METRISO C
Insulation and Resistance Measuring Instrument

Battery powered insulation resistance measuring instrument in accordance with DIN VDE 0413, parts 2 and 4 for measurement in systems with nominal voltages of up to 500 V

Insulation resistance measurement
- Measuring range: 0 … 100 GΩ
- Variable test voltage: adjustable from 50 to 1000 V

Low-resistance measurement
- Measuring range: 0 … 100 Ω

Temperature and humidity measurement via IrDa interface with additional adapter

Contact current measurement
- Measuring range: 0 … 10 mA

Special features for insulation resistance measurement
- Quick testing with limit value and signal lamp
- Auto-ranging for insulation resistance measurement over the entire scale range for quick determination of the measured insulation value

Special features for resistance measurement (low-resistance)
- Quick testing with limit value and signal lamp
- Automatic polarity reversal for recognition of interference voltage

Special instrument features
- Hold function: the measured value is frozen at the display after the measurement key is released.
- Measured values can be stored to memory with reference to electrical circuits, distribution cabinets and other objects thanks to alphanumeric entry.
- Data interface for transmission of measured values, and for software updates
- Convenient report generating software, can be expanded to a comprehensive database

Display
The LCD window consists of a backlit dot matrix which is used to display menus, configuration options and measurement results, as well as online help. Various user interface languages can be selected, depending upon the country in which the test instrument is used.

Operation
The instrument is very easy to operate. A multifunction key allows for one-handed operation when selecting menus and starting measurements. Basic functions and sub-functions are selected with the help of four softkeys.

Battery Charge Level Indicator and Device Self-Test
A battery symbol in the main menu with 5 segments ranging from depleted to fully charged keeps the user continuously informed concerning battery charge level. The test instrument is switched off automatically if the batteries are depleted, and it includes a charge control circuit for safe charging of rechargeable NiMH or NiCd batteries. Test patterns can be queried one after the other in the self-test mode, and display LEDs and relays can be tested.

Sturdy Housing for Rugged Use
Soft plastic jacketing protects the instrument against impacts, or if it is inadvertently dropped.
Signal Lamps
The device recognizes errors in the electrical system automatically, which are indicated with four lamps, (see following table).

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Status</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netz Mains</td>
<td>blinks red</td>
<td>Mains voltage is present at the measurement inputs, insulation resistance measurement is disabled</td>
</tr>
</tbody>
</table>
| LIMIT | red | – Measured insulation resistance is below the allowable limit value.  
– Measured low resistance has exceeded the allowable limit value.  
– Measured contact current has exceeded the allowable limit value. |
| U>25V | red | A voltage of greater than 25 V is present at the measurement inputs. Discharging in not yet complete. |

Data Interface
Measurement data can be read out to a printer or a PC via the integrated IRDA interface, providing the user with 3 advantages.

- Transmission of stored data to a PC for processing and archiving, or for the generation of official reports
- Immediate print-out of all measurement data (via adapter)

Software Updates
The test instrument will never become obsolete thanks to software updates which can be installed via the IRDA interface. Updates can be performed by our service department as part of our re-calibration service, or by the user himself.

Applicable Regulations and Standards

| IEC 61010-1/EN 61010-1 VDE 0411-1 | Safety requirements for electrical equipment for measurement, control and laboratory use  
Part 1: General requirements (IEC 61010-1:2010 + Cor.:2011); German edition EN 61010-1:2010 |
|-------------------------------------|------------------------------------------------------------------------------------------------------|
| IEC 61557  
DIN EN 61557  
Part 1:2007  
Part 2:2007  
Part 4:2007  
Part 10:2001 | Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures  
Part 1: General requirements  
Part 2: Insulation resistance  
Part 4:2007 Resistance of earth connection and equipotential bonding  
Part 10:2001 Combined measuring equipment for testing, measuring or monitoring of protective measures |
| VDE 0413  
Part 1:2007  
Part 2:2008  
Part 4:2007  
Part 10:2001 |  
| IEC 61326-1:2005  
DIN EN 61326-1:2006  
VDE 0843-20-1:2006 | Electrical equipment for measurement, control and laboratory use – EMC requirements - Part 1: General requirements |
| DIN EN 60529  
VDE 0470-1:2000 | Test instruments and test procedures, protection provided by enclosures (IP code) |
| DIN EN 1081:1998 | Testing floor coverings in explosive atmospheres for electrostatic discharge capacity |
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Characteristic Values

