

METRISO PRIME10

High-Precision Insulation, Low-Resistance and Voltage Meter

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- **Insulation measurement** per EN 61557-2/VDE 0413, part 2
- Test voltage in fixed steps:
50 V, 100 V, 250 V, 500 V, 1000 V, 2500 V, 5000 V, 10,000 V
- Measurement with incrementally rising voltage
- Measuring range up to 40 TΩ per IEC 61557-2
- Measurement of polarization index and absorption ratio
- Measurement with shielded measurement cable
- Protection against voltage conducting objects
- Variable adjustment of limit values
- Digital filter for stabilizing measured values
- Creation of R/I or R/U diagrams
- Storage of test results
- **Low-resistance measurement** per EN 61557-4/VDE 0413, part 4, continuity testing of protective conductors and equipotential bonding connections with a test current of > 200 mA
- USB interface for transferring data to a PC

CAT IV

CE



Applications

- Continuous display of measured insulation resistance or leakage current
- Automatic discharging of the device under test at the end of insulation testing
- Acoustic signal at 5 second intervals for quick generation of a time-resistance characteristic
- Adjustable measuring times of up to 99'59"
- Test times T1, T2 and T3 for measuring one or two absorption coefficients within a range of 1 to 600 s
- Polarization index (PI), absorption coefficients Ab1 and Ab2, dielectric absorption ratio (DAR)
- Display of momentarily applied test voltage during measurement
- Test current: 1.2 mA, 3 mA and 5 mA
- Insulation testing by means of 2 or 3-wire method
- Measurement can be conducted with measurement cables with lengths of up to 55 meters
- Automatic measurement of multi-core cables with the optional AutoISO-5000 test adapter (max. voltage: 5 kV)
- Capacitance measurement during RINS insulation test
- Measurement of temperature with probe as accessory
- Dielectric discharge (DD)
- Fault localization by means of pulse control mode
- Adjustable limit values for measured resistance values for R_{INS} and R_{CONT}
- Measurement of leakage current during insulation test
- Direct and alternating voltage measurement from 0 to 750 V

- Graphic representation of insulation resistance at the display during measurement
- New memory structure with storage of measuring points, systems and customer data
- Use of a miniature Bluetooth keyboard (optional)
- 5.6" LCD display with background illumination
- Keyboard illumination
- Mains operation or with rechargeable lithium-ion battery
- Internal quick charger

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 General requirements Part 2:2008-02 Insulation resistance measuring instruments Part 4:2007-12 Resistance of earth connection and equipotential bonding Part 10: 2014-03 Combined measuring equipment for testing, measuring or monitoring protective measures |
| 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 |

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Characteristic Values

Alternating/Direct Voltage Measurement

| Displayed Range | Resolution | Intrinsic Uncertainty |
|--------------------|------------|------------------------|
| 0.0 V ... 29.9 V | 0.1 V | ±(2% rdg. + 20 digits) |
| 30.0 V ... 299.9 V | 0.1 V | ±(2% rdg. + 6 digits) |
| 300 V ... 750 V | 1 V | ±(2% rdg. + 2 digits) |

- Frequency range: 45 ... 65 Hz

Insulation Resistance Measurement

Test voltage accuracy ($R_{\text{obs}} [\Omega] \geq 1000 \cdot U_N [V]$):
-0, +10% of the selected value

Measuring range per IEC 61557-2:

$U_N = 10,000 \text{ V}$: 10.0 M Ω ... 40.0 T Ω

Measurement with Rising Alternating Voltage with AutoISO-5000 ($U_{\text{INS}} \leq 5 \text{ kV}$)

| Displayed Range | Resolution | Intrinsic Uncertainty |
|--|-----------------|---------------------------|
| 000 k Ω ... 999 k Ω | 1 k Ω | ±(3% rdg. + 10 digits) |
| 1.00 M Ω ... 9.99 M Ω | 0.01 M Ω | |
| 10.0 M Ω ... 9.9 M Ω | 0.1 M Ω | |
| 100 M Ω ... 999 M Ω | 1 M Ω | |
| 1.00 G Ω ... 9.99 G Ω | 0.01 G Ω | |
| 10.0 G Ω ... 99.9 G Ω | 0.1 G Ω | ±(3.5% rdg. + 10 digits) |
| 100 G Ω ... 999 G Ω | 1 G Ω | |
| 1.00 T Ω ... 9.99 T Ω | 0.01 T Ω | ±(7.5% rdg. + 10 digits) |
| 10.0 T Ω ... 40.0 T Ω where $U_N = 10 \text{ kV}$ | 0.1 T Ω | ±(12.5% rdg. + 10 digits) |

