**Features**

**Test Voltages to 5000 V**

The instrument is suitable for non-destructive measurement of insulation resistance in electrical systems, as well as in machines, transformers, cables and electrical equipment utilized in, for example, locomotives, street cars and ocean going vessels with selectable test voltages of up to 5 kV.

**Voltage Measurement to 1000 V**

Testing for absence of voltage at the device under test in systems of up to 1 kV can be performed with the voltage measuring range.

**Discharging Capacitive Devices Under Test**

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

**Measurements per EN 61557 Parts 1 and 2 (VDE 0413)**

Nominal current amounts to 1 mA at a test voltage of 100 V, 250 V, 500 V or 1000 V.

**Highly Insulated Measurement Cables**

The highly insulated measurement cables are permanently connected for safety reasons, and due to technical measuring considerations. Danger resulting from inadvertently disconnected cables, for example in the event of charging caused by capacitive devices under test, is thus avoided.

**Polarization Index**

A polarization index test is recommended for electrical machines. This procedure involves expanded testing of insulation resistance. DC measuring voltage from the METRISO PRIME+ is applied to the insulation for a duration of 10 minutes. Measured values are documented after one minute, and after ten minutes. If the insulation is good, the value measured after ten minutes is higher than the value measured after one minute. The relationship between the two measurement values is the polarization index. Charged material within the insulation is aligned due to the application of measuring voltage over a long period of time, resulting in polarization. The polarization index indicates whether or not the charged material contained in the insulation can still be moved, thus allowing for polarization. This, in turn, is an indication of the condition of the insulation.

**Data Management and Report Generation**

The data of each measurement can be stored under a selected object number. Furthermore, a description for this object can be entered via the keyboard of the optional PSI module (Feature I1). The data management function allows for individual measurement data of a previously selected object to be displayed and to be deleted if required, or for previously entered objects to be deleted. Depending on the number of stored objects (max. 254), up to 1,600 measurements can be stored. The current memory occupancy is continuously displayed as a bar graph. Report data can be printed out at an external printer with Centronics interface via PSI module (Feature I1) or via printer adapter DA-II (accessory). Furthermore, it is possible to create report templates at a PC which can be downloaded to the test instrument.
Metriso Prime+
Digital High-Voltage Insulation Tester

Characteristic Values

Measuring Ranges:
Standard: DIN EN 61557-1:2007
DIN EN 61557-2:2008
VDE Regulation: VDE 0413-1:2007
VDE 0413-2:2008

Insulation Resistance

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 M ... 50.0 G</td>
<td>0.60 M ... 10.0 G</td>
<td>100 V ... 250 V</td>
<td>±(7% rdg. + 6 d)</td>
<td>±(10% rdg. + 8 d)</td>
</tr>
<tr>
<td>&gt; 10.0 G ... 50.0 G</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.00 M ... 250 G</td>
<td>0.40 M ... 50.0 G</td>
<td>250 V ... 1.00 kV</td>
<td>±(7% rdg. + 6 d)</td>
<td>±(10% rdg. + 8 d)</td>
</tr>
<tr>
<td>&gt; 50.0 G ... 250 G</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.00 M ... 999 G</td>
<td>0.40 M ... 200 G</td>
<td>1.00 kV ... 5.00 kV</td>
<td>±(7% rdg. + 6 d)</td>
<td>±(10% rdg. + 8 d)</td>
</tr>
<tr>
<td>&gt; 200 G ... 999 G</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test duration: automatic (until measured value is stable), manual (1 to 120 s) or continuous measurement (lock function)

Polarization Index (PI), Absorption Ratio (DAR)

<table>
<thead>
<tr>
<th>PI</th>
<th>0.10 ... 4.00</th>
<th>DAR</th>
<th>0.10 ... 9.80</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1 [min]</td>
<td>0.00 ... 99.50</td>
<td>t2 [min]</td>
<td>0.00 ... 99.50</td>
</tr>
</tbody>
</table>

PI and DAR are calculated values. The specifications of the insulation measurement are applicable.

