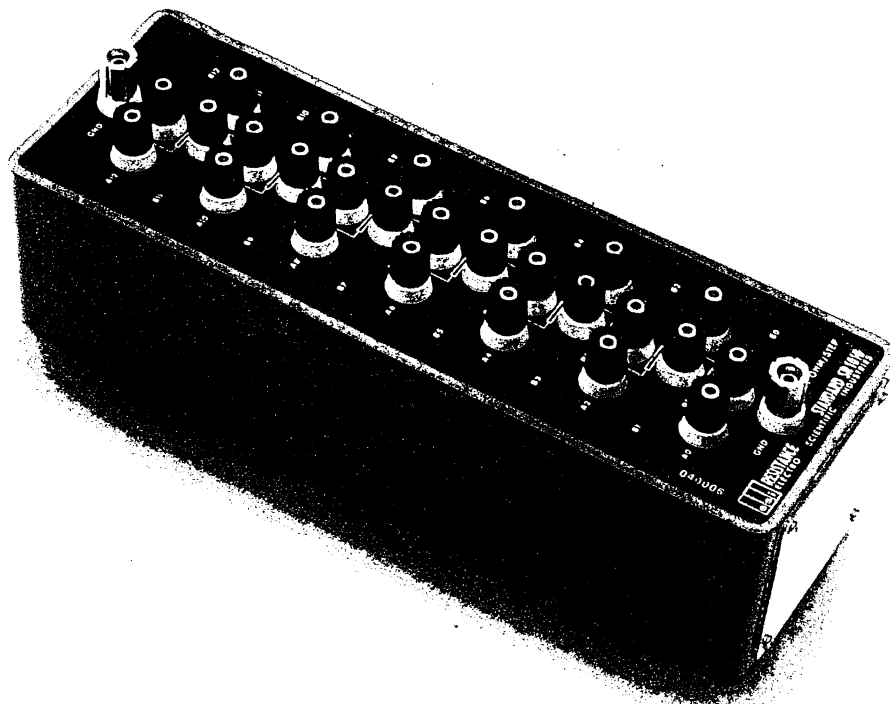


Model SR1010

Resistance Transfer Standard

- Parts per million transfers to $1M\Omega$ from single standard
- Twelve equal-value precision resistors
- Six models, decade steps 1Ω to $100k\Omega$
- Unique four-terminal junctions
- Calibration readings attached



The Model SR1010 Resistance Transfer Standard and its connecting networks and shorting bars are used to make accurate resistance transfers. The device contains 12 nominally equal resistors connected in series by specially designed true four-terminal junctions. Four-terminal measurements of series combinations will agree with the sums of individual four-terminal

measurements because of these junctions. Accurate parallel connections can also be made with the networks and the shorting bars connected to these junctions.

Each device can be connected to give three decade values—10 resistors in series ($10R$), the same 10 resistors in parallel ($R/10$), and 9 of the 10 resistors in series-parallel (R). Part-per-million resistance transfers can be made because the series value is exactly equal to 100 times the parallel value to better than 1 ppm. The series-parallel

value relative to either the series or 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 high 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.



Specifications

Standard Values

1, 10,* 100Ω/step; 1, 10, 100kΩ/step

Accuracy

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

Calibration Conditions

23°C, low power, four-terminal measurement

Temperature Coefficient

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

±15 ppm/°C, matched within 5 ppm/°C, for 1Ω

Power Coefficient

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

Maximum Power Rating

1W/step or 5W distributed over 10 resistors

Breakdown Voltage

1500V peak to case

Leakage Resistance

Greater than 10¹²Ω from terminal to case

Calibration Data

Initial calibration readings are affixed to instrument

Dimensions

Height 4.4 in. (11.20cm)

Width 12.2 in. (31.00cm)

Depth 4.0 in. (10.15cm)

Weight

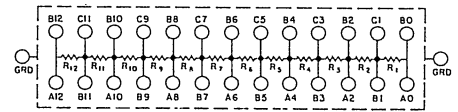
3.25 lbs (1.5kg)

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

*See SR1010/LTC

**Do not exceed 1500V to case

***With Model SB103 and Model PC101 or SPC102



Options and accessories to complete your installation

Standard equipment

Model SR1010 comes with an 8502 instruction manual.