Intrinsic uncertainty can be calculated for all other voltages using the following formula:

$$\delta_R = \pm(3\% + (U_{\text{INS}} / (U_{\text{INS}} - R_{\text{zm}} \cdot 21 \cdot 10^{-12}) - 1) \cdot 100\%) \pm 10 \text{ digits}$$

Where:

U_{INS} = selected test voltage [V]

R_{zm} = measured resistance [Ω]

Maximum values for measured resistance depend on the selected test voltage. See following list:

| Voltage | Measuring Range | Measuring Range for AutoISO-5000 |
|---------|-----------------|----------------------------------|
| 50 V | 200 G Ω | 20.0 G Ω |
| 100 V | 400 G Ω | 40.0 G Ω |
| 250 V | 1.00 T Ω | 100 G Ω |
| 500 V | 2.00 T Ω | 200 G Ω |
| 1000 V | 4.00 T Ω | 400 G Ω |
| 2500 V | 10.0 T Ω | 400 G Ω |
| 5000 V | 20.0 T Ω | 400 G Ω |
| 10000 V | 40.0 T Ω | |

Note: No degree of accuracy is specified for the $R_{\text{INS}0\text{min}}$ measurement because the test instrument conducts this measurement with a selectable test current. This results in the following calculation:

$$R_{\text{ISO min}} = \frac{U_{\text{ISO nom}}}{I_{\text{ISO nom}}}$$

Where:

$R_{\text{INS}0\text{min}}$ = minimum insulation resistance measured without current limiting

$U_{\text{INS}0\text{nom}}$ = nominal test voltage

$I_{\text{INS}0\text{nom}}$ = nominal test current (1.2, 3 or 5 mA)

- Additional intrinsic uncertainty of 3-wire measurement (caused by "G" connection): 0.05% caused by reduced leakage current via 250 k Ω resistor with a measurement via 100 M Ω and a test voltage of 50 V
- Max. short-circuit current: 6 mA ±15%
- Remaining charge at objects depends on test current: 1.2, 3, 5 mA

Measurements with AutoISO-5000

| Displayed Range | Resolution | Intrinsic Uncertainty |
|--|-----------------|--|
| 000 k Ω ... 999 k Ω | 1 k Ω | ±(3% rdg. + 10 digits) due to the tester ± 1% additional uncertainty due to the AutoISO-5000 |
| 1.00 M Ω ... 9.99 M Ω | 0.01 M Ω | |
| 10.0 M Ω ... 99.9 M Ω | 0.1 M Ω | |
| 100 M Ω ... 999 M Ω | 1 M Ω | |
| 1.00 G Ω ... 9.99 G Ω | 0.01 G Ω | |
| 10.0 G Ω ... 99.9 G Ω | 0.1 G Ω | ±(3% rdg. + 10 digits) due to the tester ± 5% additional uncertainty due to the AutoISO-5000 |
| 100 G Ω ... up to the value at which additional uncertainty of the AutoISO-5000 amounts to 5% | 1 G Ω | |

Leakage Current Measurement

| Displayed Range | Resolution | Intrinsic Uncertainty |
|-----------------|------------|-----------------------|
| 0 ... 1.2 mA | * | ** |
| 0 ... 3 mA | | |
| 0 ... 5 mA | | |

* The measurement's resolution and electrical unit of measure result from the measuring range and the individual insulation resistance value.

** Calculation is based on the resistance measurement.

Capacitance Measurement

| Displayed Range | Resolution | Intrinsic Uncertainty |
|--------------------------------|--------------|-----------------------|
| 0 nF ... 999 nF | 1 nF | ±(5% rdg. + 5 digits) |
| 1.00 μ F ... 49.99 μ F | 0.01 μ F | |

- Capacitance measurements are conducted during RISO measurements (while the device under test is being discharged).
- Intrinsic uncertainty of the measurement corresponds to a measured capacitance value and a resistance of greater than 10 M Ω connected in parallel.
- No measuring error has been defined for measuring voltages of less than 100 V.
- Cable length L is calculated as C/C_x , and intrinsic uncertainty depends on the measuring range.
- Time constant TC is calculated as $R_{\text{ins}} \cdot C$, and intrinsic uncertainty depends on the measuring range.

