

# INSULATION RESISTANCE METER

## MIC-1000



**Insulation resistance measurement**

**Leakage current indication**

**Low-voltage resistance measurement**

**Measurement of AC/DC voltage**

### Main features of MIC-1000:

- test voltages between 50...1000V in 10V steps,
- insulation resistance measurement up to 110GΩ,
- low-voltage resistance measurement,
- leakage current indication,
- automatic selection of measuring ranges,
- direct measurement absorption coefficients,
- Polarization Index (PI),
- Dielectric Absorption Ratio DAR,
- memory for 999 measurement results,
- ability to transfer the data to a PC,
- automatic discharge of tested object after measurement,
- acoustic determination of 5 second time intervals that facilitates to take time characteristics during measurement,
- ergonomic operation.

The MIC-1000 is a small, portable meter for measuring the insulation resistance of electrical and telecommunication installations, motors, machines and other devices.

The instrument can measure the insulation resistance in a very wide range 50kΩ..110GΩ and the leakage current of the insulation. Inputs of the meter are electronically protected from overloading, e.g. due to incorrect connection to the circuit being tested or incorrect use of input terminals.

### Standard Accessories

- Ni-Cd battery package 8ECF1800CS 9,6V 1,8Ah (WAAKU02)
- Power supply adaptor Z series; pin 3,5mm (WZAS3X5Z\_)
- Cable with the quadruple plug 2,5kV, 1kV (WAPRZMIC2500)
- Test lead with banana plug 1,2m; black (WAPRZ1X2BLBB)
- "Crocodile" clip K02; yellow (WAKROYE20K02)
- "Crocodile" clip K01; black (WAKROBL20K01)
- Carrying case M2 (WAFUTM2)
- User Manual
- Calibration Certificate
- Sonel CD - technical data and software

### Optional Accessories

- OPTO-RS serial transmission cable (WAPRZOPTORS)
- Adapter - converter USB1.1/RS232 (WAADAUSBR232)
- Calibration Certificate issued by Calibration Laboratory (LSWGBMIC1000)
- Sonel PE3 - software for creation of documentation from electrical measurements for PC (WAPROPE3EN)
- Sonel PE3 + Sonel Schematic - software for creation drawings and diagrams for PC computers (WAPROPE3SEN)

2 year warranty

**Nominal operating conditions**

- test voltages  $U_N$ : 50...1000V with 10V step
- test voltage accuracy  $R_{obc} [\Omega] \geq 1000 * U_N [V] : -0 +10 \%$  of the setting
- maximum measurement current: 1,2 mA  $\pm$  0,2 mA
- measurement  $T_1, T_2$  and  $T_3$  test times for absorption measurement: three, selected from the range between 1... 600 seconds accuracy  $\pm$  1s

**Electrical Safety**

- type of insulation: double, PN-EN 61010-1 and IEC 61557 compliant
- measurement category: CAT.III 300V, PN-EN 61010-1 compliant
- protection class: IP40

**Other technical data**

- power supply: Ni-Cd battery set type "SONEL" 8ECF1800CS
- dimensions: 230 x 67 x 68 mm
- weight (incl. batteries): approx. 850g
- AUTO-OFF time:
  - $R_{ISO}/I_L$  mode: depending on programmed time  $T_2$  or  $T_3$  ( $T_2/T_3 + 300$  seconds)
  - other modes: 300 seconds
- frequency of measurements in  $R_{ISO}$  mode: approx. 1 measurement/sec
- display: LCD, 4 digits, 14mm high
- operating temperature:  $-10^\circ\text{C}..+40^\circ\text{C}$
- storage temperature:  $-20^\circ\text{C}..+60^\circ\text{C}$

**DC voltages**

| Range    | Resolution | Accuracy                                     |
|----------|------------|--|
| 0...600V | 1 V        | $\pm(3\% \text{ m.v.} \pm 2 \text{ digits})$ |

**AC current 50-60 Hz**

| Range    | Resolution | Accuracy                                     |
|----------|------------|--|
| 0...600V | 1 V        | $\pm(3\% \text{ m.v.} \pm 2 \text{ digits})$ |

sine waveform with harmonics contents  $< 2 \%$

**Insulation resistance measurement (1000V)**

| Range                   | Resolution      | Accuracy                                      |
|-------------------------|-----------------|---|
| 50,00...99,90k $\Omega$ | 0,01k $\Omega$  | $\pm(3\% \text{ m.v.} \pm 20 \text{ digits})$ |
| 100,0...999,0k $\Omega$ | 0,1k $\Omega$   |   |
| 1,000...9,990M $\Omega$ | 0,001M $\Omega$ |   |
| 10,00...99,90M $\Omega$ | 0,01M $\Omega$  |   |
| 100,0...999,0M $\Omega$ | 0,1M $\Omega$   |   |
| 1,000...9,990G $\Omega$ | 0,001G $\Omega$ |   |
| 10,00...99,90G $\Omega$ | 0,01G $\Omega$  |   |
| 100,0...110,0G $\Omega$ | 0,1G $\Omega$   |   |

**Leakage current reading**

| Range           | Resolution           | Accuracy                   |
|-----------------|----------------------|----------------------------|
| 0... $I_{pmax}$ | Depending from range | $-\Delta I_-, +\Delta I_+$ |

where:  $I_{pmax}$  - maximum converter's current equal to  $1,2 \pm 0,2 \text{ mA}$   
 $-\Delta I_-, +\Delta I_+$  - basic current reading errors calculated from the resistance reading using the formulas:

$$\Delta I_- = U_{ISO} \left( \frac{1}{R} - \frac{1}{R + |\Delta R|} \right) \quad \Delta I_+ = U_{ISO} \left( \frac{1}{R - |\Delta R|} - \frac{1}{R} \right)$$

$U_{ISO}$  - test voltage  
 $R$  - displayed value of the insulation resistance  
 $\Delta R$  - basic resistance measurement error defined for the measurement

**Low voltage resistance measurement**

| Range                  | Resolution   | Accuracy                                     |
|------------------------|--------------|--|
| 0,0...99,9 $\Omega$    | 0,1 $\Omega$ | $\pm(2\% \text{ m.v.} \pm 3 \text{ digits})$ |
| 100,0...399,9 $\Omega$ | 0,1 $\Omega$ | $\pm(4\% \text{ m.v.} \pm 3 \text{ digits})$ |

- sound signalling for resistances less than approx.  $35 \pm 25 \Omega$
- maximum voltage at separate terminals – 9.6V
- maximum current at shorted terminals – 100mA

☞ „m.v.“ in the definition of accuracy denotes the measured value