

METRISO G1000A

Analog Insulation, Low Resistance and Voltage Measurement Instrument

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4/9.14

- Insulation measurement per EN 61557-2/VDE 0413, part 2
- Test voltages: 50 V, 100 V, 250 V, 500 V and 1000 V
- Analog display of measured values and limit values
- **Intelligent filter** – precise and measurement-dependent activation for the measurement of very high resistances
- Indication of dangerous touch voltage by means of LED
- Indication of limit value violations by means of LED
- **Detection of interference voltage** in switch position OFF
- **Surge protection:**
protects the instrument in the event of inadvertent connection to mains power
 - Fuse link for all resistance measuring ranges
 - *New* Electronic fuse for the protection of low resistance and resistance measurement
- Voltage measurement to 1000 V
- Low-resistance measurement per EN 61557-4/VDE 0413, part 4
- Guard terminal for compensating surface current
- **Compact and rugged:** for service calls under harsh conditions
- **One measuring point self-test with test resistance of 10 M Ω** per IEC/HD 60364-6 / EN 50110



CAT IV

CE

Applications

The insulation and resistance measuring instrument allows for quick and efficient testing of protective measures in accordance with DIN VDE 0100, ÖVE-EN 1 (Austria), NIV/NIN SEV 1000 (Switzerland), and regulations specific to other countries as well. The instrument complies with IEC/EN 61557 / VDE 0413 regulations:

- Part 1: General requirements
- Part 2: Insulation resistance
- Part 4: Resistance of earth connection, protective conductors and equipotential bonding
- Part 10: Electrical safety in low-voltage systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures

As well as requirements per VDE 0701-0702:
Repair, modification and testing of electrical devices,

The insulation measuring instrument is suitable for the following tasks:

- Measurement of insulation resistance at voltage-free devices and systems, up to 1000 V depending upon variant
- Checking of test objects for absence of voltage in systems with up to 1 kV
- Testing of the resistance of earthing conductors, protective conductors and equipotential bonding
- Testing of electrostatic discharge capacity for floor coverings (using shielded measurement cables) – EN 1081

Intelligent filter

Precise and measurement-dependent activation for the measurement of very high resistances with

- beating, i. e. compensation of 16²/₃ Hz and 50 Hz interference
- attenuation of capacitive influences from power cables, etc.
- suppression of electric field influences

Overview of Included Features

METRISO	G1000A	
Article number	M542A	
Measurements		
R _{INS}	U = 50, 100, 250, 500, 1000 V	✓
R _{LO}	0.17 ... 4 Ω	✓
U	10 ... 1000 V	✓
Display Functions		
Scale illumination	✓	
Limit value LED (green/red) for: additional acoustic signal, limit values per VDE 0100	R _{INS} R _{LO}	
LED for dangerous contact voltage in the off state and for active test voltage	✓	
Battery level display	✓	
Special Functions		
Discharge capacitive devices under test	✓	
Safety shutdown (UBatt < 8 V)	✓	
Features		
Measuring category CAT II 1000 V / CAT III 600 V / CAT IV 300 V	✓	
Test resistor: 10 M Ω	✓	
Factory calibration certificate	✓	

Discharging Capacitive Devices Under Test

Capacitive devices under test such as cables and coils, which may be charged with test voltage, are discharged by the measuring instrument. The falling voltage value can be observed at the display.

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Characteristic Values

Meas. Qty.	Scale / Standard	Measuring Range	Nominal range of use	Nominal / Open-Circuit Voltage	Nominal Current I_N	Short-Circuit Current I_K	Intrinsic Uncertainty under Reference Conditions ²	Measuring Uncertainty ³	Overload Capacity
R_{INS}	② VDE 0413	100 k Ω ... 100 M Ω	100 k Ω ... 10 M Ω	50 V / 100 V: 1.25 U_{ISO} 250 V / 500 V / 1000 V: 1.1 U_{ISO}	1 mA	≤ 5 mA	$\pm 2.5\%$	$\pm 30\%$ of the measured value	1000 V AC/DC TRMS
	①	10 k Ω ... 1 T Ω	100 k Ω ... 100 G Ω				$\pm 2.5\%$ ¹		
R_{LO}	③	0 to 5 Ω	0.17 to 4 Ω ⁴	4 V < U_0 < 6 V	Test current $I_N \geq 200$ mA		$\pm 2.5\%$	$\pm 10\%$ ⁵ of the measured value	1000 V AC/DC TRMS
$U_{AC/DC}$	④	0 ... 1000 V	10 ... 1000 V	—	—	—	$\pm 2.5\%$	—	1000 V AC/DC TRMS
U_{BAT}	⑤	8 ... 12 V	8.5 ... 12 V	—	—	—	—	—	

¹ Accuracy specified here is only achieved with the following optional accessory: "shielded high-resistance measurement cable KS-C (article number Z541F)".

