GOSSEN METRAWATT

METRISO XTRA

High-Precision Insulation, Low Resistance and Voltage Measurement Instrument

LCD Panel

Red LED: limit value exceeded
Green LED: limit value adhered to

Red LED:
– Interference voltage with device off
– High test voltage at the measuring terminals during Riso/Rins

Function Selector Switch

Slot for Carrying Strap

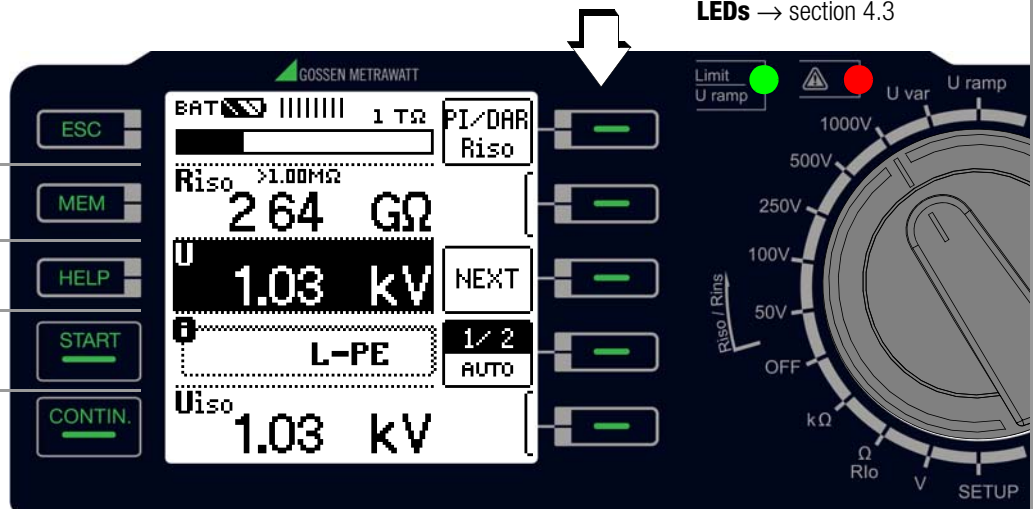Slot for Carrying Strap

Setup Menu

METRISO XTRA
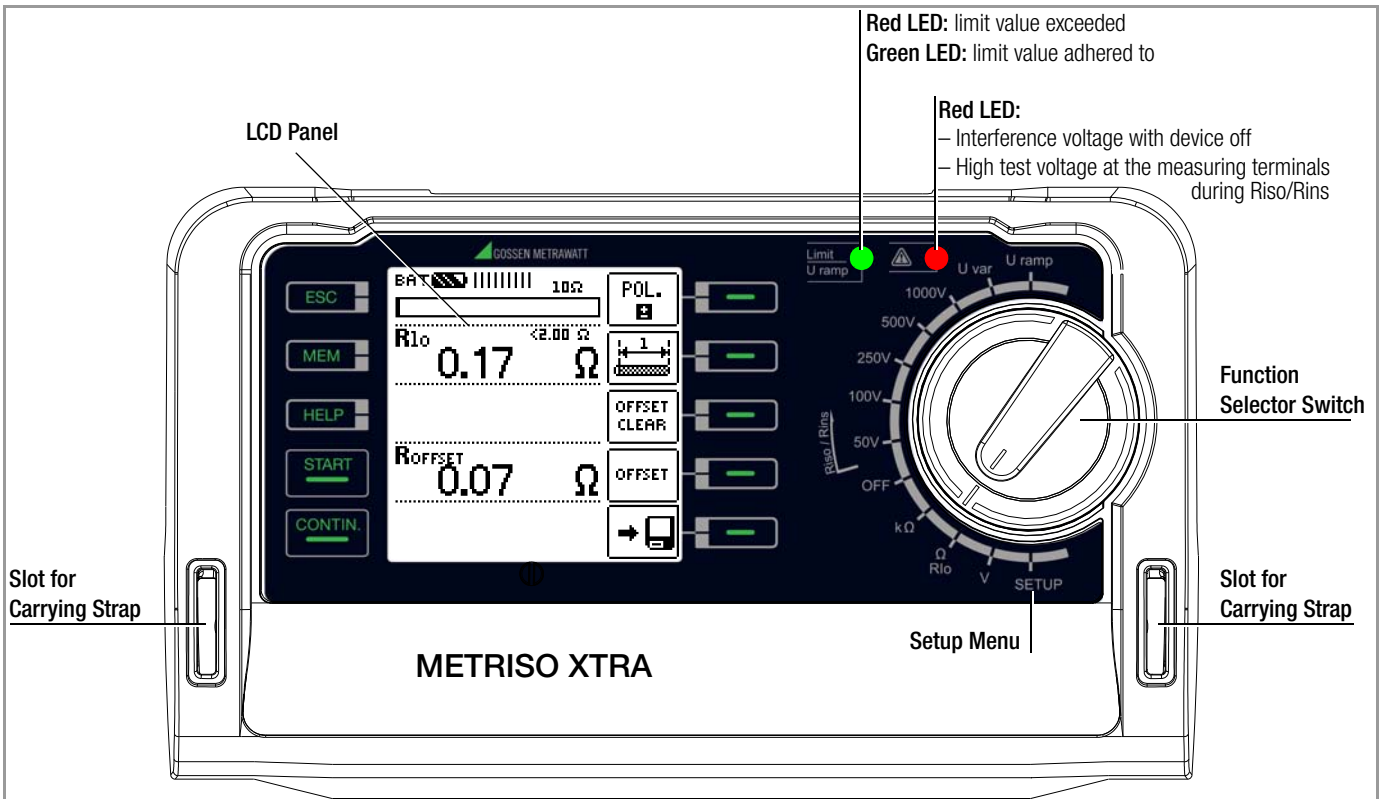
Control panel

Softkeys
- Parameter selection
- Limit value specification
- Entry functions
- Memory functions

Fixed Function Keys
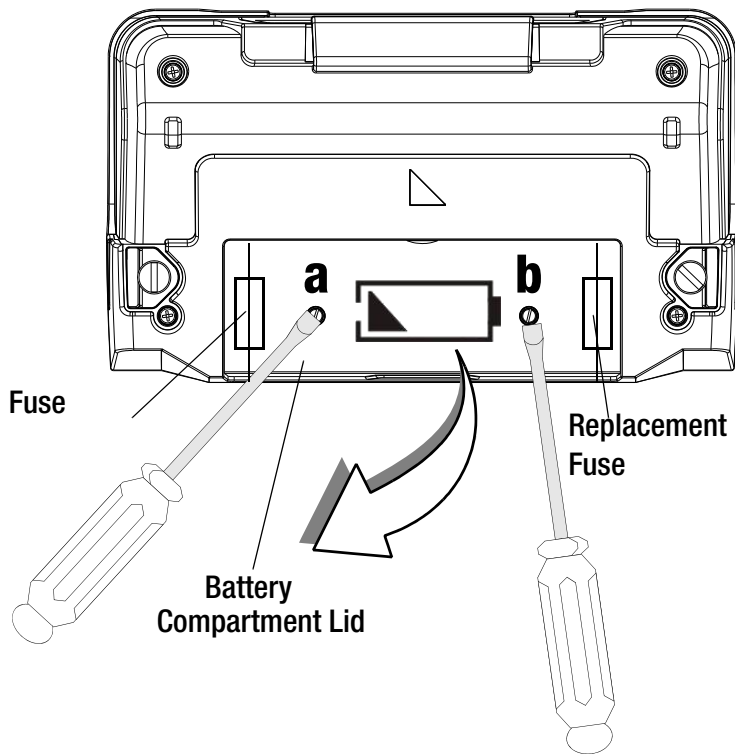
LEDs → section 4.3

ESC:	Exit submenu / activate instrument standby state
MEM:	Key for memory functions
HELP:	Access context sensitive help
START:	Start measurement
CONTIN:	Continuous measurement of Rins and R (kΩ)

Batteries, Fuses

Inserting the Battery Holder (side view)

Battery Compartment Lid

Battery Holder

Battery Holder Contacts

a

b

Fuse

Replacement Fuse

Battery Compartment Lid

Battery Compartment

Contact Spring
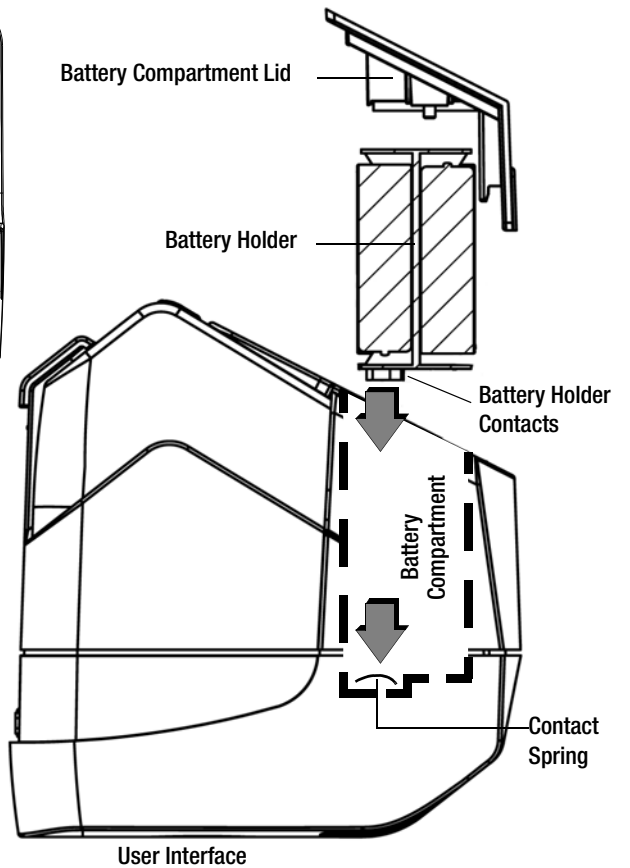
User Interface

Measuring Connections

Option KS-C (Z541F)

SHIELD

GUARD

Option Z550A*
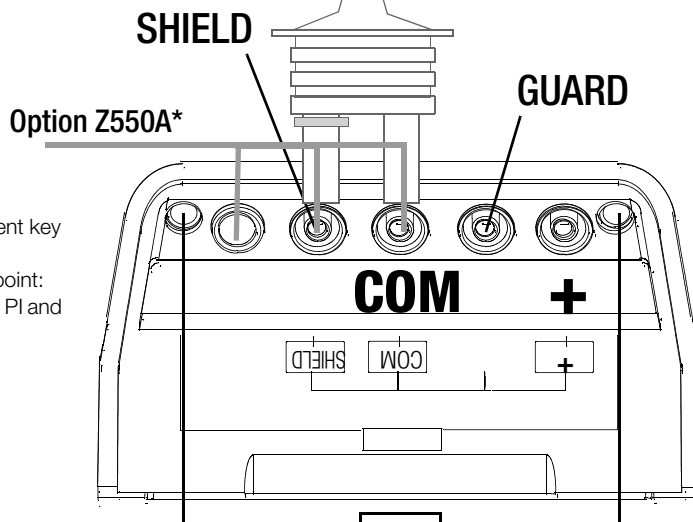
* Regarding Z550A:
Test Probe with measurement key remote control and LED for illuminating the measuring point: Do not use when measuring PI and DAR.

