GOSSEN METRAWATT

METRISO PRIME10

High-Precision Insulation, Low-Resistance and Voltage Meter

3-349-923-03
6/9.19

- **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} und 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

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_{obc} [Ω] ≥ 1000 • U_N [V]):
-0, +10% of the selected value

Measuring range per IEC 61557-2:
U_N = 10,000 V: 10.0 MΩ ... 40.0 TΩ

Measurement with Rising Alternating Voltage with AutoISO-5000 (U_{INS} ≤ 5 kV)

Displayed Range	Resolution	Intrinsic Uncertainty
000 kΩ ... 999 kΩ	1 kΩ	±(3% rdg. + 10 digits)
1.00 MΩ ... 9.99 MΩ	0.01 MΩ	
10.0 MΩ ... 9.9 MΩ	0.1 MΩ	
100 MΩ ... 999 MΩ	1 MΩ	
1.00 GΩ ... 9.99 GΩ	0.01 GΩ	
10.0 GΩ ... 99.9 GΩ	0.1 GΩ	
100 GΩ ... 999 GΩ	1 GΩ	±(3.5% rdg. + 10 digits)
1.00 TΩ ... 9.99 TΩ	0.01 TΩ	±(7.5% rdg. + 10 digits)
10.0 TΩ ... 40.0 TΩ where U_N = 10 kV	0.1 TΩ	±(12.5% rdg. + 10 digits)

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

$\delta_R = \pm(3\% + (UINS/(U_{INS}\text{-}R_{zm} \bullet 21 \bullet 10^{-12})\text{-}1) \bullet 100\%) \pm 10$ 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 GΩ	20.0 GΩ
100 V	400 GΩ	40.0 GΩ
250 V	1.00 TΩ	100 GΩ
500 V	2.00 TΩ	200 GΩ
1000 V	4.00 TΩ	400 GΩ
2500 V	10.0 TΩ	400 GΩ
5000 V	20.0 TΩ	400 GΩ
10000 V	40.0 TΩ	

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

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

Where:

R_{INSmin} = minimum insulation resistance measured without current limiting
U_{INSnom} = nominal test voltage
I_{INSnom} = 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 kΩ resistor with a measurement via 100 MΩ 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 kΩ ... 999 kΩ	1 kΩ	±(3% rdg. + 10 digits) due to the tester ± 1% additional uncertainty due to the AutoISO-5000
1.00 MΩ ... 9.99 MΩ	0.01 MΩ	
10.0 MΩ ... 99.9 MΩ	0.1 MΩ	
100 MΩ ... 999 MΩ	1 MΩ	
1.00 GΩ ... 9.99 GΩ	0.01 GΩ	
10.0 GΩ ... 99.9 GΩ	0.1 GΩ	
100 GΩ ... up to the value at which additional uncertainty of the AutoISO-5000 amounts to 5%	1 GΩ	±(3% rdg. + 10 digits) due to the tester ± 5% additional uncertainty due to the AutoISO-5000

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 µF ... 49.99 µF	0.01 µF	

- 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 MΩ connected in parallel.
- No measuring error has been defined for measuring voltages of less than 100 V.
- Cable length L is calculated as C/Cx, and intrinsic uncertainty depends on the measuring range.
- Time constant TC is calculated as Rins • C, and intrinsic uncertainty depends on the measuring range.

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	±(2% rdg. + 3 digits)
20.0 Ω ... 199.9 Ω	0.1 Ω	
200 Ω ... 999 Ω	1 Ω	±(4% rdg. + 3 digits)

- Voltage with open connections: 4 V ... 24 V
- Output current where R < 15 Ω: 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 °C	0.1 °C	±(3% rdg. + 8 digits)
-40.0 ... 211.8 °F	0.1 °F	±(3% rdg. + 16 digits)

Reference Conditions

Reference temperature	+23 °C ±2 °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 °C...+50 °C
Storage temp. range	-25 °C...+70 °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 (1st digit X)	Protection Against Foreign Object Ingress	IP XY (2nd 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

METRISO PRIME10

High-Precision Insulation, Low-Resistance and Voltage Meter

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



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



METRISO PRIME10

High-Precision Insulation, Low-Resistance and Voltage Meter

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
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*