*	N/A	0.0015uA	1500

**Note 1** – Applicable to all models that have these decade steps incorporated

**Note 2** – The Step accuracy is applicable to each Decade step value. For example, the 0.01 Step has an accuracy of 1%. This equates to a 100 μΩ error with the dial set to 1 (output = 0.01 Ohms). With the dial set to 10, the output would be 0.1 Ohms and the step accuracy would be 1 mΩ. Using a 10 ohm 3-dial decade with steps of 0.01, 0.1 and 1 Ohm and assuming all dials are set to x10, the output would be 11.1 Ohms. Each Decade Step maximum error would be ±1 mΩ (ie 0.1 Ω @ 1%, 1Ω @ 0.1% and 10Ω @ 0.01) and would mathematically add for a total maximum error of ±3 mΩ's.

**Note 3** – Maximum voltage is 1500 Volts

**Zero Resistance:** < 0.0015 ± 0.0005 ohm per decade after settling of contacts

**Breakdown Voltage:** 1500 volts to case

**Number of Decades:** 3, 4, 5, 6 & 7

*A Note about Ordering: To Order, select the model # (eg 3, 4, 5, 6 or 7 dial) and enter in the Models "X" field, the value of the highest decade resistance value you require. For example a 9343/10 would be a 3-dial decade box with a 0.01, 0.1 and 1 Ohm Decade (10 Ohms highest output on the 1 Ohm Decade). A 9345/10k would be a 5 dial decade; with decade steps of 0.1, 1, 10, 100, and 1k (10k would be highest resistance output on the 1k decade step). Special Values are available upon request.*

ORDERING INFORMATION	
Model #	Values Available for Each Model
9343/X	10, 100, 1K, 10K, 100K, 1M, 10M, 100M, 1G, 10G, 100G, 1T, or 10T
9344/X	100, 1K, 10K, 100K, 1M, 10M, 100M, 1G, 10G, 100G, 1T, or 10T
9345/X	1k, 10K, 100K, 1M, 10M, 100M, 1G, 10G, 100G, 1T, or 10T
9346/X	10K, 100K, 1M, 10M, 100M, 1G, 10G, 100G, 1T, or 10T
9347/X	100K, 1M, 10M, 100M, 1G, 10G, 100G, 1T, or 10T
/CC	Certificate of Calibration (Included)
/Report	Adds Report of Calibration (17025 Accredited)
/OM934X	Operation Manual included at no charge.
Many Precision Leads Sets Are Available – Please Contact Guidline	

