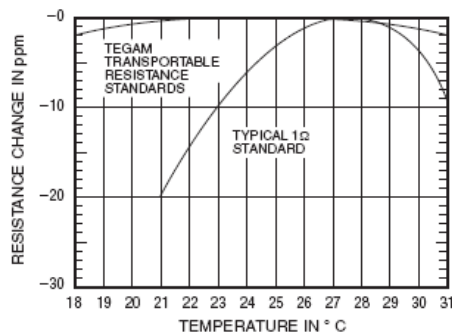


These Transportable Resistance Standards are designed for precision applications. Their accuracy, stability, and low temperature coefficient make them ideal for precise laboratory comparisons without critical environmental controls. For maximum accuracy, these standards offer users a temperature-correction chart and a built-in RTD temperature sensor to measure internal temperature.

Features

- Resistance values of 100 Ω , 1000 Ω , or 10000 Ω
- High accuracy
- High stability - <0.5 ppm/year
- Low temperature coefficient -- <0.1 ppm/ $^{\circ}\text{C}$
- Built-in temperature sensor and temperature-correction chart
- Oil-filled, hermetically sealed, custom resistors
- Increased-stability option (DC) is available to be used in an oil-bath



Temperature coefficient comparison between a typical SR-102 unit and a typical 100 Ω resistance standard



Transportable Resistance Standard

SPECIFICATIONS

Stability

First 2 years: ± 1 ppm/year
Thereafter: ± 0.5 ppm/year

Temperature coefficient

Temperature coefficient (α):

<0.1 ppm/ $^{\circ}\text{C}$ at 23 $^{\circ}\text{C}$

1/2 rate of TC change (β):

<0.03 ppm/ $^{\circ}\text{C}$ from 18 $^{\circ}\text{C}$ to 28 $^{\circ}\text{C}$

α and β are determined by the following expression:

$$R_s = R_{23} [1 + \alpha_{23} (t - 23) + \beta (t - 23)^2]$$

where R_s = Standard Resistance at temperature t

No ovens or external power required

Power coefficient

<1 ppm/W

Adjustment to nominal

SR102, SR103, SR104: ± 1 ppm

Max voltage

500 V peak to case

Power rating

1 W (Momentary 100 W overloads will not cause failure)

Insulation resistance

All terminals maintain a minimum $10^{12} \Omega$ to ground

Internal temperature sensor

100 Ω , 1 k Ω , or 10 k Ω resistor with 1,000 ppm/ $^{\circ}\text{C}$ temperature coefficient.
Integral thermometer well is provided for calibration

Hermetic sealing

The hermetically sealed resistors are additionally hermetically sealed in an oil filled can with metal-to-glass seals to improve stability. The resistance changes $< \pm 0.1$ ppm with normal atmospheric pressure and humidity changes.

Pressure effects

No pressure effects under normal atmospheric changes.

Connection terminals

Five-terminal construction, four-terminal resistor with ground intercept for the standard and temperature resistor.

Thermal emf

Thermal emf at the terminals does not exceed $\pm 0.1 \mu\text{V}$ under normal conditions.

Thermal lagging

Thermal lagging time constant is 1 hour minimum (1-1/e of total change in one hour).

Dielectric soakage effect

The resistance stabilizes to within 0.1 ppm of final value within 5 seconds with 1 V applied to the resistor.

