6634A SERIES

TEMPERATURE STABILIZED RESISTANCE STANDARDS

Perfect for Automated Measurement Systems or as a Primary Laboratory Resistance Standard

GUILDLINE INSTRUMENTS 6634A SERIES is a modular series of Resistance Standards that can be rack mountable or simply set on a bench. The 6634A Series provides a set of up to 10 precision resistance standards enclosed in a temperature controlled and EMI protected chamber.

THE 6634A SERIES IS AN EXCELLENT SOLUTION AS A WORKING STANDARD FOR AUTOMATED RESISTANCE MEASUREMENT SYSTEMS OR AS A STAND-ALONE LABORATORY PRIMARY RESISTANCE STANDARD!

For the Normal Ohms Configurations, there are 10 standard resistance values available covering the range of 0.1 Ω to 100 MΩ. Each resistance element is isolated and has 4-terminal connections on the rear panel. The resistance elements are maintained at approximately 30 °C in a temperature stabilized chamber. Each element is built with multiple resistors to improve performance.

Temperature monitoring is provided by a precision PRT sensor installed in the chamber with 4 terminal connectors provided on the front panel.

The Model 6634A is excellent as a Working Standard for Automated Resistance Measurement Systems or as Reference Standards at the Primary level. Decade resistance values are available in the range of 0.1 Ω to 100 MΩ, and custom resistance values can be ordered.

Standard model variations are available with 5, 6, 7, 8, 9 or 10 resistance elements installed. All models purchased with less than 10 resistance standards can be expanded at any time via a factory upgrade.

A Low Ohms Configuration is available for values below 0.1 Ω. This Series has the same precision temperature stability as the Normal Ohms Configuration, but is limited to a maximum of 3 Resistance Elements. This is due to the large size of the low ohmic elements. The Resistance Range of the Low Ohms models is from 1 mΩ to 100 mΩ.

FEATURES

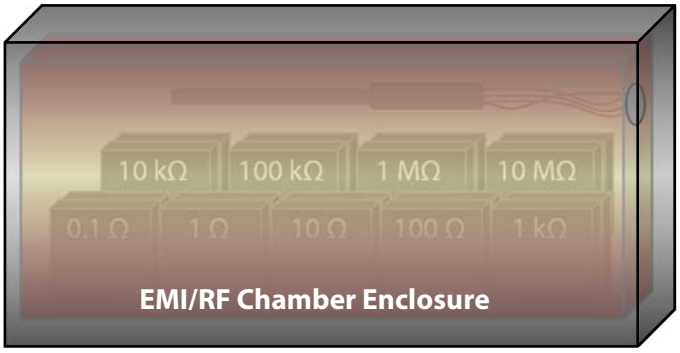
- Normal Ohms Resistance Range: 0.1 Ω to 100 MΩ in Decade Increments
- Low Ohms Resistance Range: 1 mΩ to 0.1 Ω in Decade Increments
- Temperature Coefficient < ± 0.005 µΩ/Ω / °C
- Stabilities Low as < 2 µΩ/Ω / year
- Thermometry Resistance Values Available
- 4-Wire Low Thermal Gold-Plated Connections
- Eliminates Oil Bath Requirements
- Internal PRT Stability: ± 0.05 °C / Year
- Ambient Temperature Range: 23 °C ± 5 °C
- Low Thermal EMF's – Shielded Chamber
- Guarded Resistance Element Chamber
- Custom Values / Models Available
- CE Marked with World-Wide Voltage & Frequencies
- Top End Range Values up to 100 TΩ with Guildline Model 6636

6634A Series of Temperature Stabilized Resistance Standards

The design of Guildline's 6634A Series Resistance Standards is **based on innovation, knowledge, and manufacturing experience** in building resistance standards **since 1957**. Guildline Standards are the **best by design** and by manufacture.

One **key advantage of Guildline** Resistance Standards is that each Resistance Value is **made up from multiple resistors,** not just a single resistor which is the technique used by most manufacturers. This approach **lowers the drift** that is seen with a single resistor and **reduces the internal noise** generated inside the reference resistor. Other real advantages are the **use** of a **PRT vs a thermistor** for **internal temperature control**, and the Guildline 6634A Standard **does not require any fans** like competitive models. The result is **industry leading annual drift** rates and **very quiet** measurements.

