

Model SR1010

RESISTANCE STANDARDS & INSTRUMENTS

- Each device configurable to 10R, 1R, and R/10
- Accuracy of transfer better than 1 ppm
- Six models, decade values from 1 Ω /step to 100k Ω /step
- Establish decade resistances from 0.1 Ω to 1M Ω
- Calibration readings attached to the standard

Resistance Transfer Standard

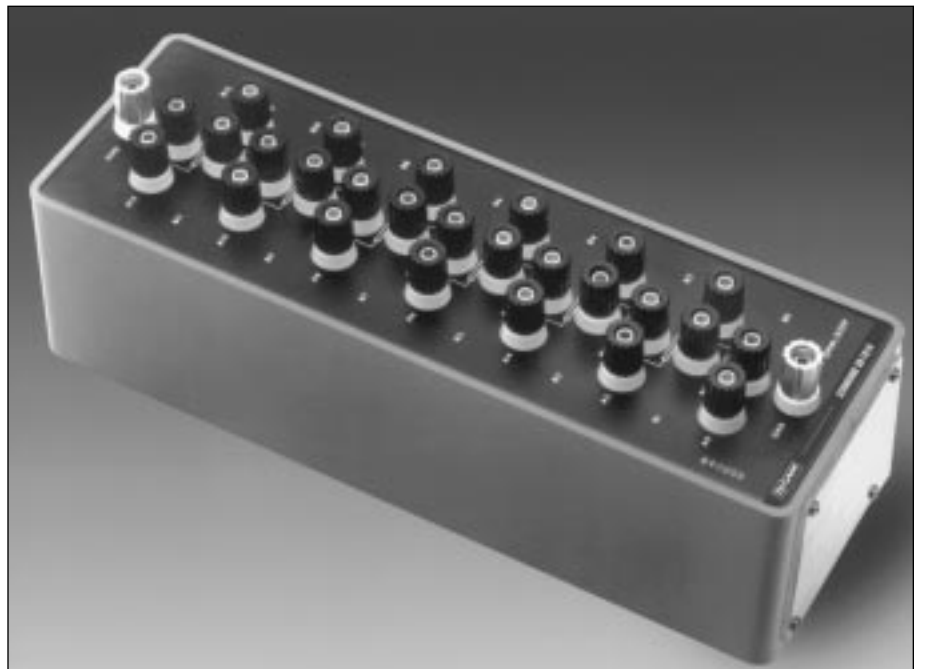
The SR1010's meet or exceed all of the requirements for resistance transfer standards in precision measurement applications. They are easily configured to transfer resistances up a decade or down a decade from their initial resistance value. When used with the connecting networks and shorting bars, they provide 1 ppm transfer accuracies.

Each transfer standard contains twelve equal value precision resistors connected in series by specially designed true 4-terminal junctions. These special junctions assure that a 4-terminal measurement of a series of resistors agrees with the sums of the individual resistors in the series. Accurate parallel connections can be made with the Parallel Compensation Network

and the Shorting Bars connected to the junctions.

These standards can be connected to provide three decade values: 10 resistors in series, 10R: 9 resistors in series — parallel, 1R: and 10 resistors in parallel, R/10. The part per million accuracy is assured as the series value is equal to 100 times the parallel value to better than 1 ppm. The series — parallel value relative to either the series value or the parallel value can be found to better than 1 ppm by making a 1:1 comparison with the remaining tenth resistor and a simple calculation.

The accuracy and precision of the individual resistors also make the Model SR1010 ideal for use as a multi-value standard resistor or reference voltage divider.



TEGAM

THE GLOBAL SOURCE FOR PROVEN TEST
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Model SR1010

RESISTANCE TRANSFER STANDARD

Specifications

Standard Values

1, 10,* 100 Ω/step; 1, 10, 100 k Ω/step.

Accuracy

Transfer***	±(1 ppm + 0.1μΩ) at parallel value for 100:1 transfer ±(1 ppm + 1μΩ) at series-parallel value for 10:1 transfer
Initial	±20 ppm of nominal value, matched within 10 ppm
Long-Term	±50 ppm of nominal value
Calibration	±10 ppm

Calibration Conditions

23°C, low power, four-terminal measurement.

Temperature Coefficient

±5 ppm/°C, matched within 3 ppm/°C, for 100 Ω and higher.
±15 ppm/°C, matched within 5ppm/°C, for 1 Ω.

Power Coefficient

±0.1 ppm/mW per resistor for 100 Ω and higher .
±0.3 ppm/mW per resistor for 1 Ω.

Maximum Power Rating

1W/step or 5 W distributed over 10 resistors.

Breakdown Voltage

1500 V peak to case.

Leakage Resistance

Greater than 10¹² Ω from terminal to case.

Calibration Data

Initial calibration readings are affixed to instrument.

Dimensions

Height 4.4 in. (11.20 cm).
Width 12.2 in. (31.00 cm).
Depth 4.0 in. (10.15 cm).

Weight

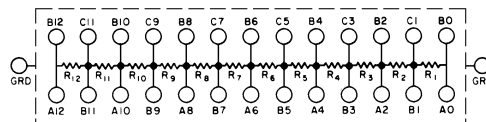
3.25 lb. (1.5 kg).