Current reversal

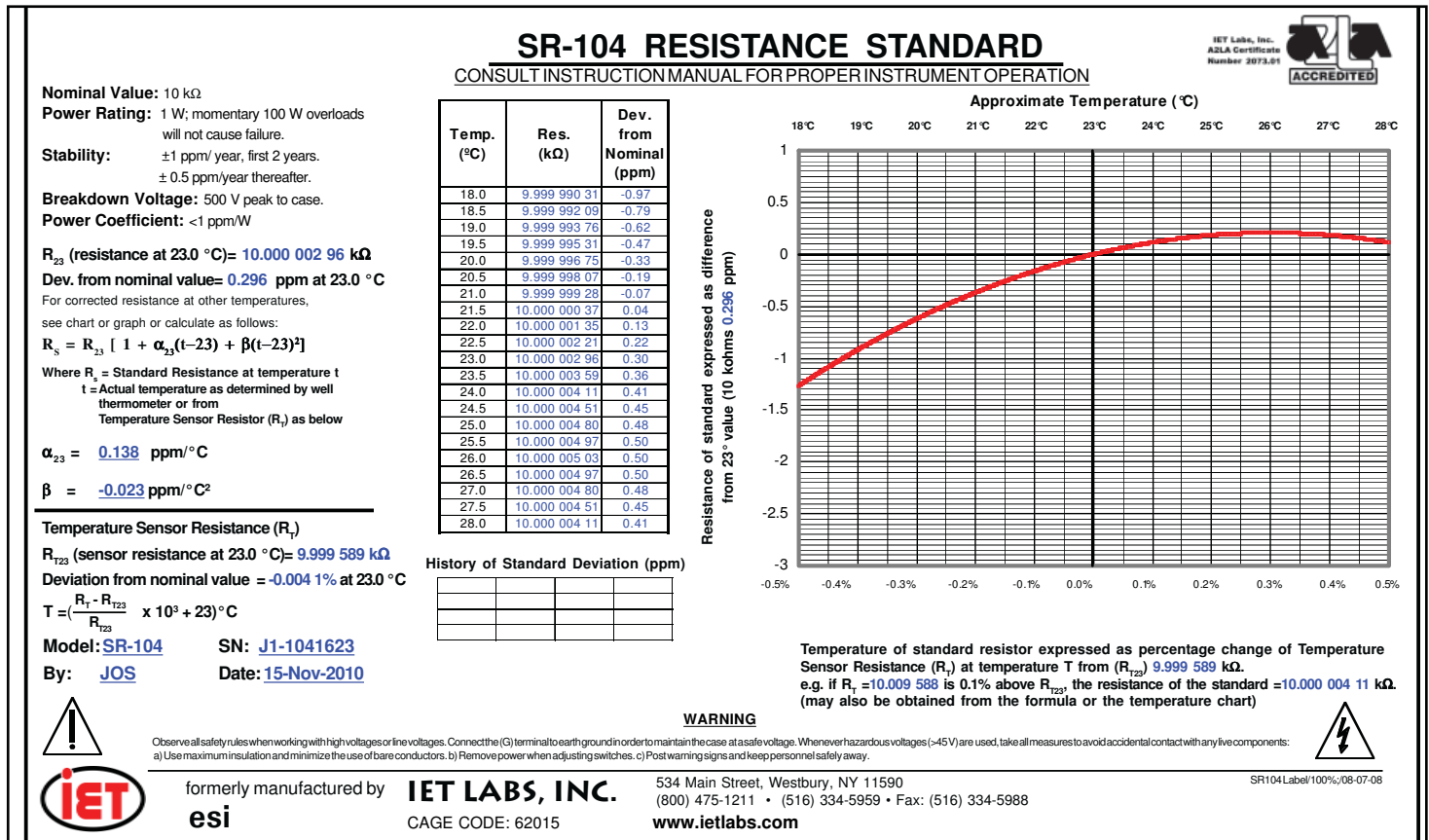
With the reversal of the current through the resistor, the resistance value changes less than ± 0.1 ppm.

Shock effects

The resistance changes is <0.2 ppm when subjected to 2 drops three-foot drops to a concrete floor on each of the 3 mutually perpendicular faces (6 drops total).



SAMPLE TEMPERATURE CORRECTION CHART



MECHANICAL INFORMATION

Dimensions

Regular

25.4 cm x 20.6 cm x 31.1 cm (10" x 8.1" x 12.25")

Deleted case (DC) version

12.7 cm x 8.9 cm x 17.8 cm (5.0" x 3.5" x 7.0")

Weight

Regular

4.8 kg (10.5 lb)

Deleted case (DC) version

1.8 kg (4.0 lb)

ORDERING INFORMATION

100 Ω Transportable Resistance Standard: **SR-102**

1,000 Ω Transportable Resistance Standard: **SR-103**

10,000 Ω Transportable Resistance Standard: **SR-104**

Optional:

For deleted case version add -DC at the end of the part number.

OPTIONAL EXTERNAL OIL BATH

This optional version can further enhance the short-term stability of the resistance standard. It comes without the insulated case, so that it may be used in an external oil bath that provides additional temperature stability. This version is called Deleted Case (DC).

When the standards are used in an oil bath, the resistance elements maintain a constant temperature, providing outstanding short-term stability, which is especially important when making Quantum-Hall-Effect measurements.

Each unit includes:

- Built-in temperature sensor
- Temperature correction chart
- Instruction manual
- ISO/IEC 17025 calibration certificate

