# GenRad 1433 Series



**The 1433 Decade Resistors are convenient resistance standards for checking the accuracy of resistance-measuring devices. They are primarily intended for precision-measurement applications where accuracy, stability, and low-zero-resistance are important. They are used as components in dc and audio frequency impedance bridges.**

*Model **1433** Precision Decade Resistor*

**Features:**

- Resistance range from 1 mΩ to 111 MΩ
- High accuracy: 0.01% up to 10 MΩ
- Low temperature coefficient
- Good frequency characteristics
- Excellent stability
- Low zero resistance
- Rack mount option available

**See also:**

- Higher accuracy: **HARS-LX Series**
- Higher power: **HPRS Series**
- Higher resistance: **HRRS Series**
- Higher voltage: **HRRS-5kV** and **HRRS-10kV Series**
- RTD simulators: **RTD Series**
- Programmable models: **PRS Series**

## SPECIFICATIONS

| Resistance per step | Total decade resistance | Max current | Max voltage (per step) | Max power (per step) | Stability (±ppm/yr) | Long-term stability (±ppm/3 yrs) | Temperature coefficient (±ppm/°C) | Resistor type |
|---|---|---|---|---|---|---|---|---|
| **1 mΩ** | 10 mΩ | 8.0 A | 5 mV | 0.04 W | 50 | 75 | 50 | Resistance wire |
| **10 mΩ** | 100 mΩ | 4.0 A | 40 mV | 0.16 W | 50 | 75 | 20 | |
| **100 mΩ** | 1 Ω | 1.6 A | 0.16 V | 0.25 W | 50 | 75 | 20 | |
| **1 Ω** | 10 Ω | 0.8 A | 0.8 V | 0.6 W | 20 | 25 | 20 | Wirewound, non-inductive |
| **10 Ω** | 100 Ω | 0.25 A | 2.5 V | 0.6 W | 20 | 25 | 15 | |
| **100 Ω** | 1 kΩ | 80 mA | 8 V | 0.6 W | 20 | 25 | 5 | |
| **1 kΩ** | 10 kΩ | 23 mA | 23 V | 0.5 W | 20 | 25 | 5 | |
| **10 kΩ** | 100 kΩ | 7 mA | 70 V | 0.5 W | 20 | 25 | 5 | |
| **100 kΩ** | 1 MΩ | 2.3 mA* | 230 V* | 0.5 W* | 20 | 25 | 5 | |
| **1 MΩ** | 10 MΩ | 0.7 mA* | 700 V* | 0.5 W* | 20 | 25 | 5 | |
| **10 MΩ** | 100 MΩ | 0.1 mA* | 1000 V* | 0.1 W* | 50 | 100 | 10 | Metal oxide film |

**Subject to maximum of 2000 V to case*

**Accuracy:**
**≤1 MΩ decades:** ±(0.01% + 2 mΩ)
**10 MΩ decades:** ±0.03%
after subtraction of zero resistance, at 23°C; traceable to SI

**Zero resistance:**
**≤1 MΩ decades:** <1 mΩ per decade at dc
**10 MΩ decade:** ≈3 mΩ at dc

**Max voltage to case:**
2000 V peak

**Terminals:**
Gold-plated, 5-way, tellurium-copper binding posts with low thermal emf and low resistance. Rear outputs are available as an option.

**Connection to units:**
3 binding posts, labeled **HI**, **LO**, and **GND**

-K Option: Kelvin connection is available as an option with 5 binding posts, labeled **HI CURRENT**, **HI SENSE**, **LO SENSE**, **LO CURRENT**, and **GND**

**Switch capacitance:**
<1 pF between contacts

**Environmental conditions:**
**Operating:** 10°C to 40°C
**Storage:** -40°C to 70°C
**Humidity:** < 80% RH

**Zero Inductance (Lo):**
0. 1 μH/decade + 0.2 μH

**Typical Value of Zero Impedance:**
**Zero Resistance (Ro):**
<0.001 Ω/decade at dc
0.04 Ω/decade at 1 MHz
Proportional to square root of frequency above 100 kHz

**Switches:**
Continuous rotation
11 positions marked "0"-"10"
Multiple solid silver-alloy contacts

**Supplied with unit:**
Instruction manual
Calibration Certificate

IET LABS, INC. in the GenRad Tradition
Long Island, NY
www.ietlabs.com
TEL: (516) 334-5959 • EMAIL: info@ietlabs.com