COM +

SHIELD COM +

Test Resistor 10 MΩ

Charger Socket, Interfaces

These connections are located under a protective rubber flap.
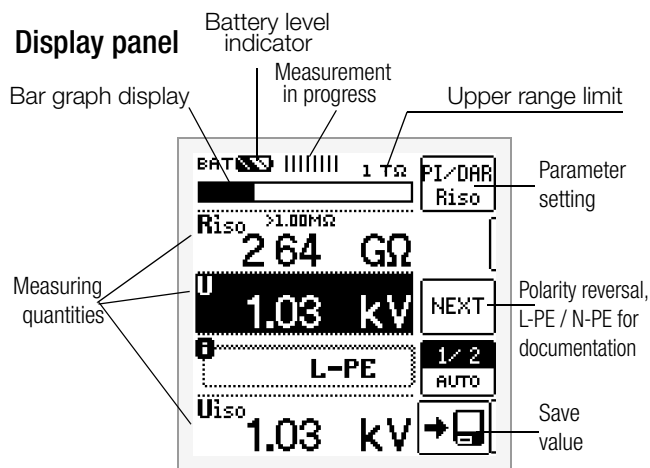
Socket for Z502R charger
Caution!

Make sure that no batteries are inserted before connecting the charger.

The test instrument must remain off during the charging process.

Port for connecting Barcode/RFID reader

RS 232

USB slave for PC connection

Display panel

Bar graph display
Battery level indicator
Measurement in progress
Upper range limit

BAT ▥▥ ‖‖‖‖‖‖ 1 TΩ PI/DAR Riso — Parameter setting

Riso >1.00MΩ
264 GΩ

Measuring quantities

U
1.03 kV NEXT — Polarity reversal, L-PE / N-PE for documentation

🔒 L-PE 1/2 AUTO

Uiso
1.03 kV →💾 — Save value

Measuring Status

‖‖‖‖‖‖‖))) — Measurement in progress: Bars moves from left to right.

‖‖‖‖‖‖‖‖‖ — Measurement on pause: Bars are static.

Battery Level Indicator
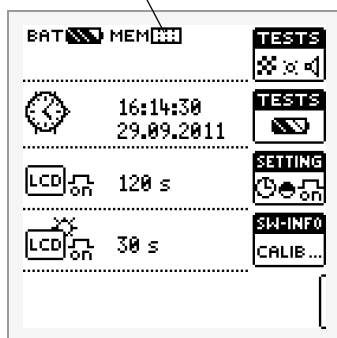
BAT ▥▥ Battery full   BAT ▨ Battery weak

BAT ▤ Battery OK   BAT ▢ Battery (nearly) depleted U < 8.5 V

Memory Occupancy Display

MEM ▮▮ Memory full > transfer data to PC! ⚠

MEM ▮▯ Memory half full

BAT ▥▥ MEM▦ TESTS ✕▫◁

🕐 16:14:30 29.09.2011 TESTS ▥

LCD⊡ on 120 s SETTING 🕐●⊡

LCD⊡ on 30 s SW-INFO CALIB...

These operating instructions describe a tester with software as of version SW-VERSION (SW1) 01.02.00.

Overview of Device Settings and Measuring Functions Relative to Rotary Switch Setting

Switch setting, see as of	Picto-graph	Device settings, measuring functions	
RISO RINS		RINS	Insulation resistance
		U	Voltage at the test probes
		U_N fix	Fixed test voltage, limit values per VDE 0100
		Uvariable	Variable test voltage, limit value: 1 MOhm (for go/no-go display while saving the measured value)
		Uramp	Variable test voltage, ramp: triggering/breakdown voltage
page 15		PI	Polarization index
		DAR	Absorption index
kΩ page 20		R	Resistance measurement
RLO		RLO	Low-resistance with polarity reversal
		RLO+, RLO–	Low-resistance, single-pole
page 21		ROFFSET	Offset resistance
V page 14		U	Voltage measurement
SETUP	TESTS ✕▫◁	Tests:		LCD pixel display LCD pixel display All pixels off
		Green limit LED Red limit LED	All pixels on Acoustic signal
	TESTS ▥	Battery test Ubat	
	SETTING 🕐●⊡		Date/time
		CULT	Language (D, GB)
		Brightness	
		SET on:	On-time for LCD and tester
		Contrast ⬛SETTING	Default settings
	SW-INFO CALIB...	Device type Serial number Software version Hardware version Calibration date	
page 8		Adjustment date	

Scope of delivery:

1   Insulation and resistance measuring instrument
1   DAkkS calibration certificate
1   Set batteries (8 pieces in battery holder)
1   Carrying strap
1   Alligator clip
1   KS17-4 cable set
1   USB cable
1   Condensed operating instructions
1   Supplement Safety Information
–   Detailed operating instructions for download from our website at www.gossenmetrawatt.com

Table of Contents

1 Applications

This instrument fulfills all requirements of applicable European and national EC directives. We confirm this with the CE mark. The relevant declaration of conformity can be obtained from GMC-I Messtechnik GmbH.

The METRISO XTRA insulation and resistance measuring instrument allows for quick and efficient testing of protective measures in accordance with DIN VDE 0100, ÖVE-EN 1 (Austria), SEV 1000 (Switzerland), and regulations specific to other countries as well.

The device is equipped with a microprocessor and complies with IEC/EN 61557 / VDE 0413 regulations:

Part 1: General requirements

Part 2: Insulation resistance

Part 4: Resistance of earth connection, protective conductors and equipotential bonding

Part 10: Electrical safety in low-voltage systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures

As well as requirements per VDE 0701-0702:
Repair, modification and testing of electrical devices

The test instrument is especially well suited for:

• Systems setup
• Initial start-up
• Periodic testing
• Troubleshooting in electrical systems

The following measurements and tests can be performed with the insulation measuring instrument:

• Insulation resistance
• Low-resistance
• Voltage

The following can also be tested by using a shielded measurement cable:

• Floor covering electrostatic discharge capability

1.1 Optional Z550A Remote Control

The optional remote control with triggering key on the test probe and a key for illuminating the measuring point makes it possible to use the measuring instrument at difficult to access places.

For safety reasons, a predefined voltage is only applied to the test probes for as long as the triggering key is held depressed.

The start key on the test instrument should be used instead of remote control for triggering polarization and absorption index measurements, because these two measurements involve complete measuring cycles.

1.2 Overview of Measuring Instrument Performance Features

METRISO		XTRA
Article No.		M550S
Measurement		
R_{INS}	U = 50, 100, 250, 500, 1000 V	✓
R_{INS}	Uvar = 50 ... 1000 V	✓
R_{INS}	Uramp (U) = 100 ... 1000 V	✓
PI		✓
DAR		✓
R	10 ... 10 kΩ	✓
R_{LO}	0.01 ... 10 Ω	✓
U	0 ... 1000 V	✓
Display Functions		
Backlit display		✓
Limit value LED (green/red) for: limit values per VDE 0100 in addition to acoustic signal		R_{INS} R_{LO}
URamp limit value LED for: indicating ramp characteristics		R_{INS}
LED for dangerous contact voltage (when switched off)		✓
Battery level display		✓
Special Functions		
Discharge capacitive devices under test		✓
Safety shutdown (UBatt < 8 V)		✓
Data storage at the instrument		✓
ETC software for data acquisition, data management and reporting		✓
Features		
Measuring categories: CAT II 1000 V / CAT III 600 V / CAT IV 300 V		✓
Test resistance: 10 MΩ		✓
Connections: charging socket, USB port (slave), RS 232 port		✓
DAkkS calibration certificate		✓

2 Safety Features and Precautions

The electronic measuring and test instrument is manufactured and tested in accordance with safety regulations IEC/EN 61010-1/VDE 0411-1 and EN 61557. When used for its intended purpose, safety of the operator, as well as that of the instrument, is assured.

Read the operating instructions thoroughly and carefully before using your instrument. Follow all instructions contained therein. Make sure that the operating instructions are available to all users of the instrument.

Tests may only be executed by a qualified electrician.

The measuring and test instrument may not be placed into service:

- If the battery compartment lid has been removed
- If external damage is apparent
- If connector cable or measuring adapters are damaged
- If the instrument no longer functions flawlessly
- After extraordinary damage due to transport
- After a long period of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature).

Opening of Equipment / Repair

The equipment may be opened only by authorized service personnel to ensure the safe and correct operation of the equipment and to keep the warranty valid.

Even original spare parts may be installed only by authorized service personnel.

In case the equipment was opened by unauthorized personnel, no warranty regarding personal safety, measurement accuracy, conformity with applicable safety measures or any consequential damage is granted by the manufacturer.

