9350 Series

Hamon Type Resistance Transfer Standard

Maintenance Free Extreme Accuracy Resistance Transfers

Guildline Instruments Model 9350 are Hamon Type Resistance Transfer Standards. They are used to make very high accuracy resistance transfers. A set of 9350's can be used to build up from a Thomas type 1 Ohm standard up to 1 MegOhm.

Applications for the 9350 include performing linearity and ratio accuracy tests on resistance bridges such as the Guildline 6622A, 6675A and 9975 bridges. At specific values the 9350 can also be used as a standard resistor. For example, by a series parallel combination, a 25 ohm standard resistor can be set up which would enable measurements with PRT's.

The 9350 contains 10 nominally equal resistors permanently connected in series by specially designed true four terminal junctions. Groups of resistors can be connected in parallel or series parallel combinations to obtain many values independent of the terminal blocks and paralleling connectors to better than 5 parts in 10^{-8}.

9350 Features

- Transfer accuracy 0.05 ppm
- 5 versions:
  10k to 1M, 1k to 100k
  100 to 10k, 10 to 1k
  1 to 100
- 10 equal value precision resistors
- Unique four terminal junctions
- Special tapered plug design avoids use of mercury shorting bars
- A Multi-value Standard Resistor
- Low maintenance

The 9350 (Hamon Type) Resistance Transfer Standard is used to make very high accuracy resistance transfers.

The various combinations are selected by a tapered plug arrangement. This method has eliminated the use of mercury wetted shorting bars common in earlier generation Hamon Type Resistance Transfer Standards. The tapered plugs have a taper angle of a critical dimension which, while maintaining a low impedance, allows the plugs to be easily removed or inserted. The taper angle is also designed to prevent cold welding of the copper. A convenient storage area is provided for the tapered plugs not in use.

The unique tetrahedral junction design allows transfers of five parts in 100 million to be achieved. By measuring each element to an accuracy of better than 1 part in 10^{-4}, 100:1 ratio transfers can now be made to an accuracy of better than 5 parts in 10^{-8} independent of junction errors. For example, by use of a good quality 5 ½ digit DVM and a 9350, resistance ratio measurements better than 5 in 100 million are achievable.

MODEL 9350 HAMON TYPE RESISTANCE TRANSFER STANDARD

9350 SERIES OPERATION

The 9350 should be maintained in a constant temperature oil bath such as the Guildline 9732VT. Using a Guildline 6622A Resistance Bridge or equivalent, the individual elements of the 9350 can be measured to better than 1 in 10^7. The high stability and precision of these elements enables the 9350 to be used as a multi value standard resistor or as a high precision voltage divider.

Each version of the 9350 can be connected to give three decade values: 10 resistors in series (10R), individual resistors (R) and 10 resistors in parallel (R/10) as well as 3000 other intermediate values. The 9350 is a versatile instrument complementing the extensive range of standards equipment available from Guildline.

9350 SERIES SPECIFICATIONS

Model [1] (Nominal Value)	Configuration Range (ohms)	100:1 Ratio[2] Accuracy ± ppm	Stability [3] 12 Months ± ppm	Temperature Coefficient ±ppm/°C	OIL Power Coefficient [4] <30 mW ±ppm	AIR Power Coefficient [5] <10 mW ±ppm
9350/10	1 - 100	0.05	10	< 1	0.1	0.1
9350/100	10 - 1K	0.05	10	< 1	0.1	0.1
9350/1k	100 - 10K	0.05	10	< 1	0.1	0.1
9350/10k	1K - 100K	0.05	10	< 1	0.1	0.1
9350/100k	10K - 1M	0.2	10	< 1	0.1	0.1

Note 1: Model Value is also nominal value in Ohms. Single Element Initial Nominal Tolerance is ±50 ppm for all Models

Note 2: Calibrated in flowing oil at 25 ^{0}C referred to the unit of resistance as maintained by the National Research Council of Canada or the National Institute of Standards and Technology and expressed as a total uncertainty with a coverage factor of k = 2. A traceable report of calibration stating the measured values and uncertainty is provided with each resistor.

Note 3: Stability is for single element

Note 4: The 9350/100K model is calibrated in air at 23 ± 1 ^{0}C. It is not recommended that the 9350/100K model be immersed in oil.

Note 5: Power coefficient is the maximum deviation in ppm per single resistor element when used within specified power range.

GENERAL SPECIFICATIONS				
Environmental	Temperature		Humidity	
Operating	18 ^{0}C to 28 ^{0}C	41 ^{0}F to 100^{0}F	<70% RH non-condensing	
Storage	-30 ^{0}C to 70 ^{0}C	-4 ^{0}F to 131^{0}F	<70% RH @ 40 ^{0}C	
Exterior Dimensions	105mm (H)	153 mm (W)	242 mm (D)	2.7 kg
	4.1" (H)	6.1" (W)	9.5" (D)	6 lbs

ORDERING INFORMATION	
9350/10	10 ohm Resistance Transfer Std
9350/100	100 ohm Resistance Transfer Std
9350/1k	1K ohm Resistance Transfer Std
9350/10k	10K ohm Resistance Transfer Std
9350/100k	100K ohm Resistance Transfer Std
/TM9350	Technical Manual (Included)
/CC	Certificate of Calibration (included)
/Report	Report of Calibration (included) (Non-Accredited)
	Accredited Report of Calibration available @ additional charge

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