## MECHANICAL SPECIFICATIONS

| Model | Dimensions | Weight |
|---|---|---|
| 3 decade | 31 cm W x 8.9 cm H x 10.2 cm D (12.2" x 3.5" x 4") | 1.7 kg (3.8 lb) |
| 4-5 decade | 37.6 cm W x 8.9 cm H x 10.2 cm D (14.8" x 3.5" x 4") | 2.0 kg (4.3 lb) |
| 6-7 decades | 43.9 cm W x 8.9 cm H x 10.2 cm D (17.3" x 3.5" x 4") | 2.4 kg (5.3 lb) |
| 8-9 decades | 48.3 cm W x 17.8 cm H x 17.8 cm D (19" x 7" x 7") | 3.5 kg (7.7 lb) |
| 10-11 decades | | 3.7 kg (8.1 lb) |

## ORDERING INFORMATION

| Model | Total resistance | Number of decades | Resolution | Historic GR model numbers |
|---|---|---|---|---|
| 1433-01 | 1.11 Ω | 3 | 0.001 Ω | |
| 1433-00 | 111.1 Ω | 4 | 0.01 Ω | 1433-U |
| 1433-02 | 1.111 kΩ | 4 | 0.1 Ω | 1433-K |
| 1433-04 | 11.11 k Ω | 4 | 1 Ω | 1433-J |
| 1433-06 | 111.1 k Ω | 4 | 10 Ω | 1433-L |
| 1433-08 | 1.111 MΩ | 4 | 100 Ω | 1433-Q |
| 1433-09 | 11.11 MΩ | 4 | 1 kΩ | |
| 1433-09A | 111.1 MΩ | 4 | 10 kΩ | |
| 1433-10 | 1.1111 kΩ | 5 | 0.01 Ω | 1433-T |
| 1433-12 | 11.111 kΩ | 5 | 0.1 Ω | 1433-N |
| 1433-14 | 111.11 kΩ | 5 | 1 Ω | 1433-M |
| 1433-16 | 1.1111 M Ω | 5 | 10 Ω | 1433-P |
| 1433-18 | 11.111 MΩ | 5 | 100 Ω | 1433-Y |
| 1433-18A | 111.11 MΩ | 5 | 1 kΩ | |
| 1433-19 | 1.111 11 kΩ | 6 | 0.001 Ω | |
| 1433-20 | 11.1111 kΩ | 6 | 0.01 Ω | 1433-W |
| 1433-22 | 111.111 kΩ | 6 | 0.1 Ω | 1433-X |
| 1433-24 | 1.111 11 MΩ | 6 | 1 Ω | 1433-B |
| 1433-26 | 11.1111 MΩ | 6 | 10 Ω | 1433-Z |
| 1433-27 | 111.111 MΩ | 6 | 100 Ω | |

| Model | Total resistance | Number of decades | Resolution | Historic GR model numbers |
|---|---|---|---|---|
| 1433-28 | 11.111 11 kΩ | 7 | 0.001 Ω | |
| 1433-29 | 111.1111 k Ω | 7 | 0.01 Ω | 1433-F |
| 1433-31 | 1.111 111 MΩ | 7 | 0.1 Ω | 1433-G |
| 1433-33 | 11.111 11 MΩ | 7 | 1 Ω | 1433-H |
| 1433-34 | 111.1111 MΩ | 7 | 10 Ω | |
| 1433-35 | 111.111 11 kΩ | 8 | 0.001 Ω | |
| 1433-36 | 1.111 111 1 MΩ | 8 | 0.01 Ω | |
| 1433-37 | 11.111 111 MΩ | 8 | 0.1 Ω | |
| 1433-38 | 111.111 11 MΩ | 8 | 1 Ω | |
| 1433-39 | 1.111 111 11 MΩ | 9 | 0.001 Ω | |
| 1433-39A | 11.111 111 1 MΩ | 9 | 0.01 Ω | |
| 1433-39B | 111.111 111 MΩ | 9 | 0.1 Ω | |
| 1433-40A | 11.111 111 11 MΩ | 10 | 0.001 Ω | |
| 1433-40 | 111.111 111 1 MΩ | 10 | 0.01 Ω | |
| 1433-41 | 111.111 111 11 MΩ | 11 | 0.001 Ω | |

**Options:**

**1433-50:** Rack Mount Kit (4-dial)
**1433-51:** Rack Mount Kit (5-dial)
**1433-52:** Rack Mount Kit (6 and 7-dial)
**1433-XX-RO:** Rear output binding posts
**1433-XX-K:** Kelvin-type 4-terminal posts and GND