² Relative to scale length:

Scale 1: 83.13 mm

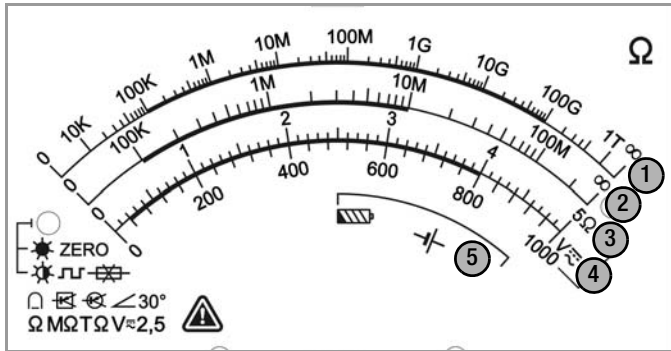
Scale 2: 75.05 mm

Scales 3 and 4: 67.02 mm

³ Within the identified range on the respective scale (nominal range of use)

⁴ with ZERO balancing

⁵ 0.17 ... 2 Ω : $\pm 20\%$



Displays

Analog Display

Measuring movement Moving-coil mechanism with core magnet

Scale length 83.13 mm (longest scale)

Limit LED

LED lights up red to indicate an exceeded limit value
LED lights up green to indicate adherence to the limit value

! LED

LED lights up red to indicate the presence of interference voltage (when instrument is switched off), test voltage during insulation measurement or residual voltage after insulation testing ($U > 50$ V),

Reference Conditions

Reference temperature + 23 °C ± 3 K

Relative atmospheric humidity 40 ... 75%

Measured quantity frequency 45 Hz ... 65 Hz

Measured quantity waveform Sine, deviation between TRMS and rectified value < 1%

Battery voltage 9.5 V ± 0.1 V

Test resistance 10 M Ω $\pm 1\%$

Normal position of use 30°

Power Supply

Batteries

8 ea. 1.5 V mignon cell (8 ea. size AA) (alkaline manganese per IEC LR14) or 8 rechargeable NiMH batteries (must be recharged externally)

Nominal range of use 8.5 ... 12 V

Battery test Battery capacity display via the Bat. TEST key

Battery saver circuit Standby function

Service life For R_{INS} (1000 V / 1 M Ω) and R_{LO} with 20 s on-time and 1 measurement each for a duration of 5 s

– With batteries (alkaline manganese): 900 measurements

– With rechargeable batteries (2000 mAh): 850 measurements

Safety shutdown

If supply voltage is too low, the instrument is switched off, or cannot be switched on.

When the rotary switch is set to the OFF position, the instrument is completely disconnected from the batteries (after approximately 10 seconds).

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Electrical Safety

Standard	
VDE regulation	VDE 0411, part 1, 1994-03
Protection class	II
Pollution degree	2
Measuring category	CAT II 1000 V / CAT III 600 V / CAT IV 300
Fuses	
Fuse link	FF315mA/1000V, effective in all resistance measuring ranges, 1 additional replacement fuse in the battery compartment
Electronic fuse	protects low-resistance measurement R_{LO}

Electromagnetic Compatibility (EMC)

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

Ambient Conditions

Accuracy temp. range	0 ... +40 °C
Operating temperature	-10 ... +50 °C
Storage temp. range	-25 ... +70 °C (without batteries)
Relative humidity	Up to 75% (max. 85% during storage/transport), no condensation allowed
Elevation	Max. 2000 m
Calibration interval	1 year (recommended)

