

# METRISO 5000 A/AK High-Voltage Insulation Tester

3-348-858-03  
9/8.14

- Broad measuring range from 10 kΩ to 1 TΩ
- Easy to read logarithmic display
- Test voltages:  
100 V, 250 V, 500 V, 1000 V, 1500 V, 2000 V, 2500 V, 5000 V
- Measurement to 2000 V in accordance with DIN VDE 0413
- Measuring range: 100 kΩ to 100 MΩ (1000 V)
- Voltage measurement to 2000 V  $\Rightarrow$ ,  $\sim$
- Guard terminal eliminates surface current
- 5 m extension cable as accessory equipment
- Power supply with batteries or hand crank generator (optional)



## Applications

Insulation measurement for cables, motors etc.

## Features

### Test Voltages to 5000 V

This instrument is suited for the non-destructive measurement of insulation resistance in electrical systems, at machines and transformers and in cables, as well as within the electrical equipment of, for example, locomotives, tram systems and ocean going vessels, with eight selectable test voltages up to 5 kV.

### Voltage Measurement to 2000 V

With the voltage measuring ranges, test objects can be checked for the absence of voltage in networks of up to 2 kV. This is important for insulation resistance measurement, because extraneous voltages distort measurement results.

### Discharge of Capacitive Devices Under Test

Capacitive devices under test such as cables and coils, which might be discharged to test voltage, are discharged by the measuring instrument. The drop in voltage can be observed at the needle gauge.

### Measurements in accordance with EN 61557 part 1 and 2 (VDE 0413)

Measuring current is equal to 1 mA at a test voltage of 100 V, 250 V, 500 V and 1000 V.

### Measurement Cables with Heavy-Duty Insulation

The measurement cables with heavy-duty insulation are permanently connected for safety and technical reasons. Possible danger caused by the unintentional removal of cables is thus avoided, for example when charging occurs due to capacitive test objects.

### Needle Gauge with LEDs

Three LEDs arranged within the needle gauge make reading easier. The lamp lights up which is located next to the scale, which is assigned to the selected measuring range. During the measurement sequence, the green LED indicates whether or not the battery charge is sufficient for the measurement.

## Applicable Regulations and Standards

|   |  |
|---|--|
| IEC 61010-1:2001<br>DIN EN 61010-1:2002<br>VDE 0411-1:2002    | Safety regulations for electrical measurement, control, regulation and lab devices<br>– General requirements   |
| IEC 61557<br>DIN EN 61557<br>Part 1:2007<br>Part 2:2007       | Measuring and monitoring facilities for testing the electrical safety in lines with nominal voltages up to AC 1000 V and DC 1500 V<br>Part 1 – General<br>Part 2 – Insulation resistance measuring devices |
| VDE 0413<br>Part 1:2007<br>Part 2:2008                        |  |
| IEC 61326-1:2005<br>DIN EN 61326-1:2006<br>VDE 0843-20-1:2006 | Generic Emission Standard; Electrical equipment for measurement, control and laboratory use<br>– EMC requirements<br>Part 1 – General requirements   |
| DIN EN 60529<br>VDE 0470-1:2000                               | Test instruments and test procedures<br>– degree of protection provided by enclosures (IP code)  |

# METRISO 5000 A/AK

## High-Voltage Insulation Tester

### Measuring Ranges

#### Insulation Resistance

| Scale/Standard | Measuring Range                         | Nominal Range of Use                 | Nominal/Open-Circuit Voltage $U_N/U_0$                    | Nom. Current $I_N$                   | Short-Circuit Current $I_K$ | Intrinsic Error <sup>1)</sup> | Deviation                    |
|----------------|---|--------------------------------------|---|--------------------------------------|-----------------------------|-------------------------------|------------------------------|
| 1<br>VDE0413   | 100 k $\Omega$<br>...<br>100 M $\Omega$ | 100 k $\Omega$<br>... 10 M $\Omega$  | 100 V<br>250 V<br>500 V<br>1000 V                         | 1 mA                                 | 1.3 mA                      | $\pm 2.5\%$                   | $\pm 30\%$ of measured value |
| 2              | 10 k $\Omega$<br>... 1 T $\Omega$       | 100 k $\Omega$<br>... 100 G $\Omega$ | 100/1500 V<br>250/2000 V<br>500/2500 V<br>1000/<br>5000 V | 0.7 mA<br>0.5 mA<br>0.4 mA<br>0.1 mA | 1.3 mA                      | $\pm 5\%$                     |                              |