R Value	(Per Step)	1Ω	10Ω*	100Ω	1kΩ	10kΩ	100kΩ
One Resistor Alone	max mA	1000	320	100	32	10	3.2
	max V	1	3.2	10	32	100	321
10 Resistors in Parallel R/10	max mA	7100	2300	710	230	71	23
	max V	0.71	2.3	7.1	23	71	230
10 Resistors in Series 10R	max mA	710	230	71	23	7.1	2.3
	max V	7.1	23	71	230	710	2300**

*10 Ω standard is SR1010/LTC

**Do not exceed 1500 V to case

***With Model SB103 and Model PC101 or SPC102



SR 1010/LTC

The Model SR1010/LTC is a 10-ohm-per-step transfer standard, identical to the standard SR1010, in all respects other than temperature and power coefficients.

Resistors having extremely low temperature coefficients have been selected so that low resistance comparisons can be made with increased accuracy. Using accessory shorting bars and networks, the transfer boxes may be placed in series, parallel, or series-parallel to provide highly accurate ratios of 10:1, 100:1 and a variety of odd ratios.

Standard Equipment

The SR1010 comes with an 8502 instruction manual.

Standard Value

10 Ω per step.

Accuracy

Transfer*	±1 ppm
Initial	±20 ppm of nominal value, matched within 10 ppm
Long-Term	±50 ppm of nominal value
Calibration	±10 ppm

Calibration Conditions

23°C, low power, four-terminal measurement.

Temperature Coefficient

Each step within ±1 ppm per °C.

Power Coefficient

±0.02 ppm/mW per resistor.

Number of Resistors	Max Current	Max Voltage
1	320 mA	3.2
10 (parallel)	2300 mA	2.3
10 (series)	230 mA	23

Maximum Power Rating

1 W/step or 5 W distributed over 10 resistors.

Breakdown Voltage

1500 V peak to case.

Calibration Data

Initial calibration readings are affixed to instrument.

Dimensions

Height 4.4 in. (11.20 cm).
Width 12.2 in (31.00 cm).
Depth 4.0 in. (10.15 cm).

Weight

3.25 lb. (1.5 kg).

*With Model SB103 and Model PC101 or SP102

OPTIONS AND ACCESSORIES

PC101 Parallel Compensation Network

The Model PC101 Parallel Compensation Network is used in addition to the Model 103 Shorting Bars for the four-terminal parallel connection of 10 low-value resistors in the Model SR1010 Resistance Transfer Standard.

Effective Accuracy

Effect of connection resistances on four-terminal parallel value less than $\pm 0.1 \mu\Omega$.

Maximum Current

2 A.

Breakdown Voltage

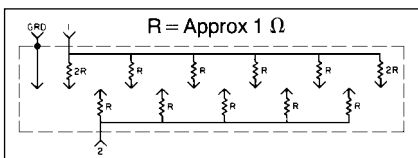
1500 V peak to case.

Dimensions

Height 1.0 in. (2.5 cm).
Width 12.0 in. (30.5 cm).
Depth 3.2 in. (8.1 cm).

Weight

1 lb. (454 gm) net.



SPC102 Series-Parallel Compensation Network

The Model SPC102 Series-Parallel Compensation Network is used in addition to the Model SB103 Shorting Bars for the four-terminal series-parallel connection of nine low-value resistors in the Model SR1010 Resistance Transfer Standard.

Effective Accuracy

Effect of connection resistances on four-terminal series-parallel value less than $\pm 1 \mu\Omega$.

Maximum Current

2 A.

Breakdown Voltage

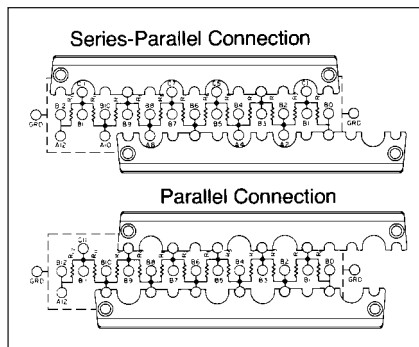
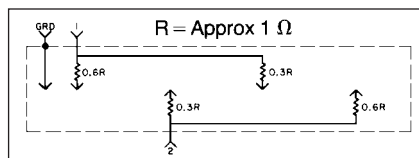
1500 V peak to case.

Dimensions

Height 1.0 in. (2.5 cm).
Width 12.0 in. (30.5 cm).
Depth 3.2 in. (8.1 cm).

Weight

1 lb. (454 gm) net.



SB103 Shorting Bars

The Model SB103 Shorting Bars are used to connect any number of resistors in the Model SR1010 Resistance Transfer Standard in parallel or nine resistors in series-parallel. They may be used by themselves or in conjunction with the Model PC101 or SPC102 networks. The resistance that must be added to the value calculated from the individual resistor values is given in the accompanying table for two- and four-terminal measurements.

Measurement and Accessory	10 Resistors in Parallel (0.1R)	9 Resistors in Series-Parallel (R)
Two-Terminal SB103	150 \pm 30 $\mu\Omega$	300 \pm 60 $\mu\Omega$
Four-Terminal SB103 and PC101 or SPC102	0 \pm 0.1 $\mu\Omega$	0 \pm 1 $\mu\Omega$
SB103 Alone	50 \pm 10 $\mu\Omega$	200 \pm 40 $\mu\Omega$

Resistance

Approximately 100 $\mu\Omega$ /bar end to end.

Maximum Current

10 A/bar.

Dimensions (each bar)

Height 1.4 in. (3.55 cm).
Width 9.5 in. (24.10 cm).
Depth 0.8 in. (2.03 cm).

Weight

8 oz. (227 gm) net.

Calibration & Technical Services

For warranty and remedial repair, calibration services and spare parts, or for additional information on TEGAM sales and service offices around the world, contact us at 440-466-6100 (ph) or 440-466-6110 (fx).



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R E S I S T A N C E T R A N S F E R S T A N D A R D



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