# GL1050 SERIES

## PRECISION RESISTANCE TRANSFER STANDARDS

Very High Stability Calibration Laboratory Resistance Transfer Standards!

**GUILDLINE INSTRUMENTS GL 1050 SERIES** of Resistance Transfer Standards are designed as very high stability calibration laboratory transfer standards for customers looking to replace the old ESI SR1050 Series.

The classic look and feel of the original ESI SR1050 Series has been maintained with the size and weight being very similar. The switches, binding posts and elements are of the highest quality found in a laboratory instrument. The resistance elements used in the Model GL 1050 Series go through the same rigorous testing and acceptance as do the elements found in our primary laboratory resistance standards.

**1MΩ AND 10 MΩ GL 1050 TRANSFER MODELS ARE AVAILABLE PROVIDING THE HIGHEST AVAILABLE UNCERTAINTY WITH GUILDLINE'S 60 YEARS OF DESIGN EXPERIENCE AND QUALITY IN EVERY UNIT SOLD!**

Like the original ESI Design, 3 Position, high isolation Lever Switching is used and no shorting or paralleling bars are required. We even alternate switch colors to allow a quick and easy visual that all values are in the correct toggle position. A 12th zero switch is provided.

Available models are 1 MΩ and 10 MΩ Decade Resistance Standards which have 11 equal valued, highly precise resistors contained within them. Each Model GL 1050 Series has 11 equal value resistors in increments of 1 MΩ per step or 10 M per step, depending on the model.

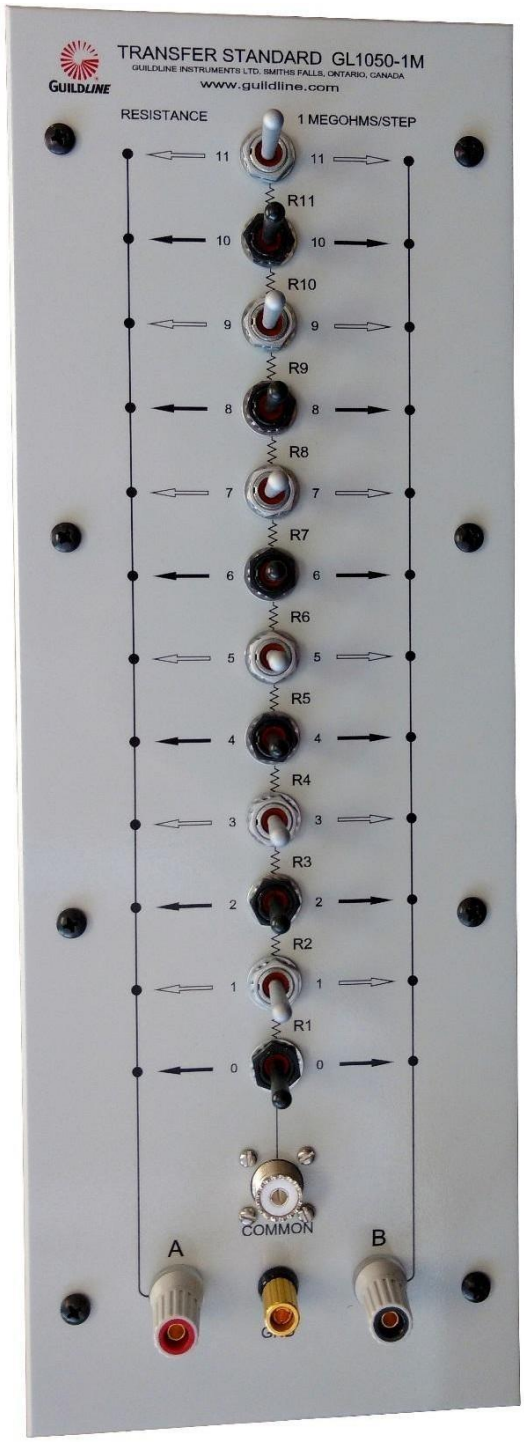
The Guildline GL 1050 Series – Keeping the original ESI performance and operation, coupled with the same exceptional Guildline quality you have come to know since 1957!

