

METRISO[®] 500D/1000D/1000IR Insulation Tester with Digital Display

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Features

- Digital and analog display
- Warning in event of dangerous contact voltage
- Quick test with signal lamp in the test probe
- Low-resistance measurement per VDE 0413 Part 4/EN 61557-4
- Voltage measurement to 500 V (500D) or 1000 V (1000D)

Applications

The insulation testers are suitable for the following tasks:

- Measurement of insulation resistance at voltage-free devices and systems, up to 1000 V depending upon model
- Resistance testing at earthing, protective and equipotential bonding conductors
- Testing of devices for absence of voltage
- Testing of discharge capacity for floor coverings in explosive atmospheres with reference to electrostatic charging (METRISO[®]1000D)



Insulation Resistance Measurement

Insulation resistance can be measured within 7 measuring ranges, depending upon model up to 3 GΩ.

Quick Test for Insulation Resistance

As long as the signal lamp at the test probe is illuminated, insulation resistance is in compliance with values set forth in DIN VDE 0100. At the same time, the lamp serves to illuminate the measuring point or the display.

Low-Resistance Measurement

Low-value resistance at earthing, protective and equipotential bonding conductors, as well as their connections and terminals, can be measured within a range of 0 to 30 Ω. Interference voltages are detected by means of test voltage polarity reversal as required by the standards. Polarity reversal can be performed automatically or manually.

Quick Low-Resistance Testing

The signal lamp in the test probe lights up to indicate measured values of less than 0.3 Ω.

Voltage Measurement to 500 V or 1000 V

Devices under test can be tested for the absence of voltage with the voltage measuring range. This is important for resistance measurement, because interference voltages distort measurement results.

Discharging Capacitive Devices Under Test

Capacitive devices under test such as cables and coils, which may become charged with open-circuit voltage, are discharged by the measuring instrument. The falling voltage level is indicated by the pointer at the quasi-analog display.

Display

The measured value is displayed both digitally and in analog format. The entire scale range (6 decades) is displayed logarithmically at the analog display for automatic measuring range selection, and the selected range is displayed in linear fashion for manual measuring range selection.

Save Display Value

The displayed measurement value can be saved to temporary memory, and can thus be frozen at the display (HOLD function) for easy reading.

Automatic / Manual Measuring Range Selection

The measuring range is automatically adapted to the measured value for insulation resistance measurements. If desired, the measuring range can also be selected manually.

Warning in the Event of Dangerous Contact Voltage

As soon as a dangerous contact voltage is applied to the measurement cables, a warning symbol appears at the display – even if the instrument is switched off.

METRISO® 500D/1000D/1000IR

Insulation Tester with Digital Display

Measurement in Accordance with the Standards

The instrument allows for measurement in accordance with DIN VDE 0100, 0105, 0190, 0701, 0702 and DIN 51953 (METRISO®1000D).

Applicable Regulations and Standards

| | |
|---|---|
| IEC/EN 61010-1 VDE 0411-1 | Safety requirements for electrical equipment for measurement, control and laboratory use |
| IEC 61557 EN 61557 VDE 0413 Part 1 Part 2 Part 4 | Devices for testing, measuring and monitoring protective safety measures in systems with voltages of up to 1000 VAC and 1500 VDC – General requirements – Insulation resistance measuring instruments – Low-resistance measuring instruments |
| DIN EN 50081 Part 1 | Generic standard for interference emission: residential, business and light industry |
| DIN EN 50082 Part 1 | Generic standard for interference immunity: residential, business and light industry |
| EN 60529 DIN VDE 0470 Part 1 | Test instruments and test procedures, protection provided by enclosures (IP code) |
| DIN EN 60051 | Direct acting and indicating electrical measuring instruments and their accessories |

Characteristic Values

Insulation Resistance

| Measuring Range | Resolution | Intrinsic Error ± (... % of reading + ... digits) | | |
|-----------------|------------|--|------------------------|---------------------------------|
| | | U _N = 100 V | U _N = 250 V | U _N = 500 V / 1000 V |
| 30 kΩ | 10 Ω | 1.5 + 2 | 1.5 + 2 | 1.5 + 2 |
| 300 kΩ | 100 Ω | 1.5 + 2 | 1.5 + 2 | 1.5 + 2 |
| 3 MΩ | 1 kΩ | 1.5 + 2 | 1.5 + 2 | 1.5 + 2 |
| 30 MΩ | 10 kΩ | 1.5 + 2 | 1.5 + 2 | 1.5 + 2 |
| 300 MΩ | 100 kΩ | 3.0 + 2 | 1.5 + 2 | 1.5 + 2 |
| 3 GΩ | 10 MΩ | 20.0 + 2 | 3.0 + 2 | 3.0 + 2 |
| 30 GΩ * | 100 MΩ | — | — | 20.0 + 2 |

