

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 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 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 Standards is better than $\pm 0.01\% + 2 \text{ m}\Omega$ from the range of 0.01 Ω to 10 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 Series truly sets 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 switches are also self-cleaning.

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 position '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 (Ω 's) | Maximum Value(Ω '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 (Ω 's) | Maximum Value(Ω '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 (Ω 's) | Maximum Value(Ω '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 (Ω 's) | Maximum Value(Ω '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 Decade | Minimum Step (Ω 's) | Maximum Value(Ω '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

| MSD (Most Significant Dial) | Maximum Dial Output (x10 Setting) | Coefficients | | | Maximum Limits | | |
|--------------------------------|--------------------------------------|--------------|-------------|------------|----------------|------------|--------------|
| | | Stability | Temperature | Power | Power | Amperes | Volts |
| | (ohms) | (± ppm/yr) | (± ppm/C) | (± ppm/mW) | (W/step) | (Adc/Step) | (volts/step) |
| 0.01 | 0.1 Ω | 500 | 5 | 0.2 | 0.5 | 7 | 0.07 |
| 0.1 | 1 Ω | 50 | 5 | 0.2 | 0.5 | 2 | 0.2 |
| 1 | 10 Ω | 20 | 5 | 0.2 | 0.5 | 0.7 | 0.7 |
| 10 | 100 Ω | 10 | 5 | 0.2 | 0.5 | 0.2 | 2 |
| 100 | 1 k Ω | 10 | 5 | 0.2 | 0.5 | 0.07 | 7 |
| 1 k | 10 k Ω | 10 | 5 | 0.2 | 0.5 | 0.02 | 20 |
| 10 k | 100 k Ω | 10 | 5 | 0.2 | 0.5 | 0.007 | 70 |
| 100 k | 1 M Ω | 10 | 5 | 0.2 | 0.5 | 0.002 | 200 |
| 1 M | 10 M Ω | 10 | 5 | 0.2 | 0.5 | 0.7mA | 700 |
| 10 M | 100 M Ω | 20 | 20 | 1 | 0.1 | 0.1mA | 1000 |
| 100 M | 1 G Ω | 50 | 20 | 50 | 0.01 | 0.01mA | 1000 |
| 1 G | 10 G Ω | 500 | 100 | 1* | 0.001 | 1.5uA | 1500 |
| 10 G | 100 G Ω | 1000 | 250 | 1* | 0.0001 | 0.15uA | 1500 |
| 100 G | 1 T Ω | 2000 | -250 | -85* | N/A | 0.015uA | 1500 |
| 1 T | 10 T Ω | 3000 | -2500 | -110* | N/A | 0.0015uA | 1500 |

Accuracy – Accuracy is based on the most significant dial (MSD) that is used for the resistance output. The accuracy of the MSD dial used for the resistance output determines the accuracy of all the dial settings for the resistance output desired. Accuracy for 1 MΩ and below is based on subtraction of Zero Resistance (nulling out all dial zero resistances and lead resistance).

| | MSD (MOST SIGNIFICANT DIAL) USED | | | | | |
|----------|----------------------------------|------------|----|-----|------|----|
| Accuracy | 10 m to 1M | 10M & 100M | 1G | 10G | 100G | 1T |
| | 0.01% + 2 mΩ | 0.1% | 1% | 2% | 5% | 6% |

Examples show a 9346 Series models dials set to various outputs to show accuracy calculations.

Example 1 – A 9346/10k Decade Standard is set to 7.96912 kΩ. The most significant dial would be 1k. Since the 1k Dial (set to 7 Position) is most significant dial used, the accuracy would be 0.01% + 2 mΩ for all the 9340 Dial Settings for the entire resistance output.

Example 2 – A 9346/100M Decade Standard is set to 23.1573 MΩ. The most significant dial would be the 10 MΩ Dial. For this output, this dial would be set to the 2 Position with remaining dials set to values as shown. Since the 10 MΩ dial is the most significant dial used, the accuracy would be 0.1% for all the 9340 Dial Settings for the entire resistance output.

Example 3 – A 9346/1T Decade Standard is set to 100.59 GΩ. Since the 1 TΩ Dial was not used this resistance requires only the 100 GΩ dials and below. The 100 GΩ is the most significant dial used so the accuracy would be 5% for all the 9340 Dial Settings for the entire resistance output. If the 1 TΩ Dial were used as the most significant dial, the accuracy would change to 6% for the output needed.

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

Zero Resistance (Typical): < 3 mΩ + (1 mΩ each decade on model) after settling

Breakdown Voltage: 1500 volts to case

9340 Series of Precision Decade Resistance Standards

Now introducing the worlds best 4-Wire Decade Standards – The 9340-4T Four Wire Decade Standards.

The 9340-4T Series of 4 Terminal precision RTD Simulators and DC Resistance Standards is a complete family of easy to use low to ultra-low 4 Wire resistance standards offering the best combination of accuracy and resistance range commercially available.

This amazing new 9340-4T Series is available in models from 3 dials to 7 dials and with an industry leading ultra-low end true 1 $\mu\Omega$ Step. This unique 9340-4T Series provides resolution and accuracies never before provided in a decade standard. Decade step values below 1 Ω are arranged in a Kelvin Varley configuration to avoid resistance from internal wiring and thus there is no minimal floor resistance.



A Note about Ordering: To Order, select the model # (eg 3, 4, 5, 6 or 7 dial) and enter in the Model's "X" field the value of the highest decade resistance value you require. For example, a 9343/10 would be a 3-dial decade standard 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 standard; 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 Guildline | |

GUILDLINE IS DISTRIBUTED BY:

Guildline Instruments Limited
 Smiths Falls, Ontario, Canada, K7A 4S9
 Phone: (613) 283-3000 ▪ Fax: (613) 283-6082
 Web: www.guildline.com
 Email: sales@guildline.com

18675-00-85_G Copyright © 2019.08.12 Guildline Instruments Limited. All rights reserved. Subject to change without notice.