SR1010/LTC Resistance Transfer Standard

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 Value

10Ω 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

Maximum Power Rating

1W/step or 5W distributed over 10 resistors

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

Breakdown Voltage

1500V peak to case

Calibration Data

Initial calibration readings are affixed to instrument

Dimensions

Height 4.4 in. (11.20cm)

Width 12.2 in. (31.00cm)

Depth 4.0 in. (10.15cm)

Weight

3.25 lbs. (1.5kg)

*With Model SB103 and Model PC101 or SP102

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

2A . .

Breakdown Voltage

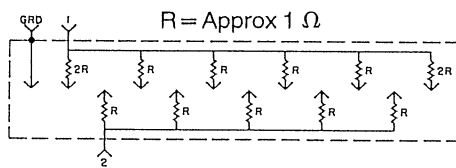
1500V peak to case

Dimensions

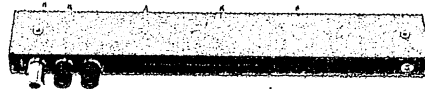
Height 1.0 in. (2.5cm)
Width 12.0 in. (30.5cm)
Depth 3.2 in. (8.1cm)

Weight

1 lb (454gm) 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

2A

Breakdown Voltage

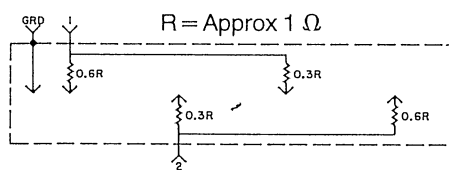
1500V peak to case

Dimensions

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

Weight

1 lb (454gm) 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 = 30 $\mu\Omega$	300 = 60 $\mu\Omega$
FOUR-TERMINAL SB103 AND PC101 OR SPC102	0 = 0 1 $\mu\Omega$	0 = 1 $\mu\Omega$
SB203 ALONE	50 = 10 $\mu\Omega$	200 = 40 $\mu\Omega$

Resistance

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

Maximum Current

10A/bar

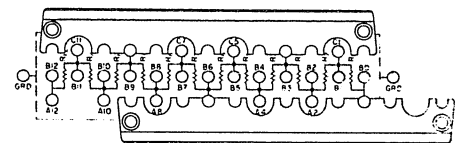
Dimensions (each bar)

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

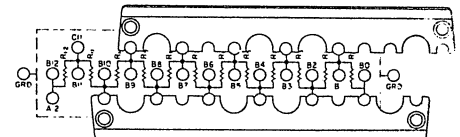
Weight

8 oz (227gm) net

Series-Parallel Connection



Parallel Connection



Warranty

WARRANTY OF QUALITY

Electro Scientific Industries, Inc., warrants its products to be free from defects in material and workmanship. Rigorous quality control permits the following standard new equipment warranties:

1. One year on components and instruments utilizing active circuitry.
2. Two years for components and instruments exclusively utilizing passive circuitry.

During the warranty period, we will service or, at our option, replace at the factory any device that fails in normal use to meet its published specifications. Batteries, tubes and relays that have given normal service are excepted. Special systems will have warranty periods as listed in their quotation.

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Where an ESI product will interconnect with components not supplied by ESI, ESI does not warrant the ESI product against failures caused by mismatch of the non-ESI product, nor will ESI

be liable for damages to the non-ESI component resulting from the mismatch.

Unless specifically requested by the customer, ESI does not inspect or test an instrument for compliance with applicable safety, governmental or industry standards. Customers who desire an inspection or test for conformity to a standard should specify the standard with particularity. Not all instruments can be modified to conform with standards adopted after the instrument was manufactured, and such modifications are not repairs, nor is failure to comply with a standard adopted after the date of manufacture a defect.

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