* METRISO®1000D(IR) only

| Nominal Voltage, U _N | 100 V | 250 V | 500 V | 1000 V |
|---------------------------------------|----------|----------|----------|----------|
| 500D | — | — | • | — |
| 1000D | • | — | • | • |
| 1000IR | — | • | • | • |
| Nominal Current, I _N | 1.0 mA | 1.0 mA | 1.0 mA | 1.0 mA |
| Open-Circuit Voltage, U ₀ | ≤ 110 V | ≤ 225 V | ≤ 550 V | ≤ 1100 V |
| Short-Circuit Current, I _K | ≤ 2 mA | ≤ 2 mA | ≤ 2 mA | ≤ 2 mA |
| Lamp ON for R _X | > 220 kΩ | > 550 kΩ | > 1.1 MΩ | > 2.2 MΩ |
| Measuring Error (100 kΩ ... 100 MΩ) | ± 5% | ± 5% | ± 3% | ± 4% |

Low-Resistance Measurement (e.g. cable resistance)

| Measuring Range Upper Limit | Resolution | Intrinsic Error ± (... % of reading + ... digits) |
|---------------------------------------|------------|--|
| Digital: 30 Ω | 0.01 Ω | 1.5 + 5 |
| Analog: 3 Ω | 0.05 Ω | |
| Open-Circuit Voltage, U ₀ | 4.5 V | |
| Short-Circuit Current, I _K | 250 mA | |
| Lamp ON for R _X | < 0.3 Ω | |
| Measuring Error ±10% (0.3 Ω ... 30 Ω) | | |

Direct and Alternating Voltage

| Measuring Range Upper Limit | Resolution | | Intrinsic Error ± (... % of reading + ... digits) | |
|---|---|-----------|--|-----------|
| | 500D | 1000D(IR) | 500D | 1000D(IR) |
| 500 V | 1 V | — | 1,5 + 2 | — |
| 1000 V | — | 1 V | — | 2,0 + 2 |
| Internal Resistance, R _i / Measuring Error | | | | |
| | 500D | | 1000D(IR) | |
| | 480 kΩ ± 25 kΩ ± 3% (50 V ... 500 V) | | 880 kΩ ± 50 kΩ ± 3.5% (50 V ... 1000 V) | |

Overload Capacity

| | 500D | 1000D(IR) |
|-----------------------|---------------|----------------|
| Insulation Resistance | AC / DC 600 V | AC / DC 1200 V |
| Cable Resistance | 315 mA | 315 mA |
| Voltage | AC / DC 600 V | AC / DC 1200 V |

Display

Analog

| | |
|-------------------|---|
| Display | LCD scale with pointer |
| Scale Length | 78 mm |
| Scaling | 61 graduations – logarithmic for automatic measuring range selection, – linear for manual measuring range selection |
| Overrange Display | triangle symbol |

Digital

| | |
|-------------------|----------------------|
| Display | 7 segment characters |
| Character Height | 14 mm |
| Number of Places | 3¾ ± 0 to 3000 steps |
| Overrange Display | "OL" appears |

Cable Resistance

If the measurement results in both directions (polarity reversal) deviate from one another by more than 10% (max. allowable measuring error) both measurement values are displayed next to each other with reduced resolution.

Reference Conditions

| | |
|---------------------|--|
| Ambient Temperature | + 23 °C ± 2 K |
| Relative Humidity | 45% ... 55% |
| Measured Quantity | |
| Frequency | 45 Hz ... 65 Hz |
| Measured Quantity | |
| Waveshape | ≤ 0.5% deviation between effective and rectified value |
| Battery Voltage | 9 V ± 0.5 V |

METRISO[®] 500D/1000D/1000IR Insulation Tester with Digital Display

Influence Quantities and Influence Error

| Influence Quantity / Sphere of Influence | Measured Quantity | | Influence Error ± (... % of reading + ... digits) | |
|---|---|---------------------|--|---|
| | 500D | 1000D (IR) | 500D | 1000D (IR) |
| Temperature | Indicated influence error valid per 10 K temperature change | | | |
| 0 °C ... 21 °C and 25 °C ... 40 °C | 3 GΩ | 3 GΩ | 2.0 + 2 | 2.0 + 2 |
| | — | 30 GΩ | — | 5.0 + 2 |
| | All other measuring ranges | | 0.5 + 2 | 0.5 + 2 |
| Auxiliary Voltage | | | | |
| 6 V ... < 8.5 V | — | 30 kΩ ... 300 MΩ | — | 0.5 + 2 where U _N =100 V /500 V 1.0 + 2 where U _N =1000 V |
| | 3 GΩ | 3 GΩ | 2.0 + 2 where U _N =500 V | 2.0 + 2 where U _N =100 V /500 V 5.0 + 2 where U _N =1000 V |
| | — | 30 GΩ | — | 10.0 + 2 |
| | All other measuring ranges | | 0.5 + 2 | 0.5 + 2 |
| Frequency | | | | |
| 25 Hz ... < 45 Hz and > 65 Hz ... 1 kHz | Alternating voltage | | 0.5 + 2 | 1.0 + 2 |

