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Resistance Transfer Standard System

SR1010 Series

The SR1010 series are extremely precise and stable resistance transfer standards. They may be used as as a multi-value standard resistor or reference voltage divider. Their superior stability make them particularly suitable for calibrating 6-1/2, 7-1/2 and 8-1/2 digit digital multimeters.

The SR1010s may be used on a lab benchtop as well as out in the field.

The SR1010 Series utilize a set of 12 hermetically sealed resistors which are matched for temperature coefficient.

For high resistance transfer standards, consider the IET/esi SR1050

For oil filled resistance transfer standards consider the IET/esi SR1030

Features

- 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 traceable to the SI through an NMI
- IET Labs continues to manufacturer the SR1010 to the same exacting specs as esi/Tegam

SR1010-10k: 10 kΩ Resistance Transfer Standard

Description

Accuracy and Stability

The SR1010 meets or exceeds all of the requirements for resistance transfer standards in precision measurement applications. It is easily configured to transfer resistances up or down a decade from their initial resistance value. When used with the connecting networks and shorting bars, it provides 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.

Ideal as a Multi-Value Standard Resistor or Reference Voltage Divider

The high accuracy and precision of the individual resistors make the SR1010 ideal for use as a multi-value standard resistor or reference voltage divider. The superior stability of the SR1010 makes it particularly suitable for calibrating 6-1/2, 7-1/2 and 8-1/2 digit digital multimeters.

IET's Resistance Technology

IET's experience in design and manufacture of resistance standards has made our standards highly respected throughout government and industry.

The SR1010 uses the same basic design as the SR1030 Transfer Standard without the use of oil.

Specifications

Resistance per Step	One Resistor Alone		10 Resistors in Parallel (R/10)		10 Resistors in Series (10R)		Temperature Coefficient	Power Coefficient	Leakage Resistance
	Max Current	Max Voltage	Max Current	Max Voltage	Max Current	Max Voltage			
1 Ω	1.0 A	1.0 V	7.07 A	707 mV	707 mA	7.07 V	±15 ppm/°C matched within 5 ppm/°C	±0.3 ppm/mW/resistor	>10^{12} Ω terminal to case
10 Ω	316 mA	3.16 V	2.23 A	2.23 V	223 mA	22.3 V	±1 ppm/°C	±0.02 ppm/mW/resistor	
100 Ω	100 mA	10 V	707 mA	7.07 V	70.7 mA	70.7 V	±5 ppm/°C matched within 3 ppm/°C	±0.1 ppm/mW/resistor	
1 kΩ	31.6 mA	31.6 V	223 mA	22.3 V	22.3 mA	233 V			
10 kΩ	10 mA	100 V	70.7 mA	70.7 V	7.07 mA	707 V			
100 kΩ	3.16 mA	316 V	22.3 mA	223 V	2.23 mA	2,230 V			>10^{13} Ω terminal to case

Nominal Values (per step):
1, 10, 100, 1k, 10 k, 100 kΩ

Transfer Accuracy:
100:1 ±(1 ppm + 0.1 μΩ) at parallel value, using SB103, PC101, and SP102 as necessary
10:1 ±(1 ppm + 1 μΩ) at parallel value, using SB103, PC101, and SP102 as necessary

Initial Adjustment:
± 20 ppm of nominal, resistors matched to within 10 ppm

Calibration Conditions:
23 ±1°C, low-power, four-terminal measurement
initial calibration reading are provided

Long-Term Resistance Stability:
for 6 months: ±20 ppm of nominal
for 2 years: ±35 ppm typical
for 5 years: ±50 ppm typical

Maximum Power:
Single Step: 1 W/step
10 resistors: 5 W distributed

Breakdown Voltage:
1500 V peak to case

Resistor Type:
Hermetically sealed wirewound

Environment:
Operating: +10 to +40°C, <50% RH
Storage: -20 to +65°C

Dimensions:
31 cm W x 11.2 cm H x 10.2 cm D (12.2" x 4.4" x 4.0")

Weight:
1.5 kg (3.25 lb)

Ordering Information

SR1010 Transfer Standards

Model Number	Description
SR1010-1	1 Ω Resistance Transfer Standard
SR1010-10	10 Ω Resistance Transfer Standard
SR1010-100	100 Ω Resistance Transfer Standard
SR1010-1K	1 kΩ Resistance Transfer Standard
SR1010-10K	10 kΩ Resistance Transfer Standard
SR1010-100K	100 kΩ Resistance Transfer Standard

Optional Accessories

Model Number	Description
SB103	Shorting Bars
SPC102	Series/Parallel Compensation Network
PC101	Parallel Compensation Network