Insulation Test Voltage

<table>
<thead>
<tr>
<th>Nominal Values of Test Voltage</th>
<th>Variable Test Voltage</th>
<th>Nominal Current</th>
<th>Intrinsic Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 V ... 250 V, 500 V, 1.00 kV</td>
<td>≥ 1.0 mA</td>
<td>0 ... +25% rdg.</td>
<td></td>
</tr>
<tr>
<td>1.50 kV, 2.00 kV, 2.50 kV</td>
<td>≥ 0.4 mA</td>
<td>± 5% rdg.</td>
<td></td>
</tr>
<tr>
<td>5.00 kV</td>
<td>≥ 0.1 mA</td>
<td>± 3.5% rdg.</td>
<td></td>
</tr>
<tr>
<td>1.00 kV</td>
<td>≥ 1.0 mA</td>
<td>± 15% rdg.</td>
<td></td>
</tr>
<tr>
<td>&gt; 1.00 kV, 2.50 kV</td>
<td>≥ 0.4 mA</td>
<td>± 5% rdg.</td>
<td></td>
</tr>
<tr>
<td>&gt; 2.50 kV, 5.00 kV</td>
<td>≥ 0.1 mA</td>
<td>± 3.5% rdg.</td>
<td></td>
</tr>
</tbody>
</table>

Variable test voltages are adjustable in increments of 50 V
Short-circuit current up to 1.00 kV, test voltage ≤ 2 mA

Voltage Measurement

<table>
<thead>
<tr>
<th>Frequency [Hz]</th>
<th>Impedance [MΩ]</th>
<th>Intrinsic Uncertainty</th>
<th>Measuring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>test voltage dc</td>
<td>50 V ... 5.00 kV</td>
<td>—</td>
<td>±(2.5% rdg. + 2 d)</td>
</tr>
<tr>
<td>50 V ... 1.00 kV ac/dc</td>
<td>15 ... 500</td>
<td>1 MΩ</td>
<td>±(2.5% rdg. + 2 d)</td>
</tr>
<tr>
<td>50 V ... 1.00 kV ac/dc</td>
<td>&gt;500 ... 1 k</td>
<td>1 MΩ</td>
<td>±(10% rdg. + 2 d)</td>
</tr>
</tbody>
</table>

Frequency Measurement

<table>
<thead>
<tr>
<th>Frequency [Hz]</th>
<th>Impedance [MΩ]</th>
<th>Intrinsic Uncertainty</th>
<th>Measuring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0 Hz ... 1.00 kHz</td>
<td>1 MΩ</td>
<td>±(0.5% rdg. + 2 d)</td>
<td>±(1% rdg. + 2 d)</td>
</tr>
</tbody>
</table>

Voltage of measuring quantity: 50 V ... 1 kV

Breakdown Voltage

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Setting Range</th>
<th>Intrinsic Uncertainty</th>
<th>Measuring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range</td>
<td>100 ... 5000 V</td>
<td>±(10% rdg. + 8 d)</td>
<td>±(15% rdg. + 10 d)</td>
</tr>
<tr>
<td>Rise time</td>
<td>5 ... 300 s</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Measuring time</td>
<td>1 ... 120 s / auto / cont. measurement</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Capacitance Measurement

<table>
<thead>
<tr>
<th>Display Range</th>
<th>Measuring Range</th>
<th>Test Voltage</th>
<th>Intrinsic Uncertainty</th>
<th>Measuring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00...10.0 µF</td>
<td>0.10...5.00 µF</td>
<td>100...450 V</td>
<td>±(10% rdg. + 5 d)</td>
<td>±(15% rdg. + 8 d)</td>
</tr>
<tr>
<td>500...5.0 kV</td>
<td></td>
<td>±(5% rdg. + 5 d)</td>
<td></td>
<td>±(10% rdg. + 8 d)</td>
</tr>
</tbody>
</table>

