GOSSEN METRAWATT

METRISO | G500/G1000/G500MM

High-Precision
Insulation, Low Resistance and Voltage Measurement Instrument

3-349-607-03
13/8.14

- Insulation measurement per EN 61557-2/VDE 0413, part 2
- Digital and analog display, backlit
- Indication of dangerous contact voltage LED
- **Acoustic** signalling when limit value is exceeded
- **Detection of interference voltage** in switch position OFF*
- **Overvoltage 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 R_{LO} and R
- **Compact and rugged** for service calls under harsh conditions

METRISO G1000: Voltage testing and measurement up to 1000 V

METRISO G500/G1000:

– **Intelligent filter:** precise and measurement-dependent activation for the measurement of very high resistances
– Low-resistance measurement per EN 61557-4/VDE 0413, part 4
– **One measuring point self-test with test resistance of 10 MΩ** per IEC/HD 60364-6 / EN 50110

* not METRISO G500MM (M550K)

CAT IV

DAkkS
German Accreditation Body
D-K-15080-01-01
DAkkS Calibration Certificate as Standard Feature

Applications

METRISO G500/G1000 as well as **METRISO G500MM** insulation and resistance measuring instruments allow for quick and effective 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 instruments are equipped with a microprocessor and comply with IEC/EN 61557 / VDE 0413 regulations:
Part 1: General requirements
Part 2: Insulation resistance measuring instruments
Part 4: Instruments for measuring resistance at earthing conductors, protective conductors and equipotential bonding
Part 10: Combined measuring equipment for testing, measuring or monitoring protective measures

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

The insulation measuring instruments are suitable for the following tasks:

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

Features Overview of Both Instrument Variants

METRISO		G1000	G500	G500MM
Article number		**M550C**	**M550D**	**M550K**
Measurements				
RISO	U = 1000 V	✓	—	—
RISO	U = 50, 100, 250, 500 V	✓	✓	✓
R	10 Ω ... 10 kΩ	✓	✓	✓
RLO	0.01 Ω ... 10 Ω	✓	✓	—
U	0 ... 1000 V	✓	—	—
U	0 ... 500 V	✓	✓	✓
Display Functions				
Backlit display		✓	✓	✓
Limit value LED (green/red) for: Additional acoustic signal, limit value per VDE 0100		R_{ISO} R_{LO}	R_{ISO} R_{LO}	R_{ISO}
LED for dangerous contact voltage (when switched off)		✓	✓	—
LCD symbol for external voltage		✓	✓	✓
Battery level display		✓	✓	✓
Special Functions				
Discharge capacitive devices under test		✓	✓	✓
Safety shutdown (UBatt < 8 V)		✓	✓	✓
Features				
Measuring categories CAT II 1000 V / CAT III 600 V / CAT IV 300 V		✓	—	—
Measuring category CAT III 600 V / CAT IV 300 V		✓	✓	✓
10 MΩ test resistor		✓	✓	