Data Backup

We advise you to regularly transfer your stored data to a PC in order to prevent potential loss of data in the test instrument.

We assume no responsibility for any data loss.

We recommend ETC software (Electric Testing Center) for backing up, processing and managing data.

Meaning of Symbols on the Instrument

⚠️ Warning concerning a point of danger (Attention, observe documentation!)

▣ Protection class II device

⎓ Charging socket for extra-low direct voltage (Z502R charger) **Attention! Only rechargeable batteries may be inserted when the charger is connected.**

CE Indicates European Conformity

🗑️ The device and included batteries may not be disposed of with the trash. Further information regarding the WEEE mark can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term "WEEE".

Calibration Seal (blue seal):

XY123	— Consecutive number
D-K	— Deutsche Akkreditierungsstelle GmbH – calibration lab
15080-01-01	— Registration number
2019-08	— Date of calibration (year – month)

See also "Recalibration" on page 38.

3 Initial Start-Up

3.1 Battery test

Four different battery symbols, ranging from fully depleted to fully charged, continuously indicate the momentary charge level in the upper left-hand corner of the display

If battery voltage has fallen below the allowable lower limit, the pictograph shown at the right appears. The instrument does not function if the batteries have been depleted excessively, and no display appears.

3.2 Installing or Replacing Batteries

New batteries must be inserted for initial start-up, or if **only one filled segment remains in the battery symbol**.

⚠️ **Attention!**
Before opening the battery compartment (see page 5 for location), disconnect the instrument from the measuring circuit (mains) at all poles.

Eight 1.5 V size AA batteries in accordance with IEC LR 6 are required for operation of the insulation measuring instrument. Use new alkaline manganese batteries only.

Rechargeable NiCd or NiMH batteries may also be used. These can be charged externally or by connecting the Z502R charger to the test instrument. We recommend rechargeable NiMH batteries.

Always replace batteries in complete sets.

Dispose of batteries in an environmentally sound fashion.

➪ Loosen both slotted screws for the battery compartment lid on the back, and remove the lid.

➪ Remove the battery holder and insert eight 1.5 V size AA batteries with correct polarity in accordance with the symbols.

⚠️ **Attention!**
Make sure that **all of the batteries are inserted with correct polarity**. If just one battery is inserted with reversed polarity, it will not be recognized by the instrument and may result in leakage from the batteries.

➪ Push the battery holder into the battery compartment such that the battery holder's contacts touch the contact springs at the bottom of the battery compartment (see drawing on page 3).
If the battery holder is not inserted as specified, the instrument cannot be supplied with power.

➪ Replace the battery compartment lid and retighten the screws.

⚠️ **Attention!**
The instrument may only be placed into service if the battery compartment lid is securely fastened!

3.3 Charging the Batteries in the Tester

⚠️ **Attention!**
Use only the Z502R charger (available as an accessory) to charge batteries which have already been inserted into the test instrument.
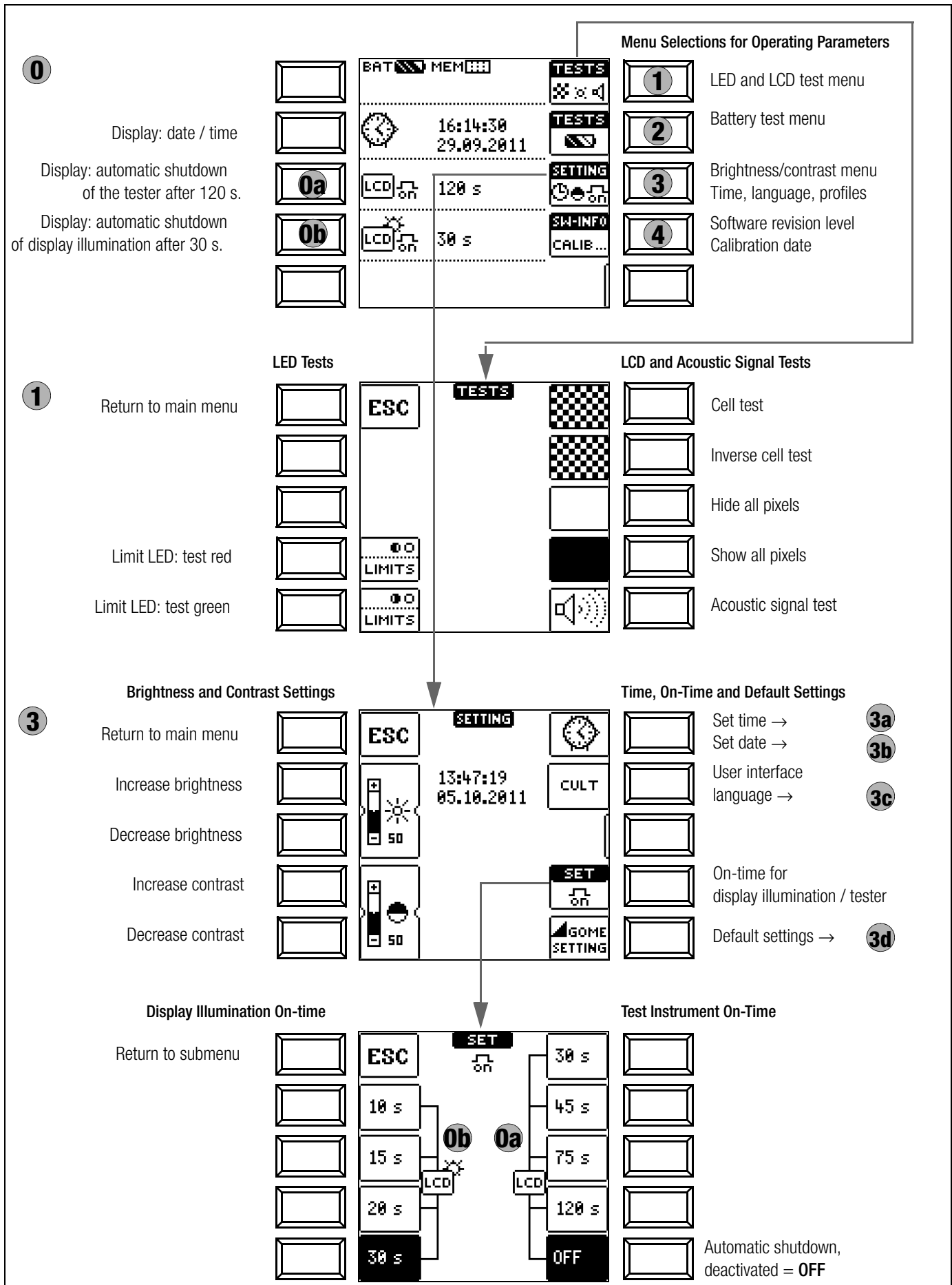**Make sure that the following conditions have been fulfilled before connecting the charger to the charging socket:**
– Rechargeable batteries have been installed with correct
   polarity (not standard batteries)
– The test instrument has been disconnected from the measuring circuit at all poles
– The instrument must remain off during charging.

Refer to section 12.2.1 with regard to charging batteries which have been inserted into the tester.

If the batteries or the battery pack have not been used or recharged for a lengthy period of time (> 1 month), thus resulting in excessive depletion:

Observe the charging sequence (indicated by the LED at the charger) and initiate a second charging sequence if necessary (disconnect the charger from the mains and from the test instrument to this end, and then reconnect it).

3.4   Device Settings – SETUP

SETUP

Menu Selections for Operating Parameters

0

BAT MEM   TESTS

1   LED and LCD test menu

Display: date / time

16:14:30
29.09.2011   TESTS

2   Battery test menu

Display: automatic shutdown
of the tester after 120 s.

0a   LCD   120 s   SETTING

3   Brightness/contrast menu
Time, language, profiles

Display: automatic shutdown
of display illumination after 30 s.

0b   LCD   30 s   SW-INFO
CALIB...

4   Software revision level
Calibration date

LED Tests

LCD and Acoustic Signal Tests

1   Return to main menu   ESC   TESTS

Cell test

Inverse cell test

Hide all pixels

Limit LED: test red   LIMITS

Show all pixels

Limit LED: test green   LIMITS

Acoustic signal test

Brightness and Contrast Settings

Time, On-Time and Default Settings

3   Return to main menu   ESC   SETTING

Set time →   **3a**
Set date →   **3b**

Increase brightness

13:47:19
05.10.2011   CULT

User interface
language →   **3c**

Decrease brightness   50

Increase contrast   SET
on

On-time for
display illumination / tester

Decrease contrast   50   GOME
SETTING

Default settings →   **3d**

Display Illumination On-time

Test Instrument On-Time

Return to submenu   ESC   SET
on

30 s

10 s   45 s

15 s   **0b**   **0a**   75 s

LCD   LCD

20 s   120 s

30 s   OFF

Automatic shutdown,
deactivated = **OFF**

SETUP

Menu Selection for Operating Parameters

0

Display: date / time

Display: automatic shutdown
of the tester after 45 s. **0a**

Display: automatic shutdown
of display illumination after 15 s. **0b**

BAT 🔋 MEM ▦ TESTS ✳ ☀ ◁ **1** LED and LCD test menu

🕐 16:14:30
29.09.2011 TESTS 🔋 **2** Battery test menu

LCD 🔲 on 120 s SETTING 🕐●🔲 **3** Brightness/contrast menu
Time, language, profiles

LCD 🔲 on 30 s SW-INFO CALIB... **4** Software revision level
Calibration date

Adjusting Brightness and Contrast

3

Return to main menu

Increase brightness

Decrease brightness

Increase contrast

Decrease contrast

SETTING 🕐

ESC

⊞ ☀ ⊟ 50

13:47:19
05.10.2011

CULT

SET 🔲 on

◢GOME SETTING

⊞ ● ⊟ 50

Set Time, Language, Profiles, Acoustic Signal

Set time → **3a**
Set date → **3b**

User interface
language → **3c**

On-time
for display illumination / tester

Default settings → **3d**

Set time

3a

Return to submenu

Decrease hours

Decrease minutes

Decrease seconds

ESC 🕐 13:51:21
05.10.2011

✓

13:51:21 ▼

13:51:21 ▼ 13:51:21 13:51:21 ▲

13:51:21 ▼

13:51:21 ▲

13:51:21 ▲

Select time/date

Activate settings

Increase hours

Increase minutes

Increase seconds

Set date

3b

Return to submenu

Decrease day

Decrease month

Decrease year

ESC 🕐 13:51:21
05.10.2011

✓

05.10.2011 ▼

05.10.2011 ▼ 05.10.2011 05.10.2011

05.10.2011

05.10.2011 ▲

05.10.2011

05.10.2011 ▲

Select time/date

Activate settings

Increase day

Increase month

Increase year

Significance of Individual Parameters

0a Test Instrument On-Time

The period of time after which the test instrument is automatically shut off can be selected here. This selection has a considerable influence on the service life and the charging status of the batteries.