Dielectric Discharge (DD)

<table>
<thead>
<tr>
<th>DD</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10 ... 2.00 ... 9.80</td>
<td></td>
</tr>
</tbody>
</table>

Reference Conditions

Ambient temperature: +23 °C ± 2 K
Relative humidity: 40 ... 60%
Measured quantity frequency: 50 Hz ± 10 Hz (during voltage measurement)
Line voltage waveshape: Sinusoidal, deviation between RMS and rectified value < 1 %

Power Supply Metriso Prime+

Line voltage: 207 V ... 253 V / 49 Hz ... 61 Hz
or (depending on country-specific version)
Feature A43: 108 V ... 132 V / 59 Hz ... 61 Hz
Power consumption: < 18 VA
Storage batteries: NiMH 9.6 V, 3 Ah, charging period 6 hours
Number of measurements: 700
Ambient Conditions

Accuracy: 0 °C ... + 40 °C
Operating temperature: −5 °C ... + 40 °C
Storage temperature: −20 °C ... + 60 °C (without batteries)
Relative humidity: max. 75%, no condensation allowed
Elevation: to 2000 m
Deployment: indoors, outdoors: only in the specified ambient conditions
METRISO PRIME+
Digital High-Voltage Insulation Tester

Electrical Safety

Standard
- IEC 61010-1: 2010
- DIN EN 61010-1: 2011
- VDE 0411-1-1:2011

Pollution degree 2

Protection
- IP 40

METRISO PRIME+
Measuring category
- Insulation measurement – 5000 V DC – no overvoltage
- Voltage measurement – 1000 V CAT II
- 600 V CAT III, 300 V CAT IV

Safety class II

Electromagnetic Compatibility (EMC)

METRISO PRIME+

Product standard
- EN 61326-1:2006

Interference Emission
- EN 55022: Class A

Interference Immunity
- Test Value
- EN 61000-4-2: Contact/Air - 4 kV/8 kV
- EN 61000-4-3: 10 V/m
- EN 61000-4-4: Mains Connection - 2 kV
- EN 61000-4-5: Mains Connection - 1 kV
- EN 61000-4-6: Mains Connection - 3 V
- EN 61000-4-11: 0.5 Period / 100%

Mechanical Design METRISO PRIME+

Display
- Multiple display with dot matrix
- 128 x 64 pixels

Dimensions
- W x H x D:
- 255 mm x 133 mm x 240 mm

Weight
- approx. 5 kg with batteries

Voltage applied to DUT during Insulation Resistance Test

Measuring voltage \( U \) on DUT as a function of its resistance \( R_x \) at nominal voltages of 100 V, 500 V, 1000 V, 2400 V and 5000 V:
METRISO PRIME+
Digital High-Voltage Insulation Tester

List of Available Features

<table>
<thead>
<tr>
<th>Features</th>
<th>0</th>
<th>01</th>
<th>02</th>
<th>04</th>
<th>05</th>
<th>07</th>
<th>10</th>
<th>15</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country version (user interface language / mains plug type)</td>
<td>A</td>
<td>D</td>
<td>GB</td>
<td>FRA</td>
<td>NL</td>
<td>ESP</td>
<td>ITA</td>
<td>D</td>
<td>CH</td>
</tr>
<tr>
<td>Storage batteries</td>
<td>C</td>
<td>w/o</td>
<td>wth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Guard 5000A” Measuring cable</td>
<td>G</td>
<td>w/o</td>
<td>wth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“LEADEX 5000” extension cable</td>
<td>H</td>
<td>w/o</td>
<td>wth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SECUTEST PSI printer module</td>
<td>I</td>
<td>w/o</td>
<td>wth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specify the designation of the basic M5000 instrument in your order, as well as any features which deviate from feature number 0!