## FEATURES

- Very High Quality Laboratory Standard with Same Operation, Specifications and Layout of the Original ESI Design!
- High Transfer Accuracy better than 2 ppm!
- 2 Models with Decade Values from 1 MΩ /step and 10 MΩ/step!
- Resistance Transfers from 100 kΩ to 110 MΩ!
- Each Device Configurable to 10R, 1R, and R/10!
- Leakage Resistance $>10^{13}$ Ω from Terminal to Case!
- Can also be Used as a Precision Voltage Divider!
- Proven Guildline Quality with Over 60 Years Design and Manufacturing Experience!

# **GL 1050 Series** of Precision Resistance Transfer Standards

Ultra-Stable, 3 Position Lever Switching is used for all resistance switching, and no shorting or paralleling bars are required. A 12th zero switch is provided. 12 switches are required so that all possible combinations of the 11 resistance elements can be realized. Based on a unique method for establishing known ratios, the Model GL 1050 standard utilizes a transfer technique that consists of switching resistance sections in parallel, series or series-parallel sections.




Guildline only uses Lever switches of the highest quality as required by a laboratory instrument. The switches are isolated from the case through Teflon spacers rated for over 5 kV peak break down voltage. Guildline workmanship is first rate with care taken for appearance, performance and functionality. These standards reflect quality found only in the original ESI models.

Over 60 years of design, highest quality materials, and highly experienced manufacture of the standards ensure that these GL 1050's will be safe for the operator and maintenance personnel throughout the life of the equipment. Particular care has been provided in isolation and leakage design to safely handle the required high voltages.

The GL 1050 Series has a 3 terminal binding post design with one terminal used as ground. All measurement binding posts used are 5-way, specifically selected for low thermals and are gold flashed.

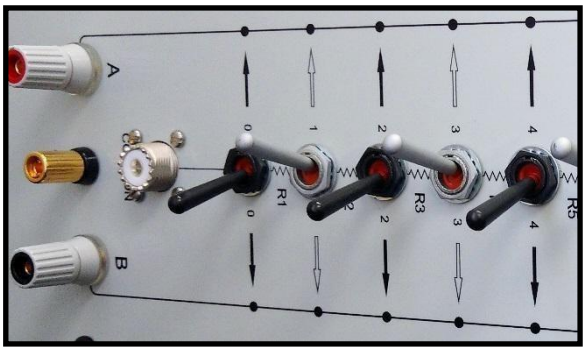
A fully isolated UHF connector is provided at the terminal end of the 11 resistor chain and the center pin is connected to the start of the resistor chain such that the decade transfer standard may be utilized as a precision voltage divider. The UHF shell is isolated completely from the case and the resistance chain. Except for the case ground terminal, all terminals, like the switches, are isolated from the case through Teflon spacers rated for over 5 kV peak break down voltage.

Internally, each resistance element section employs multiple ultra-high stability low temperature coefficient film resistors connected in series with an allowance for a fine adjustment resistance element. Each section assembly is rated for 2800 Volts and 1.5 Watts continuous operating power. The sections are doubly insulated by ceramic stand-off terminals mounted on a Teflon plate material. These design techniques result in the best performing commercially available GL 1050 models.

The long term accuracy of the GL 1050 Series is typically less than 30 ppm of nominal over a two year period. The use of high quality resistive elements as well as care in assembly and calibration ensure compliance to the provided specifications and long life reliability.

# **GL 1050 Series** of Precision Resistance Transfer Standards

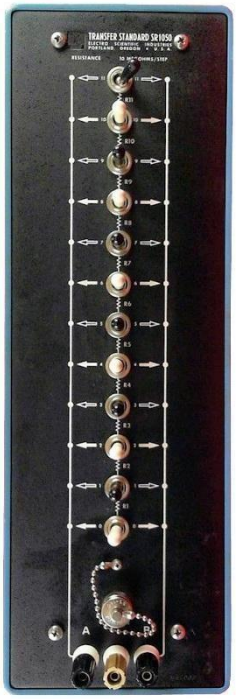
Various configurations and output values are selectable with the use of GL 1050 resistors when connected in series, parallel, or a combination of both.