0b On-Time for LCD Illumination

The period of time after which LCD illumination is automatically shut off can be selected here. This selection has a considerable influence on the service life and the charging status of the batteries.

Submenu: Battery Level Query

Battery voltage U_{BAT} (Uo) can be queried here without subjecting the battery to a load.
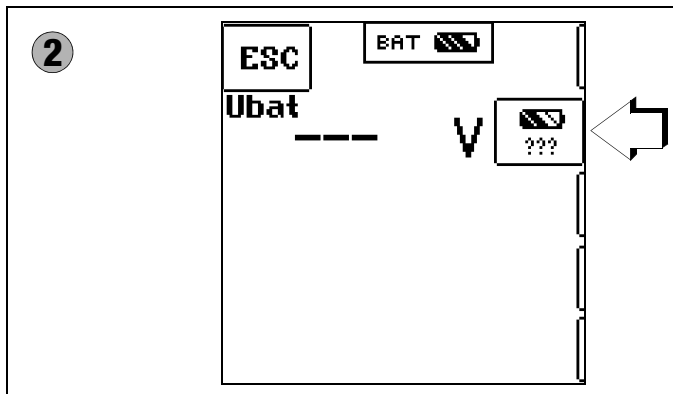
> **Note**
>
> **Measuring Sequence**
> If battery voltage drops to below 8.0 V during the course of a measuring sequence, this is only indicated by means of a pop-up window. Measured values are invalid. Measurement results cannot be saved to memory.
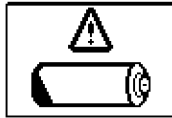
⮕ Press **ESC** in order to return to the main menu.

⚠ **Attention!**

Data are lost when the language is changed, or if the instrument is reset to its default settings!
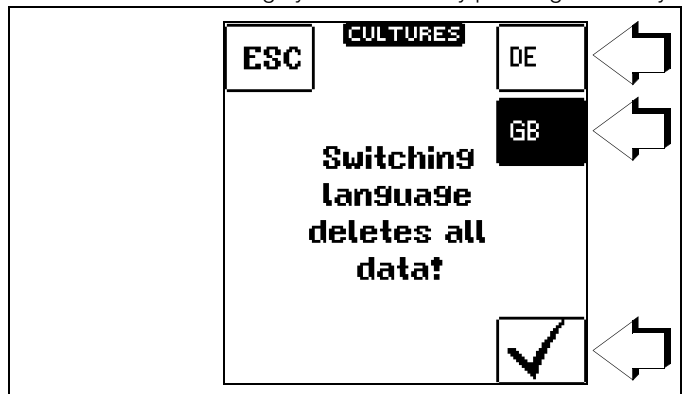Back up your measurement data to a PC with the help of ETC software before pressing the respective key.
The prompt window shown at the right asks you to confirm deletion.
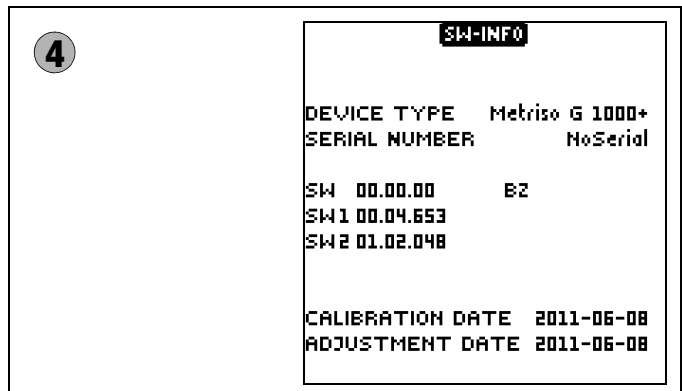
3c User Interface Language (CULTURE)

⮕ Select the desired language with the appropriate country code and acknowledge your selection by pressing the ✓ key.

3d Default Settings (GOME SETTING)

The test instrument is returned to its original default settings when this key is activated.

Firmware Revision and Calibration Information (example)


⮕ Press any key in order to return to the main menu.

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4 General Operation

4.1 Connecting the Instrument

The test leads are connected to the "+" and "COM" jacks.

Special Case: Test Probe for Remote Triggering (Option Z550A)

When inserting the 3-pole plug, make sure that the jack plug is inserted in the START/STOP position. Press and align the 3-pole plug such that it is placed flush on the connection terminal. This is the only way to assure that the three contacts of the jack plug are properly connected with the command cables.
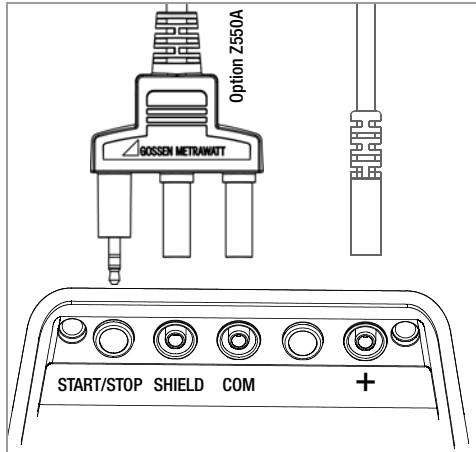
Special Case: Measuring High-Value Resistance with the KS-C Probe (Option)

When measuring electrostatic discharge capacity for floor coverings, the shielded cable should be connected to the COM and SHIELD jacks (KS-C accessory set, "cable set consisting of measurement cable and high-resistance measurement cable for measurements in the GΩ range", see diagram). Be sure to observe color coding.
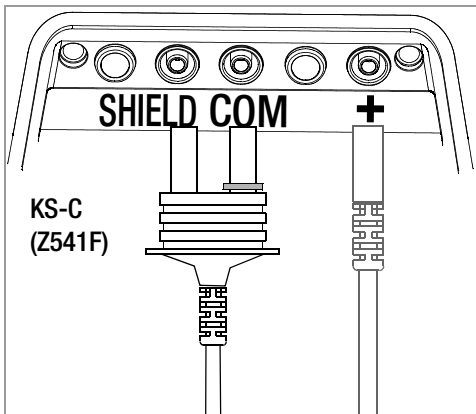
4.2 Switching On, Monitoring and Switching Off

After switching on the device, an acoustic message is generated which signals that the test instrument is ready for operation.

If supply voltage drops to a value of less than 8.5 V, the LOW BATT pop-up message appears: No more measurements can be started.

If battery voltage falls below the allowable limit value of 8.0 V, the instrument cannot be switched on, or it is switched off.

Measurements cannot be started in the resistance measuring ranges in the event of interference voltage.

The instrument only switches itself off automatically after completion of an (automatic) measuring sequence, and after the predetermined on-time has expired (see page 8). On-time is reset to its original value as defined in the setup menu, as soon as any key or the rotary function switch is activated.

If the instrument is switched off automatically with the rotary switch in any position other than OFF, it can be reactivated by pressing the ESC key. The instrument is also reactivated if the rotary switch is activated and turned through the OFF position.

The instrument can be switched off manually by turning the rotary switch to the OFF position.

4.3 Optical Indicators

LED	Status	Function – Cause
Limit	Green	**Limit Value Indication** – Measured **insulation resistance** does not violate the limit value. – Measured **low-resistance** Rlo does not violate the limit value.
Limit	Red	**Limit Value Indication** – Measured insulation resistance has fallen short of the selected limit value. – Measured low-resistance Rlo does has exceeded the permissible limit value.
Uramp	Green	**Indication of ramp characteristics** – Maximum ramp voltage (upper voltage limit) has been reached (without breakdown).
Uramp	Red	**Indication of ramp characteristics** – Maximum ramp voltage (upper voltage limit) has not been reached (due to breakdown). Breakdown voltage is displayed.
⚠	Red	**Interference voltage in switched-off condition[1] and signal-lings of test voltage during insulation measurement** Dangerous voltage of greater than 50 V is present at the measurement inputs: – Initialization of insulation resistance and low-resistance measurement is disabled. – High test voltage is applied to the measuring terminals (Riso/Rins, PI and DAR) during insulation measurement
🛑 U_{EXT}		**Detection of interference voltage in the on-state** in the resistance measuring ranges after starting measurement The value of interference voltage is displayed in addition to signalling in the resistance measuring ranges for as long as it is present.

[1] Function testing should be executed at regular intervals (see following section regarding testing the LEDs).

Testing the LED which Indicates Detection of Interference Voltage when Switched Off – OFF Switch Position

➪ Apply a voltage of greater than 50 V (+ and COM jacks).
➪ Turn the rotary switch to the V position.
➪ Read the voltage value at the LCD.
➪ Turn the rotary switch to the OFF position.

Test results: If applied voltage is unchanged and the LED which indicates the detection of interference voltage lights up red, the LED is OK. In this case, the LED reliably indicates interference voltage even when the instrument is switched off. We recommend executing this test at regular intervals.