High-Precision Insulation, Low Resistance and Voltage Measurement Instrument

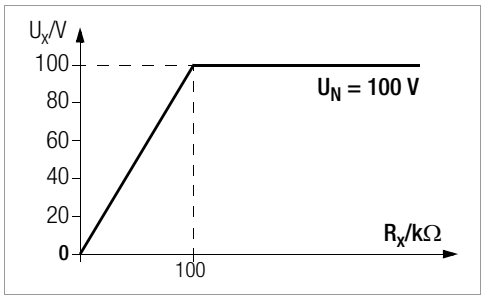
Characteristic Values

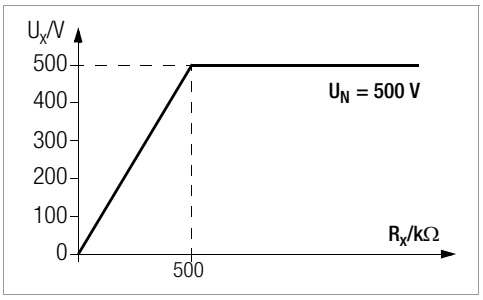
Meas. Qty.	UiSO				Range	Measuring Range	Reso-lution	Open-Circuit Voltage U_{0max}	Test Current	Intrinsic Uncertainty	Measuring Uncertainty	Overload Capacity
RISO	50 V	100 V	G500(MM): 250 V / 500 V	G1000: 250 V / 500 V / 1000 V	100 k	10.0 kΩ ... 99.9 kΩ	0.1 k	50 V/100 V: 1.25 U_{ISO} 250 V / 500 V / 1000 V: 1.1 U_{ISO}	I_N = 1 mA I_K ≤ 5 mA	±(5% rdg. + 3 d)	±(7% rdg. + 3 d)	**METRISO G500(MM)**: 600 V AC/DC TRMS **METRISO G1000**: 1000 V AC/DC TRMS
					1 M	100 kΩ ... 999 kΩ	1 k					
					10 M	1.00 MΩ ... 9.99 MΩ	10 k					
					100 M	10.0 MΩ ... 99.9 MΩ	100 k					
					1 G	100 MΩ ... 999 MΩ	1 M					
					10 G	1.00 GΩ ... 9.99 GΩ	10 M					
					100 G	10.0 GΩ ... 99.9 GΩ	100 M			±(8% rdg. + 3 d) [3]	±(10% rdg. + 3 d) [3]	
					200 G	100 GΩ ... 199 GΩ	1 G			±(25% rdg. + 5 d) [3]	±(50% rdg. + 20 d) [3] [4]	
U AC/DC	**METRISO G500** **METRISO G500MM**				100 V	10.0 V ... 99.9 V	0.1 V	—		±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	600 V AC/DC TRMS
					500 V	100 V ... 510 V [1]	1 V					
	METRISO G1000				100 V	10.0 V ... 99.9 V	0.1 V	—		±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	1000 V AC/DC TRMS
					1000 V	100 V ... 999 V [2]	1 V					
RLO	**METRISO G500** **METRISO G1000**				10 Ω	0.17 ... 9.99 Ω	0.01 Ω	4 V < U_0 < 6 V	200 mA ≤ I I ≤ 260 mA	±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	**METRISO G1000**: 1000 V AC/DC TRMS **METRISO G500**: 600 V AC/DC TRMS
R	Display range as of 01.0 Ω				100 Ω	10.0 ... 99.9 Ω	0.1 Ω	U_0 max. 15 V	1 mA ≤ I I ≤ 1,3 mA	±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	**METRISO G1000**: 1000 V AC/DC TRMS **METRISO G500(MM)**: 600 V AC/DC TRMS
					1 kΩ	100 ... 999 Ω	1 Ω					
					10 kΩ	1.00 ... 9.99 kΩ	10 Ω					

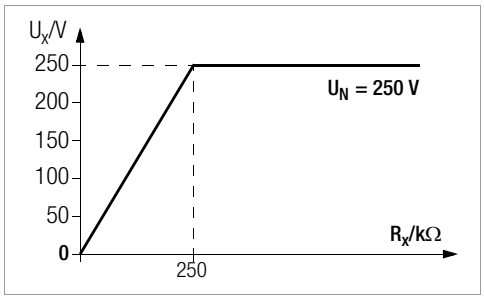
[1] Display range up to 600 V
[2] Display range up to 1.2 kV
[3] the indicated accuracy is only achieved with the shielded high-resistance measuring cable KS-C (article no. Z541F)"
[4] does not conform to DIN EN 61557-2
[5] up to 5 Ω

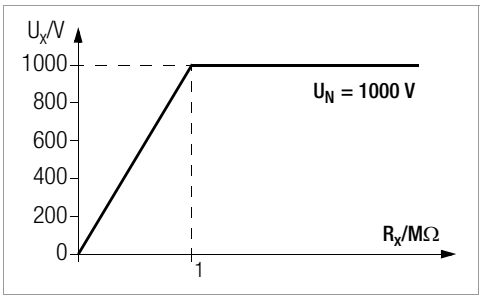
Voltage at Device Under Test During Insulation Resistance Measurement

