

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



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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 kΩ | 4 | 1 Ω | 1433-J |
| 1433-06 | 111.1 kΩ | 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 MΩ | 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 kΩ | 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