METRISO XTRA Measuring Functions, Measuring Ranges and Limit Values

	Measuring Ranges
R_{ISO} / R_{INS}	U = 50, 100, 250, 500, 1000 V
R_{ISO} / R_{INS}	Uvar = 50 ... 1000 V
R_{ISO} / R_{INS}	Uramp (U◢) = 100 ... 1000 V
R	10 ... 10 kΩ
R_{LO}	0.01 ... 10 Ω
U	0 ... 1000 V

	Limit Values		
Limit			
Limit R_{ISO} / R_{INS}	Fixed setting	50 kΩ @ U_{ISO}/U_{INS} =	50 V
	Fixed setting	100 kΩ @ U_{ISO}/U_{INS} =	100 V
	Fixed setting	500 kΩ @ U_{ISO}/U_{INS} =	250 V
	Fixed setting	1 MΩ @ U_{ISO}/U_{INS} =	500 V
	Fixed setting	1 MΩ @ U_{ISO}/U_{INS} =	1000 V
	Fixed setting	1 MΩ @ U_{ISO}/U_{INS} =	Uvar
PI limit	Adjustable	1.0, 1.1, 1.5, 2.0, 3.0, 4.0	
DAR limit	Adjustable	1.25, 1.6	
Limit R_{LO}	Fixed setting	2 Ω	

4.4 Measurement Value Display and Memory

The following appear at the **display panel**:

- Measurement values with abbreviations and units of measure
- Selected function
- Error messages

Measurement values for automatic measuring sequences are stored and displayed as digital values until the next measurement sequence is started, or until automatic shut-off occurs.

4.5 Help Function

A wiring diagram can be displayed for selected switch positions, as well as basic functions **after they have been selected with the rotary selector switch**:

➪ Press the **HELP** key in order to query online help.

➪ Press the **ESC** key in order to exit online help.

HELP

If the upper range limit is exceeded, the upper limit value is displayed and is preceded by the ">" symbol (greater than), which indicates measurement value overrun.

☞ **Note**

The depiction of LEDs in these operating instructions may vary from the LEDs on the actual instrument due to product improvements.
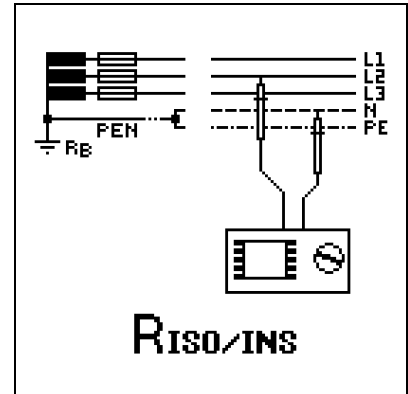
4.6 Setting Measuring Parameters using Insulation Resistance Measurement as an Example

1 Access the submenu for setting the desired parameter.

2 Select a parameter using the ↑ or ↓ scroll key.

3 The setting value is not permanently accepted for the respective measurement until the ✓ key is pressed, after which the display is returned to the main menu. You can return to the main menu by pressing ESC instead of ✓, without accepting the newly selected value.

4.7 Specifying Nominal Voltage for Uvar and Uramp

Nominal voltage can be freely selected within specified limits for the Uvar and Uramp measuring functions:

Select the EDIT menu.

Select value.

Select value.

↵ Accept value.
✓ Save value (to list).

Delete characters =
change cursor position.
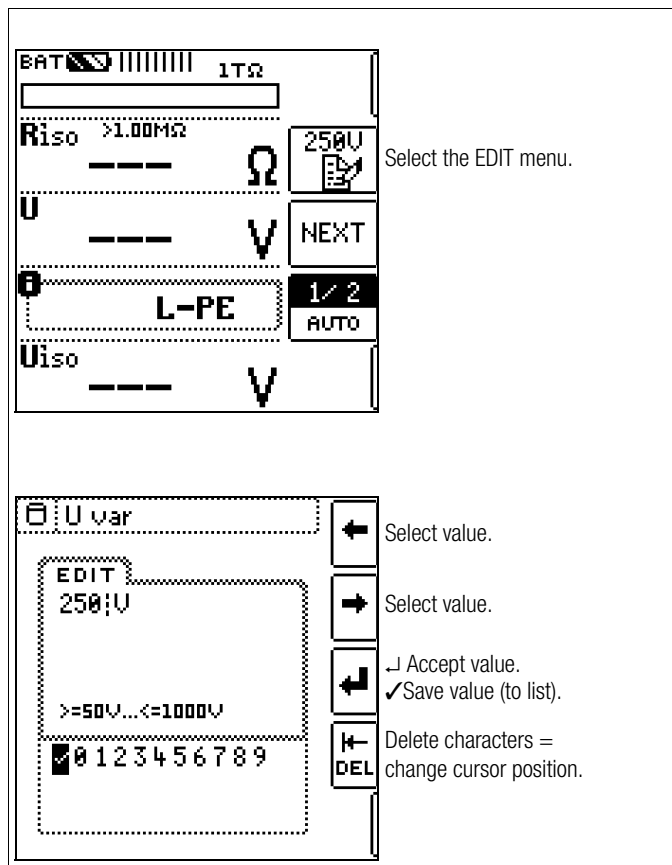
1   Access submenu for selecting the desired voltage:

Press the key with the [icon] icon.

2   Select the desired value with the left or right scroll key. The value is accepted by pressing the ↵ key. The entire value is acknowledged by selecting ✓ and then pressing the ↵ key.
    The new nominal voltage appears at the main display.

☞   **Note**

Observe the predefined limits for the new setting value. New, freely selected limit values or nominal values included in the parameters list can be deleted/edited at the PC with the help of ETC software.

5 Measuring Direct Alternating Voltage

You can measure direct voltage, as well as sinusoidal alternating voltage with frequencies ranging from 45 to 65 Hz, with this test instrument.

Select Measuring Function
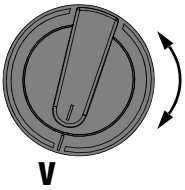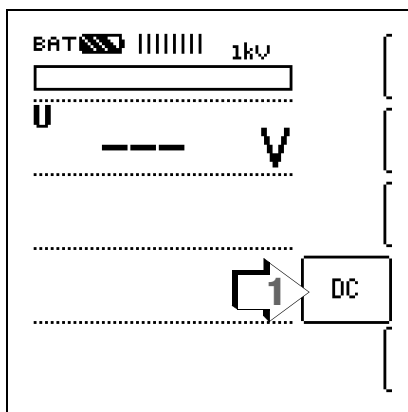

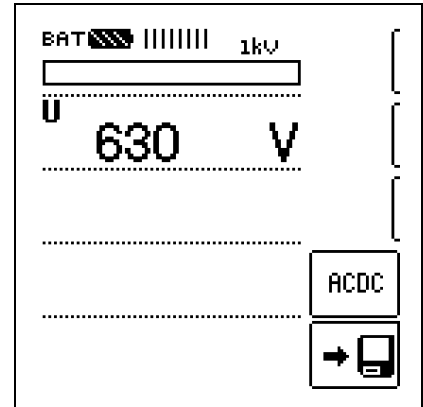➮ Select the **V** measuring function with the rotary switch.

Connection
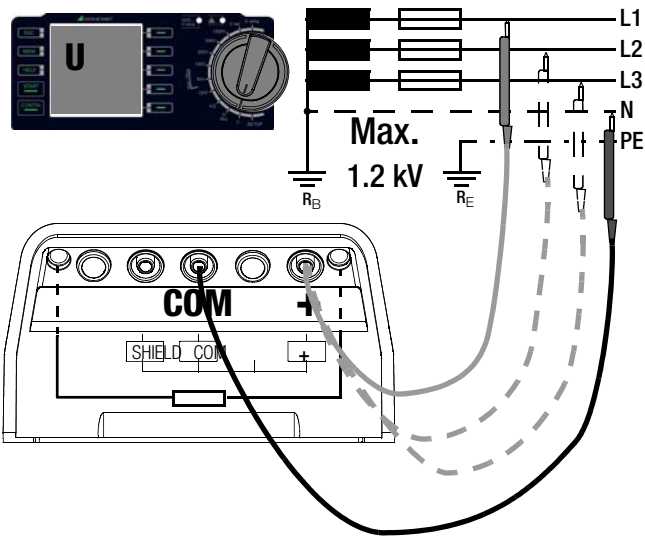
➮ Connect the measurement cables to the **+** and **COM** jacks.
➮ Contact the measuring point with both test probes.

Set the waveform parameter (voltage type).
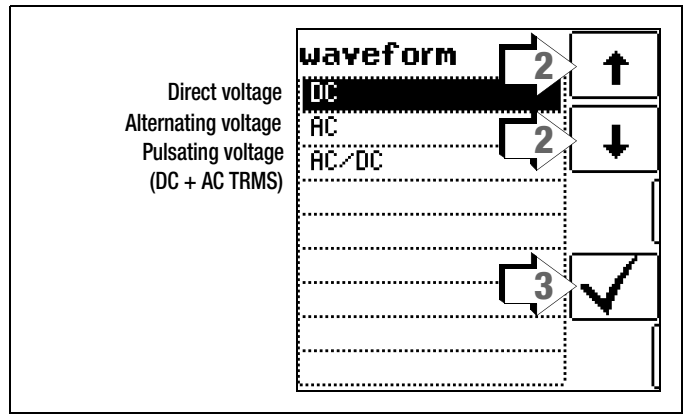
Measurement

The measured value is displayed directly (without pressing the **START** key) – in analog format at the bar graph and in digital format at the matrix display.

➮ After completing the measurement, switch the instrument off by turning the rotary switch to the **OFF** position.

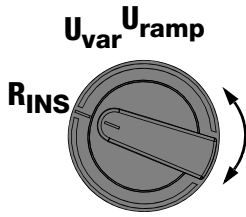The **ESC**, **START** and **CONTIN.** keys have no function in this case.