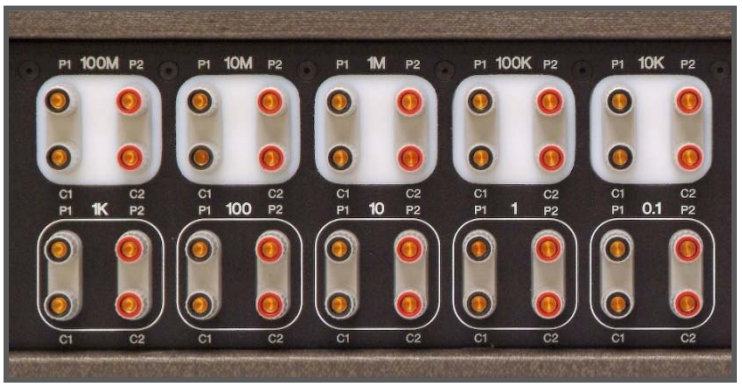
Another consideration is Electro-Magnetic Interference **(EMI)** or Radio Frequency **(RF)** impact on the performance of 6634A resistance elements. The entire Temperature (Thermal) Chamber, with all the elements, is placed inside another **EMI/RF Enclosure**. By incorporating an enclosed shielded chamber, coupled along with a **tightly controlled temperature environment**, measurement **uncertainties** can be **significantly controlled and reduced**.



The resistor elements are **electrically isolated** and **securely mounted** to the inside of a **hermetically sealed** aluminum enclosure. The resistance element itself is composed of multiple resistors, and encapsulated in a bonding material selected for its resistance to humidity and barometric pressure.

All Resistance values including Low Ohms models incorporate **5-way beryllium copper, gold plated binding posts** that provide ultra low 4-Wire thermal connections. These are the same connectors found on our **World Leading Direct Current Comparator Bridges**! For values 10 kΩ and higher, a special protective insulator is also used to electrically isolate the binding posts from the 6334A enclosure.

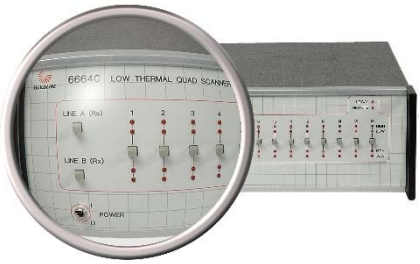
The **compact size and wide operating temperature** range of the model 6634A make it perfect for automation. When used with a low thermal scanner such as the Guildline 6664C or an automated DCC Resistance Bridge such as the Guildline 6622A Series, **full automation of resistance measurements to 100 MΩ is provided**.



Low Ohms Model - Given the performance of the Model 6634A standard values from 0.1 Ω to 100 MΩ, customers have requested that Guildline provide a 6634A with low value resistance standards - so we obliged. The **Low Ohms model** that has 3 elements from **0.001 Ω to 0.1 Ω**. You can also have any special value (e.g. 5 mΩ), but the unit is limited to 3 elements due to the larger size of the low value elements.

Thermometry Models - A Thermometry Model Series includes **special thermometry values** such as 0.25 Ω, 25 Ω, 10 Ω, 100 Ω, 200 Ω, and 400 Ω (or higher). Many customers have specified models with dual resistance elements (e.g. 2 x 10 Ω, 2 x 25 Ω, 2 x 100 Ω, etc.) as this is especially desirable for **'Self Calibration'** of temperature bridges. In addition, due to the **ultra short-term stability** of the resistance elements, a 6634A can be used to **verify actual ratios** on Temperature Bridges or devices such as Fluke (Hart) Super-Thermometers. By having 2 of each value, you can verify the 1:1 ratios as well as higher and lower ratios! If AC performance is required, check out our **7334 AC/DC Series of Precision Resistance Standards** which can also be delivered in a temperature stabilized and EMI shielded chamber.