#### Making Capacity for Insulation Resistance Measurement

Response Time < 100 G $\Omega$ : < 3 s; > 100 G $\Omega$ : < 8 s  
also valid for test voltage or measuring range changes

#### Direct and Alternating Voltage

| Measuring range    | Frequency     | Internal resistance | Max. allowable voltage    | Intrinsic error <sup>1)</sup> |
|--------------------|---------------|---------------------|---------------------------|-------------------------------|
| 0 ... 2000 V AC/DC | 15 ... 500 Hz | 5 M $\Omega$        | 2200 V AC/DC<br>max. 10 s | $\pm 5\%$                     |

#### Protective Devices

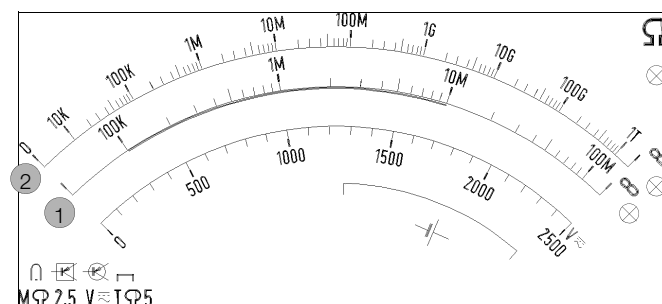
| Terminal                                     | Internal Resistance                             | Max. Allowable Voltage   | Protective Device  |
|--|---|--|--|
| -Measurement cable                           | —   | to +meas. cable/<br>to Guard cable:<br>2000 V DC/AC<br>max. 10 s | via grounded damping diodes  |
| +Measurement cable<br>Insulation measurement | —   | to -meas. cable/<br>to Guard cable:<br>2000 V DC/AC<br>max. 10 s | Diodes in high-voltage cascade,<br>PTC thermistor <sup>2)</sup> and series resistors |
| Guard cable                                  | between Guard and meas. cables<br>90 k $\Omega$ | to meas. cable<br>2000 V DC/AC<br>max. 10 s                      | PTC thermistor <sup>2)</sup> and series resistors                                    |
| Battery                                      | —   | 10 V   | Pole protection with diodes<br>voltage limiting in battery charger (optional)        |

<sup>1)</sup> with reference to scale length 97.5 mm (100 M $\Omega$  range) or 109.8 mm (1 T $\Omega$  range)

<sup>2)</sup> PTC resistor cool-down period until start of new measurement:  
at least 2 minutes must be observed!

### Display

Movement Core-magnet moving-coil mechanism  
Scale length 111.5 mm (longest scale)



### Reference Conditions

Ambient Temperature +23 °C  $\pm$  2 K  
Relative Humidity 40 ... 60%  
Meas. Quantity Frequency 50 Hz  $\pm$  10 Hz  
(for voltage measurements)  
Line Voltage Waveform Sine, deviation between effective and rectified value < 1%  
Battery voltage 8 V  $\pm$  1%  
Operating position Horizontal

### Power Supply

Standard or Storage Battery 6 ea. 1.5 V single cell per IEC R20 (6 x D-Size)  
Working Range 6 V ... 10 V  
Battery Service Life 7500 measurements for test voltage of 1000 V with meas. resistance of 1 M $\Omega$ , 15000 measurements for test voltage of 500 V with meas. resist. of 500 k $\Omega$ , measurement of 5 s – pause 25 s  
**Crank Generator (optional)** 2 to 3 r.p.s. with moderate strength, the LED  $\Omega$  signals sufficient crank frequency and consequently the validity of measuring values  
Nominal Voltage 7.5 V (at approx. 2.5 r.p.s.)  
Nominal Power 4 W (at approx. 2.5 r.p.s.)