☞ **Note**
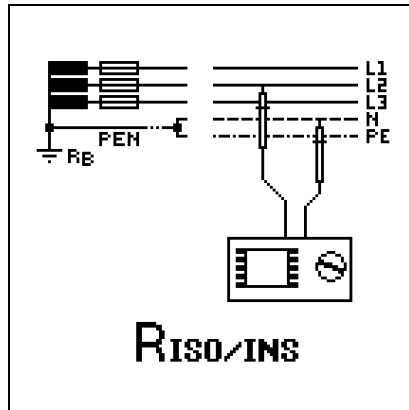   Input impedance for the voltage measuring range is 10 MΩ.

---

6 Measuring Insulation Resistance

Select Measuring Function

⇨ Select the R$_{INS}$ measuring function with the rotary switch and, depending on the measuring task, constant or variable test voltage (Uvar), or a ramp function (Uramp).

Connection

☞ **Note**
Checking Measurement Cables Before Measurements
Before performing insulation measurement, the test probes on the measurement cables should be short-circuited in order to assure that the instrument displays a value of less than 1 kΩ (see section 9). In this way, incorrect connection can be avoided and broken measurement cables can be detected.

⇨ Connect the device under test to the **+** and **COM** jacks.

Sample connection layouts for insulation resistance measurement are included in section 13.1.

Insulation resistance can only be measured at voltage-free objects. If mains voltage or interference voltage is applied to the measurement inputs, measurement cannot be started.

**Semiautomatic Measurement in Multipole Systems**

Fast, semiautomatic polarity reversal is possible in all rotary switch positions for insulation resistance measurement. However, polarity selection is only relevant for documentation.

Fast Polarity Reversal

The polarity parameter is set to **AUT01** (single-phase mains voltage) or **AUT03** (3-phase mains voltage).

There are two ways to quickly and conveniently switch amongst all polarity variants without switching to the parameter settings submenu:

• Press the NEXT key.
• Press the save key at the instrument twice after each measurement.
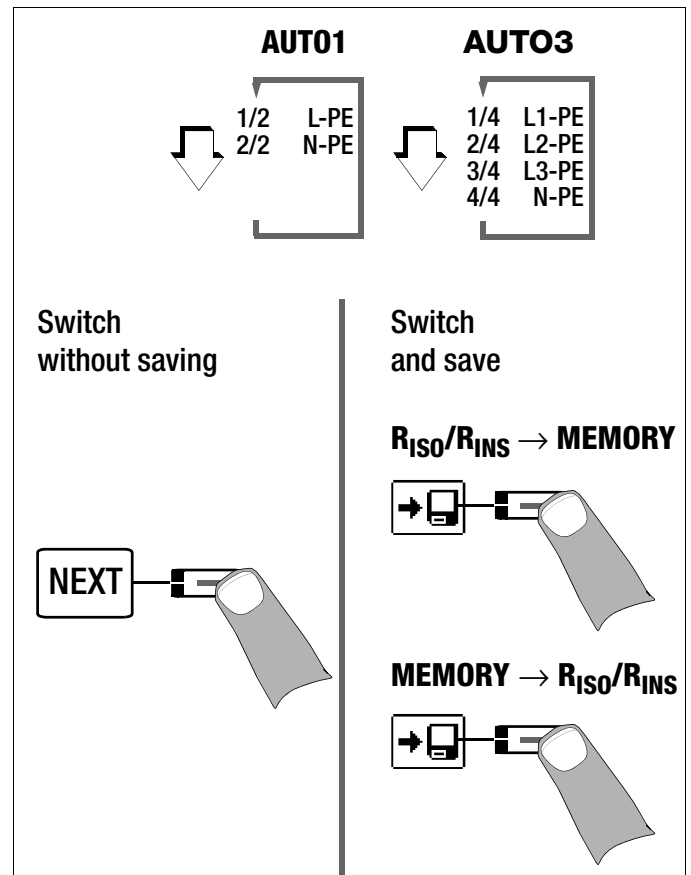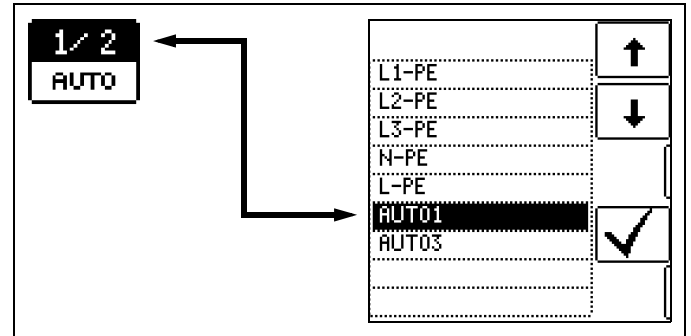

Continuous Measurement via the CONTIN. Key

☞ **Note**
The instrument's batteries are rapidly depleted during the insulation resistance measurement. Stop continuous measurement with "constant test voltage" as soon as the display has settled in.

6.1 Measuring with Constant Test Voltage and Nominal Value Selection via Rotary Switch Position

Set Parameters

Test voltage switch position: 50 V / 100 V / 250 V / 500 V / 1000 V

Polarization index
Absorption index
Insulation resistance
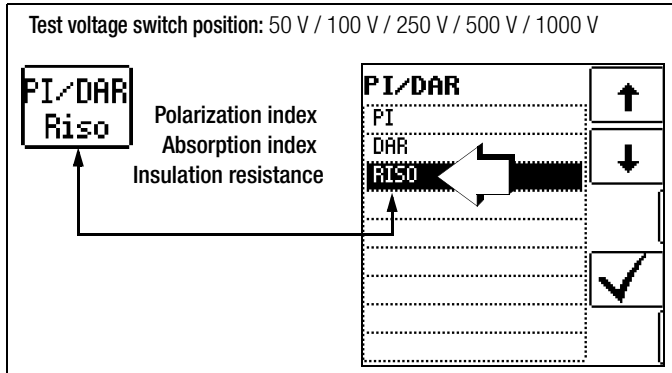
The constant test voltage function offers two options:

- **After briefly pressing** the **START** key, specified test voltage UN is read out and insulation resistance RINS is measured. As soon as the measured value is stable (settling time may be several seconds in the case of high cable capacitance values), measurement is ended and the last measured values for RINS and UINS are displayed. **U** is the **voltage** which is measured **at the test probes** during and after testing. This voltage drops to a value of less than 10 V (see section entitled "Discharging the Device Under Test".

or

- **As soon as** you press the **CONTIN** key, test voltage UN is applied and insulation resistance RINS is measured. Do not press the key again in order to stop measurement until the measured value has settled in (settling time may be several seconds in the case of high cable capacitance values). Voltage U, which is measured during testing, corresponds to voltage UINS. After once again pressing the **CONTIN** key, measurement is ended and the last measured values for RINS and UINS are displayed. U drops to a value of less than 10 V after measurement (see the section entitled "Discharging the Device Under Test".

Start Measurement
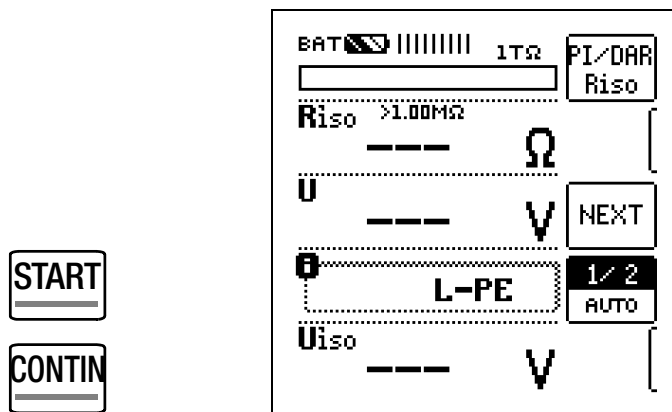
After pressing the **START** key, nominal voltage U_N (50 ... 1000 V) selected with the rotary switch is applied until the measured values settles in.

After pressing the **CONTIN.** key, the previously selected test voltage or nominal voltage U_N (50 to 1000 V) is applied until the **CONTIN. key** is pressed once again.

U is the **voltage** which is measured **at the test probes** during and after testing. This voltage drops to a value of less than 10 V after measurement (see section 6.5, "Discharging the Device Under Test'').

Test voltage U is displayed for **U_{INS}**.

6.2 Measurement with Constant Test Voltage and Variably Adjustable Nominal Value

A test voltage which deviates from nominal voltage, and is usually lower, can be selected for measurements at sensitive components, as well as systems with voltage limiting devices.
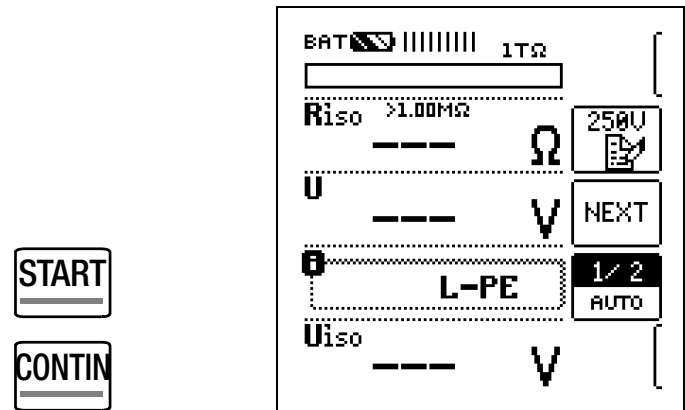
Set Parameters

Variable test voltage
(constant nominal value):
50 V ... 1000 V
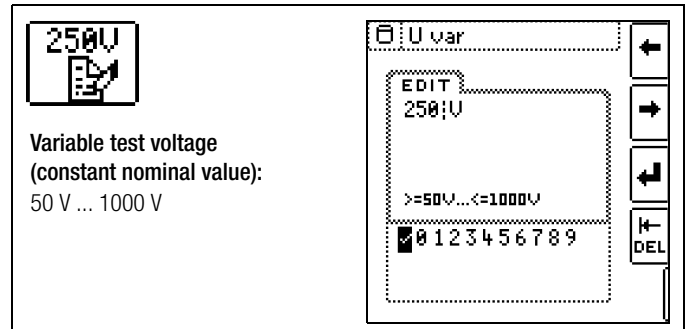
Refer to section 4.7 regarding how to enter the variable voltage. The selected nominal voltage is displayed in the main menu.