Measuring voltage Ux at the device under test depending upon its resistance Rx at nominal voltages of 100, 250, 500 and 1000 V:









Intelligent Filter

Measurement-dependent and precise activation for the measurement of very high resistances with:

- beating, i. e. compensation of $16^2/_3$ Hz and 50 Hz interference

Reference Conditions

Reference temperature	+ 23 °C ±3 K
Relative humidity	40 ... 75%
Measured quantity frequency	45 Hz ... 65 Hz
Measured quantity waveshape	Sine, deviation between TRMS and rectified value < 1%
Battery voltage	9.5 V ±0.1 V
Test resistor	10 MΩ ±1%

Electrical Safety

Protection class	II
Pollution degree	2
Measuring category	G1000: CAT II 1000 V / CAT III 600 V / CAT IV 300 V G500/G500MM: CAT III 600 V / CAT IV 300 V
Fuses	
Fuse link	FF315mA/1000V, effective in all resistance measuring ranges, 1 additional replacement fuse in the battery compartment
Elektronic fuse	for protecting low-resistance and resistance measurement R_{LO} and R (not METRISO G500MM (M550K))

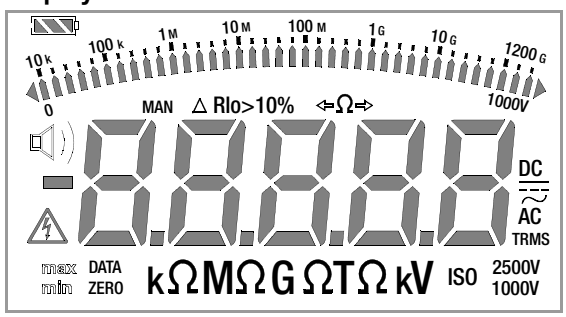
Ambient Conditions

Accuracy temperature 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)

Electromagnetic Compatibility (EMC)

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

Displays



Digital Display	With additional bar graphs or pointer depending on selection with *A.dı SP* parameter, backlit (transflective); leading zeros can be suppressed at the digital display depending on selection with *0.dı SP* parameter; overranging indicated with *OL* at display; dimensions: 65 x 36 mm **Cable resistance** If measurement results for the two directions of current flow (polarity reversal) differ by more than 10% (this corresponds to typical measuring error for the instruments), both measured values are displayed next to each other with reduced resolution.
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 an **external voltage** bevore insulation testing (U > 50 V) with the device switched on or off – the presence of the **test/measuring voltage** during (insulation) measurement (U > 50 V) the presence of a **residual voltage** after insulation testing (U > 50 V) with the device switched on or off
⚡ at LCD	Detection of external voltage at the LCD with the device switched on where U DC > 50 V and U AC > 40 V (50 Hz) for all measuring functions

Mechanical Design

Dimensions	225 x 130 x 140 mm
Weight	Approx. 1.4 kg with batteries
Protection	Housing: IP 52, measurement cables and connectors: IP 40 per DIN VDE 0470, part 1 / EN 60529, housing category 2

Extract from table on the meaning of IP codes

IP XY (1st digit X)	Protection Against Foreign Object Entry	IP XY (2nd 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

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Power Supply

Batteries	8 ea. 1.5 V mignon cell (8 ea. size AA) (alkaline manganese per IEC LR14)
Nominal range of use	8.5 ... 12 V
Battery test	Battery capacity display with battery symbol in 4 segments: ▭. Querying of momentary battery voltage via menu function.
Battery saver circuit	Automatic shutdown of display illumination after 15 second s (after the last time the rotary switch is actuated) can be set via the bLi GHt parameter. The test instrument is automatically switched to the standby mode* when the measured value remains unchanged and none of the controls are activated during this time. * Specified time "APoFF" (entered in minutes) adjustable via SETUP menu (default setting approx. 10 min).
Service life	For R_{INS} (1000 V / 1 MΩ) and RLO with 20 seconds on-time and 1 measurement each for a duration of 5 seconds: – With batteries (alkaline manganese): 900 measurements – With rechargeable batteries (2200 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).