Example of a complete type designation (= article number, = order code) for a METRISO PRIME+:
- Test instrument for German speaking countries with DAkkS calibration certificate* and SECUTEST PSI printer module:
  M5000 A01

* The test instrument can be recalibrated by our calibration service at any time.
We recommend a calibration interval of 1 to 2 years.

Included with Basic Instrument
1. high-voltage insulation measuring instrument with permanently connected measurement cables and test probes,
2. alligator clips (5 kV version)
3. mains power cable and 1 interface cable
4. operating instructions

Report Generating Options
Up-to-date PC software (free starter program or demo software for data management, as well as report and list generation) can be downloaded from our website.

Interface cable Z3241 is required for communication between test instrument and PC.
General Features and Accessories

**Feature I1: SECUTEST ®PSI**

Values measured by the test instrument can be printed from the PSI module and comments can be added with the alphanumeric keypad. The LCD at the test instrument is used as a display for the PSI module. The PSI module is mounted inside the lid of the test instrument in a space-saving fashion.

For additional information see our data sheet for the SECUTEST ®PSI.

**ISO Calibrator 1 (M662A)**

Calibration adapter for testing the accuracy of measurement instruments for insulation resistance and low impedance resistance for test voltages of up to 1000 V.

Order Information

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital high-voltage insulation measuring instrument (basic instrument) – see table on page 4 for features and add-ons</td>
<td>METRISO PRIME+</td>
<td>M5000</td>
</tr>
<tr>
<td>Standard type available from stock, M5000 with Features A01, C1 and E1</td>
<td>M5000-V001</td>
<td>M5000-V001</td>
</tr>
</tbody>
</table>

**PC Analysis Software**

- [http://www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)

  (° Products → Software → Electrical Testing → ETC)

**Accessories**

- Guard cable (1.65 m) with plug and alligator clips
  - Guard 5000A
  - Z580C
- 5 m extension cable
  - Leadex 5000
  - Z580D
- PSI module including 2 rolls recording chart, 1 printer ribbon cartridge, batteries and operating instructions
  - SECUTEST ®PSI
  - GTM5016000R0001
- Interface cable RS232, 2 m
  - Z3241
  - GTZ3241000R0001
- Pack of 10 recording chart rolls for PSI module (1 roll approx. 6.7 meters)
  - PS-10P
  - GTZ3229000R0001
- Pack of 10 printer ribbon cartridges for PSI module
  - Z3210
  - GTZ3210000R0001
- 2 alligator clips (5 kV version)
  - KY 5000A
  - Z580B
- Calibration adapter for test voltages of up to 1000 V
  - ISO Calibrator 1
  - M662A

[°] Data sheet available

For further information on accessory equipment please refer to:
- our „Measuring Instruments and Testers“ catalog
- our website [www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)
Examples of Menu-driven Operation

**Test Selection**

- Insulation Test
- Polarisation Index Test
- Withstand/Breakdown Capacitance
- Voltage Measurement

**Setting of Parameters**

- **Insulation Test**: Setting 2.86 GΩ, < 25 V
- **Polarisation Index Test**: PI 5.21, DAR 2.01
- **Measurement of Breakdown Voltage**: U₀ 600 V, Uₜₑˢᵗ 240 V
- **Capacitance Measurement**: C 1.00 µF, DD 1.20

**Display of Final Results**

- **Insulation Test**: RINS 2.86 GΩ, UINS < 25 V
- **Polarisation Index Test**: PI 5.21, DAR 2.01
- **Measurement of Breakdown Voltage**: U₀ 600 V, Uₜₑˢᵗ 240 V
- **Capacitance Measurement**: C 1.00 µF, DD 1.20

**Voltage Measurement**: U~ 232 V, f 49.9 Hz
ME\textsc{TRISO} PRIME+

Digital High-Voltage Insulation Tester
METRISO PRIME+
Digital High-Voltage Insulation Tester