❏ **Pole Selection Report Entry**

The poles between which testing takes place can only be entered here for reporting purposes. The entry itself has no influence on the actual polarity of the test probes or pole selection.

Start Measurement

After pressing the **START** key, nominal voltage U_N (50 to 1000 V) entered previously via the parameters menu is applied until the measured values settles in.

After pressing the **CONTIN.** key, the previously selected test voltage or nominal voltage U_N (50 to 1000 V) is applied until the **CONTIN.** key is pressed once again.

U is the **voltage** which is measured **at the test probes** during and after testing. This voltage drops to a value of less than 10 V after measurement (see section 6.5, "Discharging the Device Under Test'').

Test voltage U is displayed for **U_{INS}**.

☞ **Note**

The instrument's batteries are rapidly depleted during the insulation resistance measurement. Stop continuous measurement with "constant test voltage" as soon as the display has settled in.

6.3 Measurement with Rising Test Voltage (ramp function) and Variably Adjustable Final Value

The "Uramp" rising test voltage function (ramp function) is used to detect weak points in the insulation, as well as to determine response voltage for voltage limiting components.

Set Parameters

Maximum test voltage (final ramp value)
100 V ... 1000 V

Current load:
Max. 1 mA (at 1 KΩ/V)
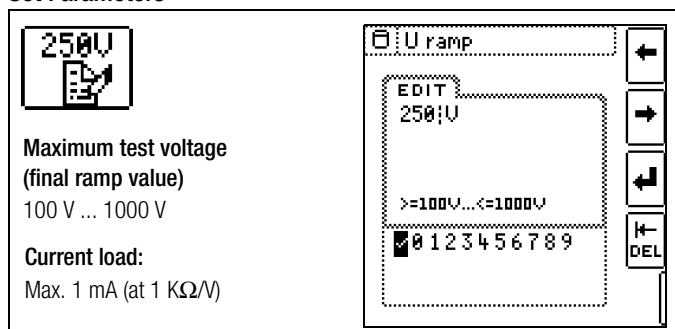
Refer to section 4.7 regarding how to set the final ramp value. The selected nominal voltage value is displayed in the main menu.

❏ **Pole Selection Report Entry**

The poles between which testing takes place can only be entered here for reporting purposes. The entry itself has no influence on the actual polarity of the test probes or pole selection.
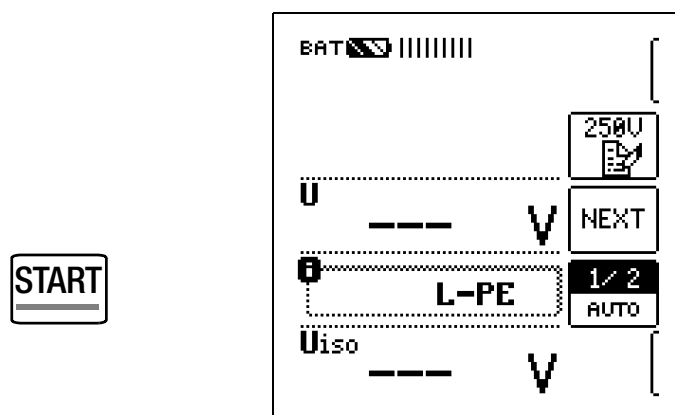
Start Measurement

After briefly pressing the **START** key, test voltage is continuously increased until the specified nominal voltage U_N (100 ... 1000 V) is reached.

Insulation measurement with rising test voltage is ended:

- As soon as specified maximum test voltage U_N is reached and the measured value is stable

or

- After sparkover occurs at breakdown voltage

As soon as the final ramp value is reached, the **Uramp LED** lights up green. If the final ramp value is not reached due to sparkover, the **Uramp LED** lights up red.

U is the **voltage** which is measured **at the test probes** during and after testing. This voltage drops to a value of less than 10 V after measurement (see section 6.5, "Discharging the Device Under Test'').

Highest achieved test voltage U or any **triggering or breakdown voltage** which occurs is displayed for **U_{INS}**.

☞ **Note**

Measurement can be stopped at any time by pressing the START key or the CONTIN. key.

6.4 Insulation Resistance Measurement – Special Conditions

⚠ **Attention!**

Insulation resistance can only be measured at voltage-free objects.

If measured insulation resistance is less than the selected limit value, the limit LED lights up red.

If an interference voltage of roughly ≥ 15 V is present and "U_{EXT} – Interference Voltage" appears in a pop-up window, insulation resistance is not measured. In the case of interference voltage > 50 V, the "> 50 V" LED lights up.

In 3-phase systems, all conductors (L1, L2, L3 and N) must be tested against PE!

⚠ **Attention!**

Do not touch the instrument's terminal contacts during insulation resistance measurements!

If nothing has been connected to the terminal contacts, or if a resistive load component has been connected for measurement, your body would be exposed to a current of approximately 1 mA at a voltage of 1000 V. The noticeable shock may lead to injury (e.g. resulting from a startled reaction etc.).

6.4.1 Measurements with the Guard Cable

The measurement of very high resistances necessitates extremely minimal measuring current and may be rendered problematic as a result of influences such as electromagnetic fields, humidity or surface pollution. An accurate test set-up is thus absolutely essential.

A guard cable must be used for measurements within a range of 100 GΩ (10 GΩ) … 1 TΩ, in order to prevent surface current from distorting measurement results. The guard rings prevent current at the surface of the insulation material from flowing from the +measurement cable to the –measurement cable, instead of through the insulation material itself.

- ➪ Insert the plug from the guard cable into the appropriate jack in the test instrument.
- ➪ Plug the alligator clip onto the guard cable test probe.
- ➪ Connect the alligator clip to the guard ring between the two measuring points at the insulation material under test.
- ➪ Refer to section 6.1 to section 6.3 regarding the measuring sequence.
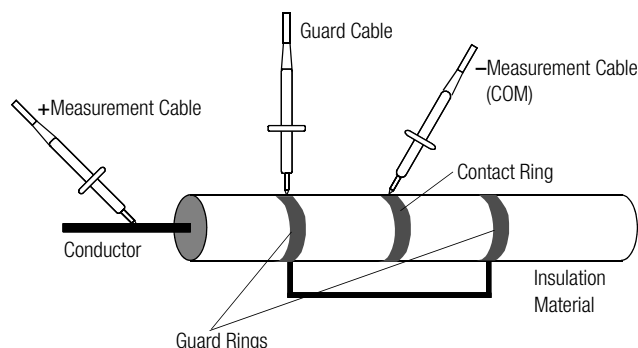
☞ **Note**

The following materials can be used as guard rings: aluminum foil, copper foil or metallic hose clamps.

6.5 Discharging the Device Under Test

When an insulation resistance measurement has been performed on a capacitive object it is automatically discharged by the instrument after measurement has been completed. Contact with the device under test must be maintained to this end. The falling voltage value can be observed at the U display.
Do not disconnect the DUT until less than 10 V is displayed for U!

6.6 Evaluation of Measured Values

Instrument measuring error must be taken into consideration in order to assure that the limit values set forth in DIN VDE regulations are not fallen short of. The required minimum display values for insulation resistance can be determined with the help of the table, "Display Values in Consideration of Measuring Uncertainty", on page 30. These values take maximum device error into consideration (under nominal conditions of use). Intermediate values can be interpolated.

6.7 Polarization Index Measurement

In the case of electrical machines which include components with windings (generator and motor windings), it's advisable to conduct polarization index testing. This procedure involves expanded testing of insulation resistance. The accumulation of moisture and contamination on windings can be detected as reduced insulation resistance.

DC measuring voltage from the METRISO XTRA is applied to the insulation for a duration of 10 minutes to this end. 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.

The molecules within the insulation are 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 molecules contained in the insulation can still be moved, thus allowing for polarization. This, in turn, is an indication of the condition of the insulation. The more freely the charge carriers can be moved, the better is the condition of the insulation.

The following rules apply in general:

$$PI = \frac{R_{10min}}{R_{1min}}$$

PI value < 1:	Troubleshooting is required.
PI value = 1 to 2:	Maintenance is advisable.
PI value = 2 to 3:	DUT is OK! No immediate action is required. Preventive maintenance can be planned according to workload.
PI values > 3:	Error-free device under test

Applications

Determination of moisture and contamination levels

☞ **Note**
Z550A Option
Use of the measurement cable with remote start/stop is not advisable for polarization index measurement PI or absorption index measurement DAR, because measurement is only conducted as long as the START key is pressed and held. In order to assure that the entire measuring sequence is nevertheless executed, start each measurement with the **START** key at the test instrument only.

Set Parameters

Test voltage switch position: 50 V / 100 V / 250 V / 500 V / 1000 V

Start Measurement

The selected polarization index menu is only displayed until the rotary switch is activated or the parameter is changed.

6.7.1 Absorption Index (DAR) – DC Charging Test

The absorption index test is part of the polarization index test. Insulation resistance measurements are placed in relationship to one another after 30 and 60 seconds.

Applications: Faster version of the polarization index test.

$$DAR = \frac{R_{60s}}{R_{30s}}$$

### Set Parameters

Start Measurement

The selected polarization index menu is only displayed until the rotary switch is activated or the parameter is changed.

7 Test Resistor for Insulation Measurement for Checking the Insulation Measuring Instrument

According to section 5.3.1.2 of VDE 0105-100 (EN 50110-1), the following applies: "These measuring instruments must be tested before, and if applicable after use."

The two outermost jacks on the connection panel must be connected to each other internally via a 10 MΩ test resistor to this end.