Guildline's **6664C Low Thermal, 4-Wire Scanners** are the first commercial scanners capable of operating at **1000 V.** This Scanner has greatly **improved the measurement/calibration** throughput of **6634A Resistance Standards**. With the low thermal, 4-Wire connections, you can simply connect the 6634A directly to a **6664C-8 or 16 Channel Scanner** to provide a single connection point for **all resistance values** when selected manually via the push-button operation or **automatically via software**. With 4-Wire, 2 A and 1000 V capability; the 6664C is perfect for automating standard resistance measurements.



For Thermometry, the Guildline **3210 Series of Thermometry Adapters** provides a **low noise, low thermal** contact, high isolation interface switch and connection panel (i.e. Scanner). The 3210 allows multiple PRTs, SPRT's or other **temperature devices** to be **easily connected to measurement** devices such as Guildline's 6622T and 6640T Temperature Bridges and the Model **6634A Temperature Stabilized Resistance Standard**. The 3210 has a **built-in switch** to automatically **measure multiple connected devices**, while using individual programmable **pre-heat/keep-warm currents** in between measurements.

The 6634A Temperature Stabilized Resistance Standard is the **recommended standard** for **Guildline's 6625A Resistance and Current Measurement Systems**. The 6625A Measurement System provides demanding users the **best in performance** and value. Incorporating some of the most unique instruments and standards, the 6625A Measurement System is the best **"turn-key" Resistance** and Current Measurement System available today. This System provides the **best in measurement specifications** and the widest range of operation available from any manufacturer and is ideally suited for NMIs, militaries, and calibration labs.

The **6625A Measurement System** is highly configurable to meet wide ranging workload requirements. The 6625A is capable of resistance measurements using **6634A models** from **1 μΩ up to 1 GΩ** at 1000 V with a single 6622A DCC Bridge.

The **6625A unique design** and modularity allows customers to purchase what they need today to **support calibration** of their current work-load and be assured of an **upgrade path** to support their **future requirements**. With a **6634A incorporated**, the 6625A System is typically delivered ready for use in a single 'fly-away' rack less than **30 inches (76 cm) in total height**.

6634A Specifications

Nominal Resistance Ω	Nominal Initial Tolerance[2] +/- µΩ/Ω (ppm)	24 Hour Stability +/- µΩ/Ω	12 Month Stability[3] +/- µΩ/Ω	Temperature Coefficient +/- µΩ/Ω / °C	Maximum Voltage V
0.001[1]	20	0.4	15	0.04	0.01
0.01[1]	10	0.2	10	0.02	0.03
0.1	5	0.1	2.5	0.01	0.1
1	5	0.01	2.5	0.005	0.32
10	5	0.01	2.5	0.005	1.0
100	5	0.01	2.5	0.005	3.2
1 k	5	0.01	2.5	0.005	10
10 k	5	0.01	2	0.005	32
100 k	5	0.02	2.5	0.01	100
1 M	10	0.04	4	0.02	320
10 M	20	0.2	5	0.2	1000
100 M	40	0.5	20	0.2	1000

Note 1: Models containing Low Ohms Values are limited to a maximum of 3 elements.

Note 2: Nominal initial tolerance is defined as the maximum variation of resistance mean values as initially adjusted at the point of sale.

Note 3: Stability is exclusive of the effects of applying power above 20 mW, but not exceeding the maximum voltage, in terms of hysteresis and short-term temperature stabilization.

Note 4: Initial 12-month drift is for after the first year of ownership only. The initial 12-month drift is higher due to stabilization of elements. After the initial 24 months, the two-year specification is used as the maximum yearly drift specification.

Calibration Note: Calibrated in air at 23 °C traceable to the SI unit of electric resistance. Calibration uncertainties expanded and expressed at the 95 % level of confidence. An ISO/IEC 17025 accredited certificate and report of calibration stating the calibrated value and estimated uncertainty is provided with each resistor.