### Ambient Conditions

Operating Temperature 0 °C ... + 40 °C  
Storage Temperature -20 °C ... + 60 °C (without batteries)  
Relative Humidity max. 75%,  
condensation must be avoided  
Elevation up to 2000 m

# METRISO 5000 A/AK High-Voltage Insulation Tester

## Electrical Safety

|                      |                               |
|----------------------|-------------------------------|
| Protection Class     | II                            |
| Test Voltage         | 8.5 kV~                       |
| Measuring Category   | 1000 V CAT II or 2000 V CAT I |
| Nominal Voltage      | 1000 V                        |
| Open Circuit Voltage | 5000 V                        |
| Contamination Degree | 2                             |

## Electromagnetic Compatibility (EMC)

Product standard DIN EN 61326-1:2006

| Interference Emission |                         | Class               |
|-----------------------|-------------------------|---------------------|
| EN 55022              |                         | B                   |
| Interference Immunity |                         | Performance Feature |
| EN 61000-4-2          | Contact/Air - 4 kV/8 kV | B                   |
| EN 61000-4-3          | 10 V/m                  | B                   |

## Mechanical Design

|            |  |
|------------|--|
| Dimensions | W x D x H:<br>290 mm x 250 mm x 140 mm |
| Weight     | 3.4 kg with batteries                  |
| Protection | IP 52                                  |

Extract from table on the meaning of IP codes

| IP XY<br>(1 <sup>st</sup> digit X) | Protection against<br>foreign object entry | IP XY<br>(2 <sup>nd</sup> digit Y) | Protection against the<br>penetration of water        |
|------------------------------------|--|------------------------------------|---|
| 0                                  | not protected                              | 0                                  | not protected   |
| 1                                  | ≥ 50.0 mm dia.                             | 1                                  | vertically falling drops                              |
| 2                                  | ≥ 12.5 mm dia.                             | 2                                  | vertically falling drops<br>with enclosure tilted 15° |
| 3                                  | ≥ 2.5 mm dia.                              | 3                                  | spraying water  |
| 4                                  | ≥ 1.0 mm dia.                              | 4                                  | splashing water                                       |
| 5                                  | dust protected                             | 5                                  | water jets  |

## Equipment METRISO 5000 A

- 1 high-voltage insulation tester with permanently connected measurement cables and test prods,
- 2 crocodile clips (5 kV version)
- and plug-in battery module including batteries**
- 1 carrying strap
- 1 operating instructions

## Equipment METRISO 5000 AK

- 1 high-voltage insulation tester with permanently connected measurement cables and test prods,
- 2 crocodile clips (5 kV version)
- and hand crank generator**
- 1 carrying strap
- 1 operating instructions

## Accessories

### Hand Crank Generator for retrofit



### Carrying Bag F2000

The test instrument, replacement batteries, guard cable, etc., can all be conveniently stored and transported with the F2000 carrying bag.



### ISO-Kalibrator 1

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



# METRISO 5000 A/AK

## High-Voltage Insulation Tester

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### Order Information

| Designation  | Type                | Article Number |
|--|---------------------|----------------|
| High-voltage insulation tester,<br>for battery operation                                     | METRISO 5000 A      | M580A          |
| High-voltage insulation tester,<br>for hand crank generator operation                        | METRISO 5000 AK     | M580C          |
| Universal carrying bag<br>for METRISO 5000 A/AK,<br>PROFiTEST®0100S-II or<br>PROFITEST 204   | F2000 <sup>D)</sup> | Z700D          |
| 2 alligator clips<br>1000 V CAT III / 5000 V CAT I 16 A                                      | KY 5000A            | Z580B          |
| 1 guard cable with plug and crocodile clip   | Guard 5000A         | Z580C          |
| 5 m extension cable  | Leadex 5000         | Z580D          |
| Hand crank generator<br>for retrofitting METRISO 5000 A<br>to hand crank generator operation | Z580A               | Z580A          |
| Set consisting of: METRISO 5000 A,<br>F2000, KY 5000A and 5000A guard                        | METRISO 5000A-Set   | M580S          |
| Set consisting of: METRISO 5000AK,<br>F2000, KY 5000A and 5000A guard                        | METRISO 5000AK-Set  | M580T          |
| Calibration adapter for test voltages<br><b>up to 1000 V</b>                                 | ISO-Kalibrator 1    | M662A          |

<sup>D)</sup> Data sheet available

For additional information on accessories, please refer to

- the relevant datasheet or our „Measuring Instruments and Testers“ catalog
- our website [www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)