Applicable Regulations and Standards

IEC 61010-1 / EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements	
DIN EN 61557 / VDE0413	Part 1:2007-12 Part 2:2008-02 Part 4:2007-12 Part 10: 2001-12	General requirements Insulation resistance measuring instruments Instruments for measuring resistance at earthing conductors, protective conductors and equipotential bonding Combined measuring equipment for testing, measuring or monitoring protective measures
EN 1081	Testing of electrostatic discharge capacity for floor coverings in potentially explosive atmospheres	
EN 60529 VDE 0470, part 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 DAkkS calibration certificate
1 Set batteries
1 Carrying strap
1 Alligator clip (not METRISO G500MM (M550K))
1 KS17-4 cable set
1 Condensed operating instructions
1 CD ROM with the following content:
– Comprehensive operating instructions (English and German)
– Data sheet

Accessories (not included)

ISO Kalibrator 1

Calibration adapter for the rapid, efficient testing of the accuracy of measuring instruments for insulation resistanced and low-impedance resistances.

Cable Set KS-C

Cable set consisting of measurement cable and high resistance measuring cable, for measurements in the G-Ω range.

Cable Set KS24

Cable set KS 24 consists of a 4 m long extension cable with a permanently mounted test probe at one end and a contact protected socket at the opposite end, as well as an alligator clip for plugging onto the test probe.

Telearm 1

Floor Probe

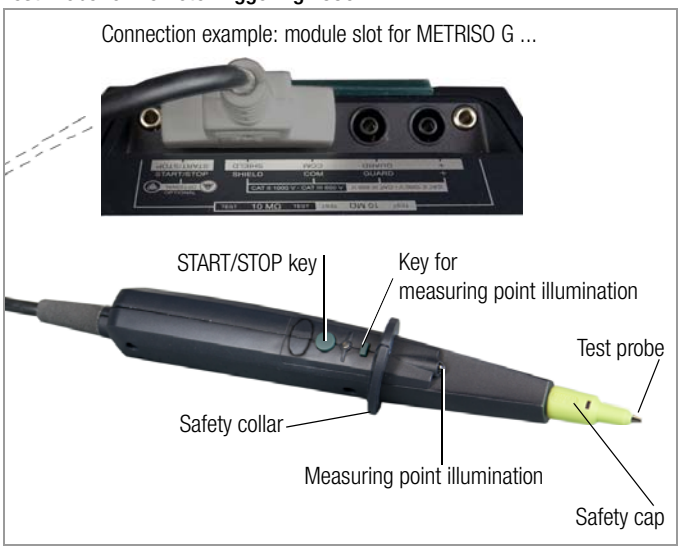
The 1081 floor probe can be used for measuring the resistance of insulating floors in accordance with DIN VDE 0100 Part 600 and EN 1081.

Reel TR25

Drum with Measurement Cable TR50

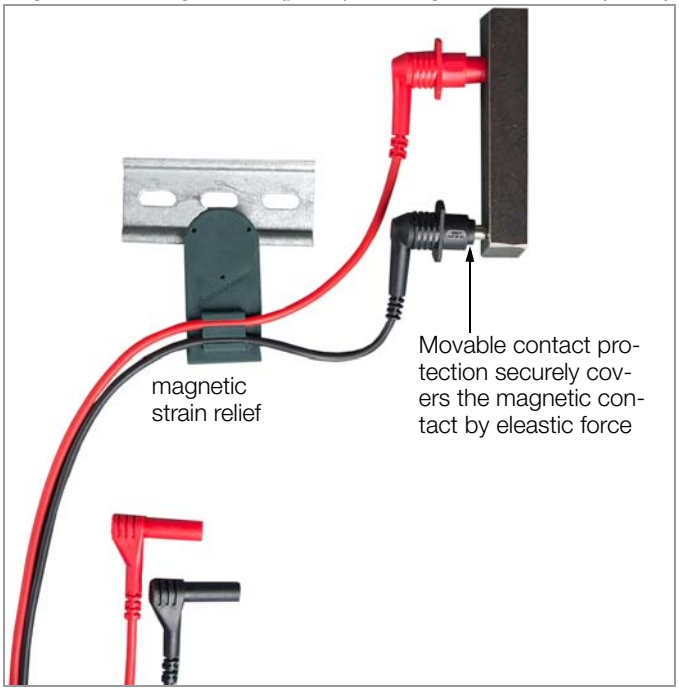
50m measurement cable coilded around a metal drum. Connection to one end of the cable is accomplished with a jack which is integrated into the drum. The other end is equipped with a banana plug. The drum axle with handle can be removed for space saving storage.
Cable resistance component can be compensated for in selector switch position R_{LO}.