General Specifications

Resistance Range (Low Ω)	0.001 Ω to 0.1 Ω (Maximum of 3 elements). Special Values between 0.001 Ω to 0.1 Ω available at time of order.			
Resistance Range (Normal Ω) ►	0.1 Ω to 100 MΩ. Maximum 10 Elements in one unit. Special values between 0.1 Ω and 100 MΩ available at time of order.			
Temperature Stability ►	± 0.05 °C over 1 year, exclusive of self heating effects of the resistors			
PRT Sensor ►	Temperature Set-point	Stability (1 Year)	Resistance	Scale
	30 °C ± 0.5 °C	± 0.05 °C	100 Ω ± 0.1 % at 0 °C	(0-100 °C) 0.392 Ω/°C
Power Requirements ►	VAC: 100, 120, 220, 240 V ± 10 %	Frequency: 50/60 Hz ± 10 %	15 VA Maximum	
Environmental ►	Operating	18 °C to 28 °C, < 50 % RH, non-condensing		
	Storage	-20 °C to 60 °C, < 90 % RH, non-condensing		

Dimensions Rack Mount	Height (Bench Top Adder)		Width		Depth		Weight (Bench Top Adder)	
	132 mm (142 mm)	5.2 in (5.6 in)	440 mm	17.4 in	503 mm	19.8 in	9.4 kg (11 kg)	20.7 lbs (24 lbs)

Set-Point Note. Optional PRT Set-Points of 35 °C and 40 °C are available, however the unit cannot go lower than 30 °C. This is due to the 6634A Design which uses heaters to raise the temperature, but does not include cooling as this creates internal noise. By using a 30 °C temperature, this allows the unit to operate efficiently when placed in either a laboratory environment of 23 °C ± 5 °C or inside an equipment rack, which typically operates at around 28 °C.

100 MΩ not high enough? Check out the **6636 Temperature Stabilized** Resistance Standard. The 6636 can be configured with up to 6 standard decade resistance values, covering the range of 10 MΩ to 100 TΩ. Each resistance element is isolated and has an N-type terminal connection on the back panel.

(Model 6636 Rear

Guildline also provides **world leading Air Resistance Standards** with values from **100 µΩ all the way to 100 GΩ** with our 9334A Series; and from **10 MΩ to 10 PΩ** with the 9336 and 9337 Series.

9334A Series

Need high Current capability in a resistance standard? Check out our **9230A Series of Precision DC Shunts** (Resistors) or our 9211 and 9210 Multi-Tap Shunts (Resistors).

AC Performance a requirement? The **7334 Series of AC/DC Resistance Standards** are designed for AC Temperature Bridges.

Need AC Resistance but with high currents and higher frequencies? For best AC Performance to 100 kHz, our **7340 and 7350 AC/DC Shunts** provide stable resistance values for AC currents up to 100 A. **Values, performance and quality** that nobody else can provide!

7340 Series

Each of the Data sheets for these Series and Models can be found on the web at **www.guildline.com**.

ORDERING INFORMATION	
6634A-10	Resistance Standard with 10 Decade Elements 0.1 Ω to 100 MΩ
6634A-9	Resistance Standard with 9 Decade Elements 0.1 Ω to 10 MΩ
6634A-8	Resistance Standard with 8 Decade Elements 1 Ω to 10 MΩ
6634A-7	Resistance Standard with 7 Decade Elements 1 Ω to 1 MΩ
6634A-6	Resistance Standard with 6 Decade Elements 1 Ω to 100 kΩ
6634A-5	Resistance Standard with 5 Decade Elements 1 Ω to 10 kΩ
6634A-LO	Resistance Standard with 3 Decade Elements 0.001 Ω to 0.1 Ω
/TM6634A	Technical Manual (Included)
/ST-X	Optional Internal Temperature Set point (Specify 35 °C or 40 °C)
Note: ISO/IEC 17025 Report of Calibration and Calibration Certificate Included	
/Lead-11	Low Thermal Lead Pair w/Gold Plated Banana Plugs, 1 m length
/Lead-12	Low Thermal Lead Pair w/Gold Plated Banana Plugs, 2 m length
*Other Precision Leads Are Available – Call and tell us your requirements	

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