High-Precision Insulation, Low-Resistance and Voltage Meter

Protective Conductor and Equipotential Bonding Conductor Measurements with ± 200 mA Test Current

Measuring range per IEC 61557-4: 0.12 Ω ... 999 Ω

| Displayed Range | Resolution | Intrinsic Uncertainty |
|----------------------------------|---------------|--|
| 0.00 Ω ... 19.99 Ω | 0.01 Ω | $\pm(2\% \text{ rdg.} + 3 \text{ digits})$ |
| 20.0 Ω ... 199.9 Ω | 0.1 Ω | |
| 200 Ω ... 999 Ω | 1 Ω | $\pm(4\% \text{ rdg.} + 3 \text{ digits})$ |

- Voltage with open connections: 4 V ... 24 V
- Output current where $R < 15 \Omega$: min. 200 mA (I_{SC} : 200 mA ... 250 mA).
- Measuring current flows bidirectionally, average resistance appears at the display.
- Compensation of measurement cables by means of offset balancing

Temperature Measurement with sensor Z555J

| Displayed Range | Resolution | Intrinsic Uncertainty |
|------------------------------------|------------------------|---|
| -40.0 ... 99.9 $^{\circ}\text{C}$ | 0.1 $^{\circ}\text{C}$ | $\pm(3\% \text{ rdg.} + 8 \text{ digits})$ |
| -40.0 ... 211.8 $^{\circ}\text{F}$ | 0.1 $^{\circ}\text{F}$ | $\pm(3\% \text{ rdg.} + 16 \text{ digits})$ |

Reference Conditions

| | |
|-----------------------------|---|
| Reference temperature | +23 $^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$ |
| Relative humidity | 40% ... 60% |
| Measured quantity frequency | 45 Hz ... 65 Hz |
| Measured quantity waveform | Sinusoidal |
| Battery voltage | Lithium-ion, 14.8 V, 5.3 Ah |

Electrical Safety

| | |
|---------------------|--|
| Protection category | II (double, compliant with EN 61010-1 and IEC 61557) |
| Pollution degree | 2 |
| Measuring category: | CAT IV 600 V (CAT III 1000 V) per IEC 61010-1 |

Power Supply

| | |
|----------------------|---|
| Rechargeable battery | Lithium-ion, 14.8 V, 5.3 Ah, permanently installed |
| Battery test | Yes |
| Energy content | 78 Wh Number of R_{INS} measurements per EN 61557-2 with battery operation: at least 1000 measurements |
| Mains power | 90 ... 260 V, 50/60 Hz, 178 W |
| Safety shutdown | < 11 V |

Ambient Conditions

| | |
|-----------------------|--|
| Operating temp. range | -20 $^{\circ}\text{C}$...+50 $^{\circ}\text{C}$ |
| Storage temp. range | -25 $^{\circ}\text{C}$...+70 $^{\circ}\text{C}$ |
| Relative humidity | 20% ... 80%, no condensation allowed |
| Elevation | ≤ 3000 m |

Electromagnetic Compatibility (EMC)

| | |
|-----------------------|---|
| Interference emission | EN 61326-1:2013, class A |
| Interference immunity | EN 61326-1:2013 EN 61326-2-2:2013 ≤ 8 mA |

Display Devices

| | |
|---------|---------------------|
| Display | LCD segment display |
|---------|---------------------|

Mechanical Design

| | |
|------------|--|
| Dimensions | 390 x 310 x 180 mm |
| Weight | Approx. 7 kg |
| Protection | Per EN 60529 IP 40 (IP 67 for closed housing) |

Excerpt from Table on the Meaning of IP Codes

| IP XY (1 st digit X) | Protection Against Foreign Object Ingress | IP XY (2 nd digit Y) | Protection Against Water Ingress |
|---------------------------------|---|---------------------------------|----------------------------------|
| 0 | Not protected | 0 | Not protected |
| 1 | ≥ 50.0 mm dia. | 1 | Vertically falling droplets |
| 2 | ≥ 12.5 mm dia. | 2 | Dripping (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 |
| | | 7 | Occasional submersion |

Scope of Delivery

- 1 **METRISO PRIME 10**
- 1 Set of measurement cables consisting of:
 - 11 kV cable, 3 m, (CAT IV 1000 V), with banana plug sockets, red
 - 11 kV cable, 3 m, shielded, (CAT IV 1000 V), with banana plug sockets, black
 - 10 kV "E" cable, 3 m, (CAT IV 1000 V), with banana plug sockets, blue
- 3 Alligator clips, 11 kV, 32 A (CAT IV 1000 V), black, red and blue
- 2 Test probes, 5.5 kV, 32 A with banana plug socket, red and black
- 1 Temperature probe (Z555J)
- 1 USB cable
- 1 Power cable, 230 V
- 1 Accessories pouch
- 1 Set of operating instructions
- 1 Calibration certificate
- 1 Safety data sheet
- 1 Transport document for lithium-ion batteries
- 1 Supplement safety information on measuring accessories

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Accessories (not scope of supply)

Measurement lead MCABLE-10m-black (Z5550)



Measurement lead MCABLE-10m-red (Z555P)



Measurement lead MCABLE-10m-blue (Z555R)