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Display Range</th>
<th>Test Current</th>
<th>Measuring Range</th>
<th>Nominal Values (Impedance)</th>
<th>Intrinsic Uncertainty</th>
<th>Measuring Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{ISO}$</td>
<td>000 $\Omega$ ... 99.9 $\Omega$</td>
<td>1 mA $^3$</td>
<td>20 $\Omega$ ... 10.0 $\Omega$</td>
<td>$U_0 = 100$ V $^2$</td>
<td>±(5% rdg. + 3 d)</td>
<td>±(7% rdg. + 3 d)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.20 $\Omega$ ... 10.0 $\Omega$</td>
<td>$U_0 = 250/500/1000$ V $^2$</td>
<td>±(5% rdg. + 3 d)</td>
<td>±(7% rdg. + 3 d)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; 10.0 $\Omega$ ... 99.9 $\Omega$</td>
<td>$U_0 = 100/250/500/1000$ V $^2$</td>
<td>±(8% rdg. + 3 d)</td>
<td>±(10% rdg. + 3 d)</td>
</tr>
<tr>
<td>$U_{ISO}$</td>
<td>000 V ... 1.20 kV</td>
<td></td>
<td>50 ... 1.00 kV</td>
<td>5 $\Omega$</td>
<td>±(2.5% rdg. + 3 d)</td>
<td>±(5% rdg. + 3 d)</td>
</tr>
<tr>
<td>$U_-$</td>
<td>00.0 V ... 500 V</td>
<td></td>
<td>10 ... 500 V</td>
<td>5 $\Omega$</td>
<td>±(2.5% rdg. + 3 d)</td>
<td>±(5% rdg. + 3 d)</td>
</tr>
<tr>
<td>$f$</td>
<td>15.0 ... 400 Hz</td>
<td></td>
<td>45 ... 200 Hz</td>
<td>5 $\Omega$</td>
<td>±(0.5% rdg. + 2 d)</td>
<td>±(1% rdg. + 2 d)</td>
</tr>
<tr>
<td>$R_{LO}$</td>
<td>0.00 ... 9.99 $\Omega$</td>
<td>$I_B = 200$ mA</td>
<td>0.15 ... 10 $\Omega$</td>
<td>$U_B = 4.5$ V</td>
<td>±(2.5% rdg. + 3 d)</td>
<td>±(5% rdg. + 3 d)</td>
</tr>
<tr>
<td></td>
<td>&gt; 10.0 ... 99.9 $\Omega$</td>
<td></td>
<td>&gt; 10 ... 100 $\Omega$</td>
<td></td>
<td>±(8% rdg. + 3 d)</td>
<td>±(10% rdg. + 3 d)</td>
</tr>
<tr>
<td>$I_B$</td>
<td>0.00 ... 9.99 mA</td>
<td></td>
<td>2 $\Omega$</td>
<td>0.1 ... 10 mA AC</td>
<td>±(5% rdg. + 3 d)</td>
<td>±(8% rdg. + 3 d)</td>
</tr>
<tr>
<td>$T$ $^4$</td>
<td>−10.0 ... +50.0 °C</td>
<td></td>
<td>0 ... +40 °C</td>
<td></td>
<td>±2 °C</td>
<td></td>
</tr>
<tr>
<td>$F_{rel}$ $^1$</td>
<td>10.0 ... 90.0%</td>
<td></td>
<td>20 ... 80%</td>
<td></td>
<td>±5%</td>
<td></td>
</tr>
<tr>
<td>Phase Test</td>
<td>LED FE &gt; 100 V</td>
<td></td>
<td>100 ... 500 V</td>
<td>&gt; 100 M$\Omega$/50 Hz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) With external adapter (Z541A) as accessory
2) Nominal DC voltage = $U_N + (0 \ldots 15\%)$
3) At nominal resistance of $R_N = 1000 \Omega/V$

Reference Conditions

- Ambient Temperature: $+23 \, ^\circ\text{C} \pm 2 \, ^\circ\text{K}$
- Relative Humidity: 40 ... 60%
- Battery Voltage: 5.5 V ± 1%
- Measured Qty. Frequency: 50 Hz ± 0.2 Hz
- Line Voltage Waveshape: sine, deviation between effective and rectified values < 1%

Power Supply

- Batteries: 4 ea. 1.5 V baby cells (4 x C-Size) (alkaline-manganese per IEC LR14) or 4 ea. NiCd rechargeable batteries
- Nominal Range of Use: 4.6 ... 6.5 V
- Battery Test: Symbolic display
- Battery Saving Circuit: Display illumination can be deactivated. The test instrument is switched off automatically 10 to 60 seconds after the last key operation. ON-time can be selected by the user. for $R_{ISO}$ (1000 V/1 M$\Omega$), $R_{LO}$ with 20 sec. on-time and a measurement duration of 5 sec. each – with one set of batteries (alkaline-manganese): (1,600 measurements) – with one set of storage batteries (2200 mAh): (1,000 measurements)
- Service Life: for $R_{ISO}$ (1000 V/1 M$\Omega$), $R_{LO}$ with 20 sec. on-time and a measurement duration of 5 sec. each – with one set of batteries (alkaline-manganese): (1,600 measurements) – with one set of storage batteries (2200 mAh): (1,000 measurements)
- Safety Shutdown: The instrument is switched off if supply voltage drops to below the specified level, or it cannot be switched on.
- Charging Socket: Rechargeable batteries can be recharged inside the instrument by connecting the NA102 charger to the charging socket.

