

## 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



### MECHANICAL SPECIFICATIONS

| Model         | Dimensions  | Weight          |
|---------------|---|-----------------|
| 3 decade      | 31 cm W x 8.9 cm H x 10.2 cm D<br>(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<br>(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<br>(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<br>(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