Test Probe for Remote Triggering Z550A



The test probe with integrated control module allows for remote triggering in areas with difficult access or in situations which require your full attention. Poorly lit measuring points can be ilumi-nated with the integrated test probe lighting. The connection cable is shielded from interfering influences.

Magnetic measuring contacts (patent) with magnetic strain relief (Z502U)



METRISO | G500/G1000/G500MM

High-Precision
Insulation, Low Resistance and Voltage Measurement Instrument

Operating Case METRISO G (Z550C)

Order Information

Description	Type	Article number
Insulation measuring instrument for DIN VDE 0100, ÖVE-EN 1 (Austria) and NIV/NIN SEV 1000 (Switzerland), complies with IEC/EN 61 557/VDE 0413, parts 1, 2, 4 and 10		
Test voltages to 1000 V, voltage measurement to 1000 V, including low-resistance measurement	**METRISO G1000**	M550C
METRISO G1000 (M550C) inclusive Test Probe for Remote Triggering (Z550A) and Operating Case (Z550C)	**METRISO G1000-Set**	M550G
Test voltages to 500 V, voltage measurement to 500 V, including low-resistance measurement	**METRISO G500**	M550D
METRISO G500 (M550D) inclusive Test Probe for Remote Triggering (Z550A) and Operating Case (Z550C)	**METRISO G500-Set**	M550H
Test voltage up to 500 V, voltage measurement up to 500 V	**METRISO G500MM**	M550K
METRISO G500MM (M550K) inclusive Test Probe for Remote Triggering (Z550A) and Operating Case (Z550C)	**METRISO G500MM-Set**	M550J
Accessories (not included)		
Calibration adapter for testing the accuracy of instruments used for measuring insulation resistance and low-resistance for test voltages of up to 1000 V (per VDE 0413, parts 1, 2 and 4).	ISO calibrator 1	M662A
Cable set consisting of measurement cable and shielded high-resistance measurement cable for measurements in the GΩ range	KS-C	Z541F
Alligator clips (1 pair) for KS17-4 and KS-C	KY-95-3	Z110J
Cable set consisting of a 4 m long extension cable with a permanently attached test probe at one end and a contact protected socket at the other end, and 2 alligator clips which can be plugged onto the test probe	KS24	GTZ3201000R0001
Triangular probe for floor measurements per EN 1081, DIN VDE 0100-600 (Standing-Surface Insulation)	1081 probe	GTZ3196000R0001
Telescoping rod for PE measurement	Telearm 1	GTZ3232000R0001
Reel with 25 m measurement cable	TR25 reel	GTZ3303000R0001
Drum with 50 m measurement cable	TR50 drum	GTY1040014E34
Test probe with START/STOP key and an additional key for illuminating the measuring point, including shielded cable and test probe holder for carrying belt	Test Probe for Remote Triggering METRISO G	Z550A
1 guard lead and 1 crocodile clip (not for METRISO G500MM (M550K))	Guard 5000A	Z580C
Magnetic Measuring contacts with contact protection – Set with magnetic holder, measurement contacts 5,5 mm in diameter insulated, CAT III 1.000 V / 4 A, temperature between –10 °C and 60 °C, under standard conditions and flat-head screws holding force 1.200 g vertical to contact area; measuring instrument connector: angled multilam plug according (for METRISO G series)	Set 1 – Magnetic Measuring Tips	Z502U
Operating case for METRISO G500(MM)/G1000(+) with outer bag for measuring leads	Operating Case METRISO G	Z550C