Overload Capacity

- $R_{LO}$ und $I_B$: Electronic protection prevents the device from being switched on if interference voltage is present.
- $U_-$: 500 V- continuous

Electrical Safety

- Safety Class: II per IEC 61010-1/EN 61010-1/
  VDE 0411-1
- VDE Requirement: VDE 0411 Part 1, 2011
- Pollution degree: 2
- Measuring Category: Insulation measurement –1000 V DC – no overvoltage
  Voltage measurement – 500 V – CAT II
- Fuses: FF0,315-1000G

Electromagnetic Compatibility EMC

- Interference Emission: EN 61326-1:2006 Class B
- Interference Immunity: EN 61326-1:2006

Ambient Conditions

- Nominal Service Temp.: 0 ... +40 °C
- Operating Temperature: −10 ... +50 °C
- Storage Temperature: −20 ... +60 °C (without batteries)
  max. 85%, no condensation allowed
- Elevation: max. 2000 m
- Deployment: indoors; outdoors: only under specified ambient conditions
**METRISO C**

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### Mechanical Design

- **Display**: multiple dot matrix display, 128 x 64 pixels (65 mm x 38 mm), illuminated
- **Protection**: housing: IP 52 per DIN VDE 0470, part 1/EN 60529
- **Dimensions**: 275 mm x 140 mm x 65 mm
- **Weight**: approx. 1.2 kg with batteries

### Data Interface

- **Type**: infrared interface (SIR/IrDa) bidirectional, half-duplex
- **Format**: 9600 baud, 1 start bit, 1 stop bit, 8 data bits, no parity, no handshake
- **Range**: max. 10 cm recommended distance: < 4 cm

### Standard Equipment

- 1 METRISO C test instrument
- 1 carrying strap
- 1 set of batteries
- 1 pair of measurement cables
- 1 proprietary calibration certificate
- 1 operating instructions

### Accessories

#### Floor Probe

The 1081 floor probe allows for the measurement of resistance at insulating floor coverings in accordance with DIN VDE 0100, part 610, and EN 1081.

#### Order Information

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>Article Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Instrument/Instrument Set</strong></td>
<td>Digital insulation and resistance measurement instrument, operator guidance in english</td>
<td>METRISO C-GB int.</td>
</tr>
<tr>
<td><strong>Expansions</strong></td>
<td>Sensor for temperature and relative humidity for METRISO C and Profitest 0100S-II (as from Software AH)</td>
<td>T/F Sensor</td>
</tr>
<tr>
<td></td>
<td>IR interface for connection to a USB PC port for transmission of data between the PC and the METRISO C, e.g. for software updates at the test instrument or for visualization of measured values at the PC</td>
<td>IrDa-USB Converter</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Charger for recharging batteries while inside the METRISO C</td>
<td>NA102</td>
</tr>
<tr>
<td></td>
<td>Cable set consisting of measurement cable and high-resistance measurement cable for METRISO C for measurements in the GΩ range</td>
<td>KS-C</td>
</tr>
<tr>
<td></td>
<td>Hard-shell case with blister insert for 1 series C instrument and accessories</td>
<td>HC30-C</td>
</tr>
<tr>
<td></td>
<td>Hard-shell case with blister insert for 2 series C instruments and accessories</td>
<td>HC40</td>
</tr>
<tr>
<td></td>
<td>Triangular probe for floor measurements in accordance with EN 1081 and DIN VDE 0100</td>
<td>1081 Probe</td>
</tr>
<tr>
<td></td>
<td>Calibration adapter for testing the accuracy of measuring instruments for insulation resistance and low-value resistors</td>
<td>ISO-Calibrator 1</td>
</tr>
</tbody>
</table>

### PC Evaluation Software

- [http://www.gossenmetrawatt.com](http://www.gossenmetrawatt.com) (→ Products → Electrical Testing → Insulation; Grounding; Low Ohmic ... → METRISO C)
- or
- [http://www.gossenmetrawatt.com](http://www.gossenmetrawatt.com) (→ Products → Software → Software for Testers)