Test adapter AutoISO-5000 (Z555Z)

Measurement leads with safety plugs and alligator clips inclusive



METRISO PRIME10

High-Precision Insulation, Low-Resistance and Voltage Meter

Backpack for METRISO PRIME 10 measuring instrument and accessories (Z556K)
(Tester/Case not inclusive)



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Order Information

| Description | Type | Article Number |
|---|-------------------------|----------------|
| Measurement of insulation resistance up to 40 TΩ, freely selectable test voltage from 50 to 10,000 V, auto-ranging, automatic capacitance discharging, PI / DAR, adjustable time interval, 1.2, 3 or 5 mA test current, capacitance and temperature measurement, calculation of dielectric discharging DD, digital filter, low-resistance measurement, voltage measurement from 0 to 750 V AC/DC, adjustable limit values, graphic LCD, memory management, CAT IV 600 V, IP 40, measuring case with accessories | METRISO PRIME 10 | M555A |
| Accessory Measurement Cables | | |
| 10 kV measurement lead, CAT IV 1000 V, 3 m, red, 4 mm safety plugs | MCABLE-3m-red | Z555A |
| 10 kV measurement lead, CAT IV 1000 V, 3 m, black, 4 mm safety plugs | MCABLE-3m-black | Z555B |
| 10 kV E measurement lead, CAT IV 1000 V, 3 m, blue, 4 mm safety plugs | E-MCABLE-3m-blue | Z555C |
| 10 kV measurement lead, CAT IV 1000 V, shielded, 5 m, black, 4 mm safety plugs | MCABLE-5m-black | Z555L |
| 10 kV measurement lead, CAT IV 1000 V, 5 m, red, 4 mm safety plugs | MCABLE-5m-red | Z555M |
| 10 kV measurement lead, CAT IV 1000 V, 5 m, blue, 4 mm safety plugs | MCABLE-5m-blue | Z555N |
| 10 kV measurement lead, CAT IV 1000 V, shielded, 10 m, black, 4 mm safety plugs | MCABLE-10m-black | Z555O |
| 10 kV measurement lead, CAT IV 1000 V, 10 m, red, 4 mm safety plugs | MCABLE-10m-red | Z555P |
| 10 kV measurement lead, CAT IV 1000 V, 10 m, blue, 4 mm safety plugs | MCABLE-10m-blue | Z555R |
| 10 kV measurement lead, CAT IV 1000 V, shielded, 20 m, black, 4 mm safety plugs | MCABLE-20m-black | Z555S |
| 10 kV measurement lead, CAT IV 1000 V, 20 m, red, 4 mm safety plugs | MCABLE-20m-red | Z555T |
| 10 kV measurement lead, CAT IV 1000 V, 20 m, blue, 4 mm safety plugs | MCABLE-20m-blue | Z555U |
| 10 kV measurement cable, CAT IV 1000 V, shielded, 55 m, black, 4 mm safety plugs | MCABLE-10KV-black | Z556M |
| 10 kV measurement cable, CAT IV 1000 V, shielded, 55 m, red, 4 mm safety plugs | MCABLE-10KV-red | Z556N |

| Description | Type | Article Number |
|--|------------------------------------|----------------|
| 10 kV measurement cable, CAT IV 1000 V, shielded, 55 m, blue, 4 mm safety plugs | MCABLE-10KV-blue | Z556O |
| Accessory Test Probes and Alligator Clips | | |
| 5.5 kV test probe, banana plug socket, red | PINPROBE-red | Z555G |
| 5.5 kV test probe, banana plug socket, black | PINPROBE-black | Z555H |
| 5.5 kV alligator clip, CAT IV 1000 V, blue | CROCODILECLIP-blue | Z555D |
| 5.5 kV alligator clip, CAT IV 1000 V, red | CROCODILECLIP-red | Z555E |
| 5.5 kV alligator clip, CAT IV 1000 V, black | CROCODILECLIP-black | Z555F |
| 5.5 kV alligator clip, CAT IV 1000 V, yellow | CROCODILECLIP-yellow | Z556L |
| Accessory Adapters and Sensors | | |
| Test adapter for METRISO PRIME 10 measuring instrument, permits automated test sequence for insulation measurement at multi-core cables | AutoISO-5000 | Z555Z |
| METRISO PRIME 10 temperature probe with 2 m connector cable | Temperature probe METRISO PRIME 10 | Z555J |
| Accessories Pouch | | |
| Universal carrying pouch for accessories | CASE METRISO PRIME 10 | Z555K |
| Backpack for METRISO PRIME 10 measuring instrument and accessories | METRISO PRIME 10 Backpack | Z556K |

For additional information regarding accessories please refer to:

- www.gossenmetrawatt.com

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