Power Supply

Batteries

6 ea. 1.5 V single-cell battery,
alkaline-manganese per IEC LR20,
zinc-carbon per IEC R20

Service Life

for insulation resistance measurement
where U_N = 500 V:

METRISO[®]500D:
18,000 measurements
with alkaline-manganese batteries
9000 measurements with zinc-carbon

METRISO[®]1000D:
10,000 measurements
with alkaline-manganese batteries
5000 measurements with zinc-carbon

METRISO[®]1000IR:
10,000 measurements
with alkaline-manganese batteries
5000 measurements with zinc-carbon

Battery Test

Battery voltage can be displayed under
operating conditions.

Battery Saving Circuit

The instrument is automatically switched
to stand-by three minutes after the last key
or rotary switch operation.

Fuses

Cable Resistance Measuring Range

METRISO[®]500D: FF 0.315/500 V
METRISO[®]1000D: FF 0.315/1000 V
METRISO[®]1000IR: FF 0.315/1000 V

Electrical Safety

Test Voltage 4 kV

Nominal Insulation
Voltage

METRISO[®]500D: 600 V
METRISO[®]1000D: 1000 V
METRISO[®]1000IR: 1000 V

Safety Class

II

Electromagnetic Compatibility (EMC)

Interference Emission EN 50081-1: 1992

Interference Immunity EN 50082-1: 1997

Mechanical Design

Protection housing: IP 52
test probes: IP 20

Dimensions 165 mm x 125 mm x 110 mm
(without measurement cables)

Weight 1.85 kg (with batteries)

Ambient Conditions

Working Temperature 0 °C ... + 40 °C

Operating Temp. – 10 °C ... + 55 °C

Storage Temperature – 25 °C ... + 70 °C (without batteries)

Relative Humidity max. 75%, no condensation allowed

Elevation to 2000 m

Standard Equipment

- 1 insulation tester (with permanently connected measurement cables)
- 2 plug-on alligator clips
- 1 carrying strap with 2 test probe holsters
- 1 set of batteries (6 single-cell batteries)
- 1 operating instructions
- 1 replacement fuse

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Accessories

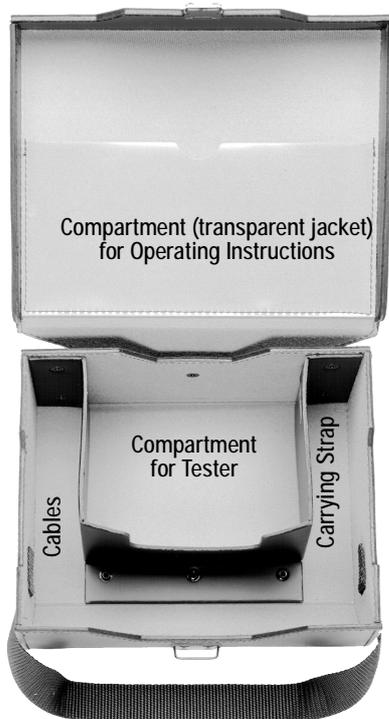
1081 Triangle Probe for Floor Measurements

The three-footed, metallic measuring electrode can be used for:

- Determining the electrical resistance of elastic floor coverings in accordance with EN 1081
- Measuring resistance at insulating floor coverings and insulating walls in accordance with DIN VDE 0100, part 610



F837 Ever-Ready Case



Training

We offer interesting seminars in German with practical experience concerning "Protective Measures in Power Installations and Devices". Operation of the METRISO®500D and the METRISO®1000D is also covered in detail in these seminars, as are currently required DIN VDE measurements.

Order Information

| Description | Type | Article Number |
|--|------------------|--------------------|
| Insulation tester | METRISO®500D | GTM 5040 000 R0001 |
| Insulation tester | METRISO®1000D | GTM 5050 000 R0001 |
| Insulation tester | METRISO®1000IR | GTM 5050 000 R0002 |
| Ever-ready case for all above listed insulation testers | F837 | GTZ 3312 000 R0001 |
| Telescoping rod for PE measurements | Telearm 1 | GTZ 3232 000 R0001 |
| Reel with 25 m measurement cable | TR25 reel | GTZ 3303 000 R0001 |
| Drum with 50 m measurement cable | TR50 drum | GTY 1040 014 E34 |
| Cable set for insulation tester | KS24 | GTZ 3201 000 R0001 |
| Floor measurement triangle probe, recommended for METRISO®1000D | 1081 | GTZ 3196 000 R0001 |
| Calibration adapter for testing the accuracy of measuring instruments used for insulation resistance and low-resistance for measuring voltages of up to 1000 V | ISO-Kalibrator 1 | M662A |

Please refer to our *Measuring Instruments and Testers Catalog* for additional information concerning accessories.

Carrying Strap with 2 Test Probe Holsters (included)



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