

METRAOHM | 413

Low-Resistance Ohmmeter

3-348-810-03
5/7.11

- **Handy measuring instrument per VDE 0413 part 4 / EN 61557-1 / -4**
- **Large measuring range from 0.01 to 1999 k Ω**
- **Measurement cable zero balancing**
- **Compact and durable**
For rugged service calls and laboratory use
- **Overvoltage protection**
Protects the instrument in the event of inadvertent connection to mains voltage
- **Indication of interference voltage**
- **IP 65 protection**

CE



Applications

The **METRAOHM 413** is a battery powered instrument for the measurement of low-value resistances in electrical systems. Large protective conductor, earthing, equipotential bonding and lightning protection systems can also be tested quickly and safely with the **METRAOHM 413**. Resistance is measured between reference earth (e.g. an equipotential bonding strip) and any desired points to this end. A measuring current of 200 mA and automatic functions assure reliable measuring results.

- Adjustment of shunts in instrumentation applications
- Testing of electrical connections at busbars in open-pit mining, in industry and in household applications
- Testing of cable resistance, wiring, shunt resistors in printed circuit boards and thick-film circuits
- Measurement of contact resistance in relays, power contactors and load interrupters
- Measurement of fuse resistance, as well as cable resistance in heavy current circuits
- Testing of coil resistance in transformers, coils, small motors etc.

Description

Easy Operation

Operation is very easy. Measurement cables of almost any length can be used thanks to the offset balancing function. Measurement polarity can be reversed, and both measured values are stored to memory for subsequent comparison. Resultant deviations in the measuring results (e.g. possible galvanic voltages) can thus be recognized.

Offset Balancing

Offset balancing compensates for measurement cable resistance. The offset value is saved to memory and is utilized for all future measurements until balancing is performed once again. The value remains in memory, even after the measuring instrument has been switched off.

A variety of measurement cables with resistances of up to 3.5 Ω can be used.

Protection Against Operator Error

The **METRAOHM 413** is protected against inadvertent connection to devices under test with fault voltages of up to 500 V by means of protective devices.

Interference Voltage Warning

Interference voltage is indicated visually with a red LED, and audibly with an acoustic warning signal. The voltage value is displayed at the LCD as well, as long as the test probe makes contact.

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Applicable Regulations and Standards

IEC 61010-1 DIN EN 61010-1 VDE 0411 Part 1	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements
EN 61557-1 / -4 / VDE 0413 Part 4	Ohmmeters
EN 60529 VDE 0470-1	Test instruments and test procedures Protection provided by enclosures (IP code)
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

Characteristic Values

Measuring ranges	0.01 Ω ... 1999 k Ω
Accuracy	$\pm(1.5\% \text{ rdg.} + 4 \text{ digits})$ at 20 °C
Measuring current	< 10 Ω 200 mA constant > 10 Ω 1 μ A ... 20 mA
Open-circuit voltage	> 4 V

Display

Digital display	LCD, 10 mm high, 3½ places, with background illumination
Overflow indication	by OL
Battery status	indicated by 2 segments on the LCD
External voltage display	for voltages as from approx. 15 V: Alternately, red LED VOLT blinks and symbol – U – appears on the LCD. Numerical display of voltage level, in the case of AC voltage, symbol ~ for AC is additionally shown. Between 15 V and 400 V an intermittent acoustic signal sounds as a warning signal

Ambient Conditions

Reference temp.	20 °C
Storage temperature	-10 °C ... +70 °C
Operating temp.	-10 °C ... +50 °C

Power Supply

Battery	9 volt block battery per IEC 6 LR 61 AIMn, automatic shutdown after 20 seconds of inactivity
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Battery Saving Circuit

The measuring instrument is switched off automatically if none of the keys are activated for a period of approximately 20 seconds.

Electrical Safety

Safety class	II per IEC 61010-1
Test voltage	3.2 kV
Measuring category	CAT II 600 V, CAT III 300 V
Overvoltage protection	reversible by means of semiconductor at nominal voltages of up to 400 V, from 400 to 500 V with special fuse (can only be replaced at the factory)

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326-1:2006 class B
interference immunity	EN 61326-1:2006

Mechanical Design

Housing	impact resistant ABS with unbreakable display cover
Protection	housing: IP 65
Dimensions	60 x 230 x 40 mm
Weight	180 g (including battery)

Standard Equipment

- 1 **METRAOHM 413** low-resistance ohmmeter
- 1 plug-in measuring cable
- 1 9 volt block battery per IEC 6 LR61
- 1 operating instructions

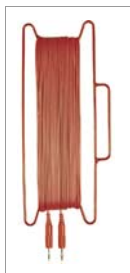
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Accessories

TR25 Reel with Measurement Cable

Reel with 25 m measurement cable.
Cable ends are equipped with banana plugs.



TR50 Drum with Measurement Cable

50 m measurement cable coiled onto a metal drum. Connection to the inside end of the cable is made possible with a socket integrated into the drum. The other end is equipped with a banana plug. The drum axle with handle can be removed for space saving storage.



Order Information

Designation	Type	Article Number
Low-Resistance Ohmmeter	METRAOHM 413	M630A
Reel with 25 m Measurement Cable	TR25	GTZ3303000R0001
Drum with 50 m Measurement Cable	TR50	GTY1040014E34

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