Mechanical Design

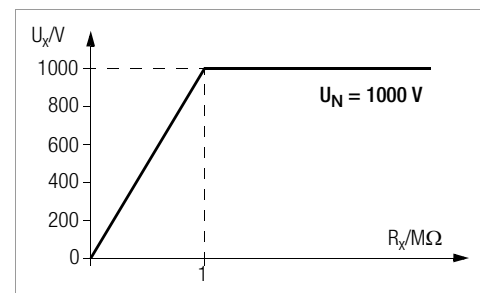
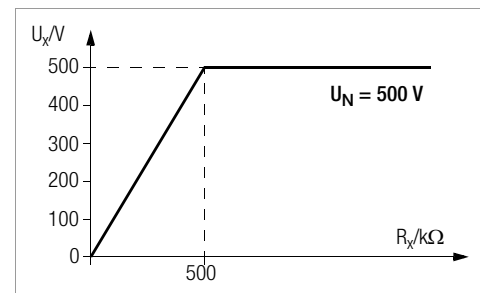
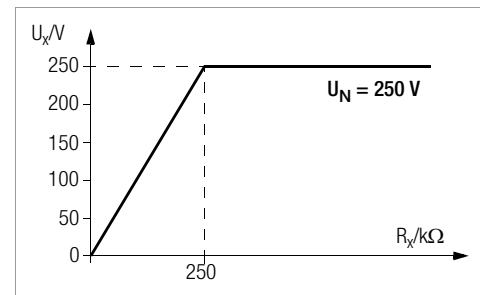
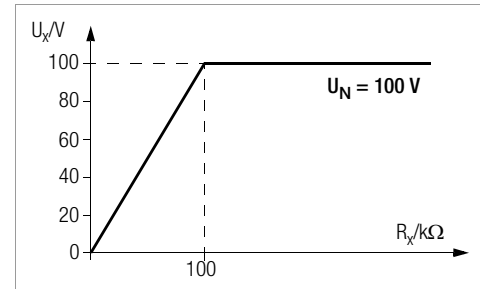
Dimensions	225 x 130 x 140 mm
Weight	Approx. 1.5 kg with batteries
Protection	Housing: IP 52, measurement cables and connectors: IP 40 per DIN VDE 0470, part 1 / EN 60529, housing category 2

Excerpt from Table on the Meaning of IP Codes

IP XY (1 st digit X)	Protection Against Foreign Object Entry	IP XY (2 nd digit Y)	Protection Against Penetration by Water
2	≥ 12.5 mm dia.	2	Dripping (at 15° angle)
3	≥ 2.5 mm dia.	3	Spraying water
4	≥ 1.0 mm dia.	4	Splashing water
5	Dust protected	5	Jet-water
6	Dust-proof	6	Powerful water jets

Voltage at Device Under Test During Insulation Resistance Measurement

Measuring voltage U_x at the device under test depending upon its resistance R_x at nominal voltage $U_N = 50\text{ V}$, 100 V , 250 V , 500 V and 1000 V :



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Applicable Regulations and Standards

IEC 61010-1/ EN 61010-1 VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements (IEC 61010-1:2010 + Cor.:2011); German version of EN 61010-1:2010 Part 31: Safety requirements for hand-held probe assemblies for electrical measurement and test (IEC 61010-031:2002 + A1:2008); German version of EN 61010-031:2002 + A1:2008
IEC 61557/ EN 61557/ VDE 0413	Part 1: General requirements (IEC 61557-1:2007); German version of EN 61557-1:2007 Part 2: Insulation resistance (IEC 61557-2:2007); German version of EN 61557-2:2007 Part 4: Resistance of earth connection and equipotential bonding (IEC 61557-4:2007); German version of EN 61557-4:2007 Part 10: Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures (IEC 61557-10:2000); German version of EN 61557-10:2001
EN 1081	Testing of electrostatic discharge capacity for floor coverings in potentially explosive atmospheres
EN 60529 VDE 0470-1	Test instruments and test procedures Degrees of 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

Scope of Delivery

- 1 Insulation and resistance measuring instrument
- 1 Factory calibration certificate
- 1 Set of batteries
- 1 Carrying strap
- 1 Alligator clip
- 1 KS17-4 cable set
- 1 Condensed operating instructions
- 1 CD ROM with the following content:
 - Complete operating instructions
 - Data sheet

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Accessories (not included)



ISO-Calibrator 1

Calibration adapter for rapid, efficient testing of the accuracy of measuring instruments for insulation resistance and low-value resistors

TR25 Reel



KS-C Cable Set

Cable set consisting of measurement cable and high-resistance measurement cable for measurements in the GΩ range

TR50 Drum with 50m 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. Cable resistance can be compensated for with the rotary selector switch in the R_{LO} position.



KS24 Cable Set

The KS24 cable set includes a 4 m long extension cable with a permanently attached test probe at one end and a contact protected socket at the other end, as well as an alligator clip which can be plugged onto the test probe.



Floor Probe

The 1081 floor probe makes it possible to measure the resistance of insulating floors in accordance with DIN VDE 0100, part 610, and EN 1081.

Telearm 1



Z550A Test Probe for Remote Triggering