This can be accomplished by the use of the resistors when connected in series, parallel, or a combination of both (R, 1/R, 10R). An example chart of these settings is shown below.

| GL 1050 Standard Switch Position | R0 | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Set to R/10** | ↓ | ↑ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | Off |
| **Set to 10R** | ↓ | Off | Off | Off | Off | Off | Off | Off | Off | Off | ↑ | Off |
| **Set to 1R** | ↓ | Off | Off | ↑ | Off | Off | ↓ | Off | Off | ↑ | Off | Off |

## *Don't Be Fooled!*



Original ESI SR1050 Design

Other manufacturers claim to have ESI SR1050 replacement models. However, none of them retain the original design, performance and operational requirements that made this instrument a highly prized, high quality and long lasting standard.

There are easy ways to spot the cost reductions other manufacturers use that result in poor performance. The simplest method is to look at the switches used. Guildline incorporates only the finest, 3 position toggle switches providing low thermals, low noise and the repeatability required for a laboratory standard. Additionally, Guildline incorporates additional proprietary techniques to provide the isolation needed for these standards. Just look at the switches installed by other manufacturers and compare them to Guildline's GL 1050!

Another area to look at is the common connector. ESI and Guildline both use a UHF Connector. Other manufacturers took the inexpensive route and put in a BNC connector. Does this really make a difference? The answer is not so obvious, however remember that this unit is rated up to 2500 Volts peak between any terminal and the case. A BNC connector (standard) has a maximum rating of 500 Volts. While some special higher voltage BNC connectors are available, the maximum rating is still only 1 kV, or about 1500 Volts short of providing safe operation. Safety and safe designs are one area not worth cost cutting features that can put operators at risk!

Other areas not so obvious are internal to the unit. Are the design and components used of laboratory quality instruments? Are multiple resistors for each of the element's buildup used, or did the manufacturer decide to only use one element? The best way to test performance is to ask the manufacturer to supply a unit for testing and then examine these results carefully.

# **GL 1050 Series** of Precision Resistance Transfer Standards

| SPECIFICATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ACCURACY | | STABILITY | LONG TERM | TEMPERATURE | RESISTANCE MATCHING | |
| | | | | | | ADJUSTMENT | TC |
| 1 MΩ | ±20 ppm | ±2 ppm | ±15 ppm | ±30 ppm | ±3 ppm/°C | ±10 ppm | ±3 ppm |
| 10MΩ | ±20 ppm | ±2 ppm | ±15 ppm | ±30 ppm | ±3 ppm/°C | ±10 ppm | ±3 ppm |

1 – within ±1 °C of measured value

| GENERAL SPECIFICATIONS | | |
|---|---|---|
| Maximum Power Rating: | 1 W/step or 5 W distributed over 10 steps, or maximum voltage of 2.5 kV where this value does not result in power > 1 W per resistor | |
| Power Coefficient: | <± 0.05 ppm/mW per resistor | |
| Break Down Voltage: | 2,500 peak V between any terminal and case | |
| Leakage Resistance: | Greater than $10^{13}$ Ω from terminal to case | |
| Connection Terminals: | Three gold-plated, 5-way, tellurium-copper binding posts with low thermal emf and low resistance. One shielded UHF terminal labeled COMMON, used when the unit is employed as a precision voltage divider. | |
| Calibration Data: | Initial Calibration readings are listed on certificate and instrument | |
| Environmental: | Operating (Specifications) | Storage |
| Temperature: | 23 °C ± 3 °C | 0 °C to 50 °C |
| Humidity: | 20 % to 50 % RH | 15 % to 80 % RH |
| Size (Either Model) H x W x D: | 17" x 6.0" x 5.9" | 43 cm x 15.2 cm x 15 cm |
| Weight (Either Model): | 11 lbs | 5 kgs |

**Warranty Accuracy** - Specifications are guaranteed for 2 years from date of shipment. Typically specifications are maintained for a longer period of time. Instruments are guaranteed for the 2-year standard warranty with the instrument. Refer to Guildline warranty statement for more information.

| | |
|---|---|
| GL 1050-1M | 1 MΩ/Step Precision Resistance Transfer Standard |
| | |
| /TM | GL 1050 Technical Manual included at no charge |
| /CC | Certificate of Conformance (Included) |
| /Report | Certificate and Report of Calibration (with data) included |
| Low Thermal Leads are Available. Contact Guildline for more information. | |

**GUILDLINE IS DISTRIBUTED BY:**

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