The sum of test resistor and cable resistance (for both cables), including test probes, amounts to 10 MΩ ±5%. This value allows for quick self-testing.
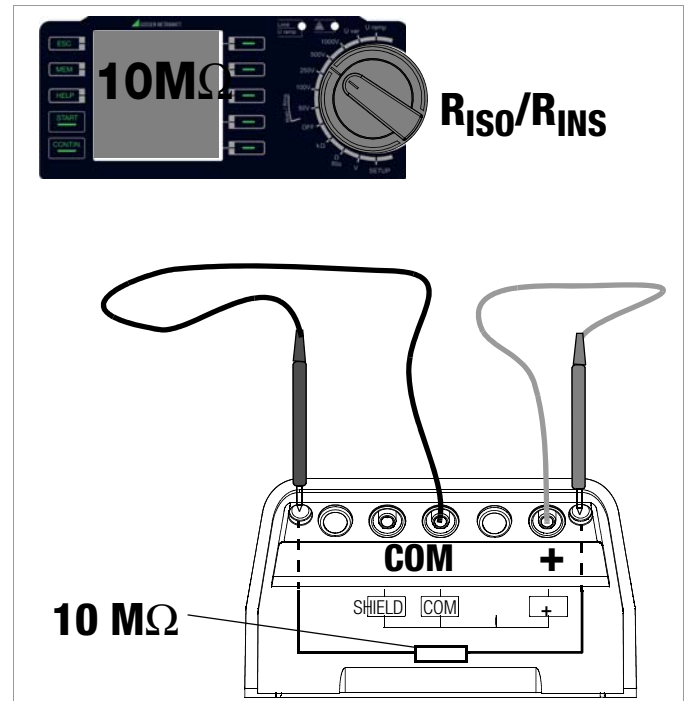

➪ Connect the measurement cables to the + and **COM** jacks.

➪ Insert the test probes into the above described jacks.

➪ Select the RiSO/iNS measuring function with the rotary switch, as well as the desired test voltage, e.g. RiSO 100V.

➪ Press the start key and view the measurement results.

8 Measuring Resistance – kOhm Function

Resistances of greater than 10 Ω and less than 10 kΩ are measured in this switch position. Refer to section 9 regarding resistances of less than 10 Ω .
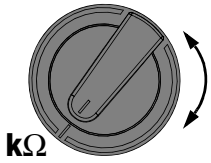
Select Measuring Function

⇨ Select the **k**Ω measuring function with the rotary switch.
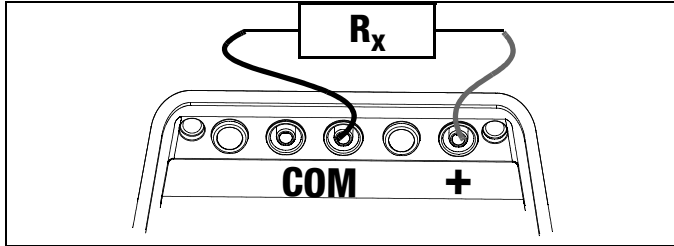
Connection

⇨ Connect the device under test to the **+** and **COM** jacks.

⚠ **Attention!**
Resistance can only be measured at voltage-free objects. If mains voltage or interference voltage is applied to the measurement inputs, measurement cannot be started.

Start Measurement
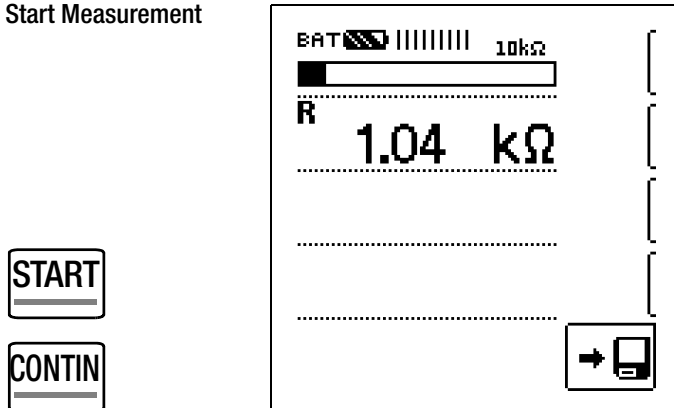
⇨ Start an individual measurement by briefly pressing the **START** key, or initiate continuous measurement by briefly pressing the **CONTIN** key.

Special Case: Measuring High-Value Resistance with the KS-C Probe

Connection

⇨ Connect the device under test to the **+** and **COM** jacks with a shielded cable via the optional **KS-C** probe.

9 Measuring Low-Value Resistance of up to 10 Ohm (protective conductor and equipotential bonding conductor)

According to the regulations, the measurement of low-value resistance at protective conductors, earth conductors or bonding conductors must be performed with (automatic) polarity reversal of the test voltage, or with current flow in one direction (+ pole to PE) and then the other (– pole an PE).

⚠ **Attention!**

In the measuring function R_{LO}, measurements are performed with **currents about 200 mA**.
Please check before measuring whether your DUT or your circuit is designed for these high current values.

⚠ **Attention!**

Low-value resistance can only be measured at voltage-free objects.

Select Measuring Function

R_{LO}

➪ Select the **Rlo** measuring function with the rotary switch.

Connection

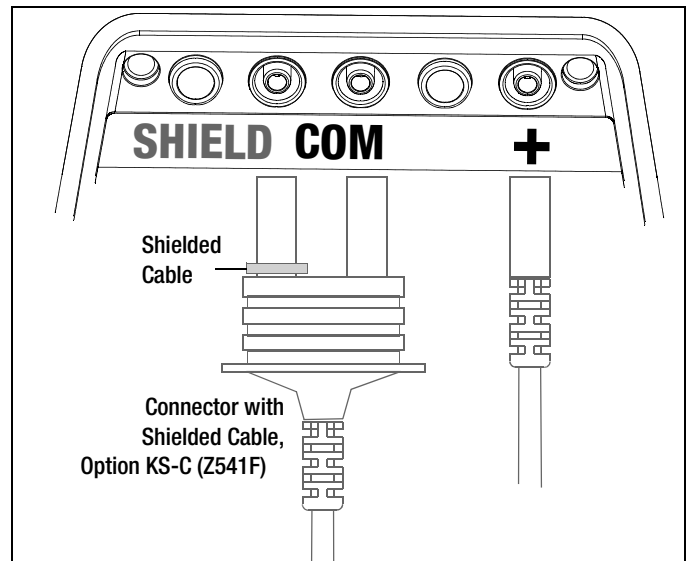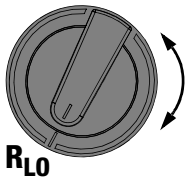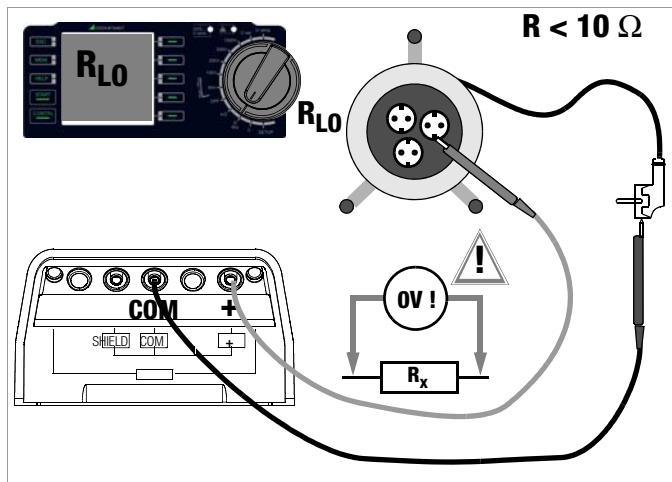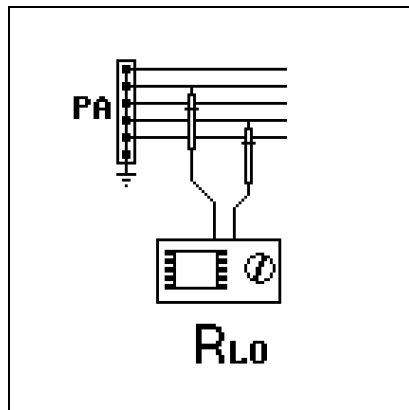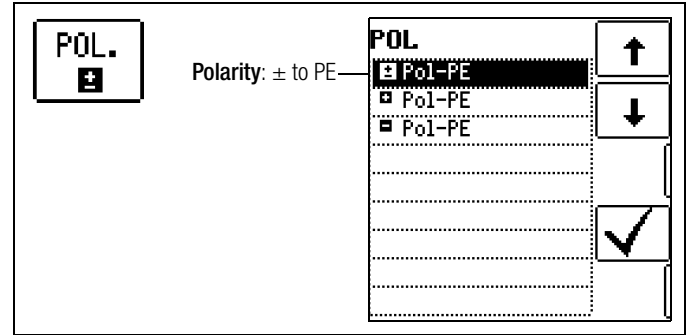➪ Connect the device under test to the **+** and **COM** jacks.

Set Polarity Parameter (direction of current flow)

➪ Select a polarity option or automatic polarity reversal.

Measuring ROFFSET

When using extension cables with resistance of up to 5.00 Ω, their resistance can be deducted automatically from the measurement results. Proceed as follows:
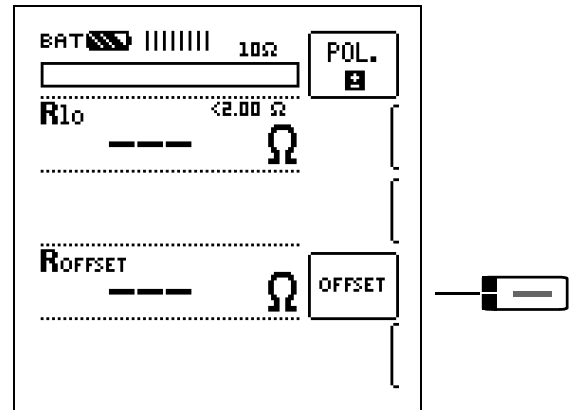
➪ Short-circuit the end of the measurement extension cable with the second test probe at the instrument.
➪ Start measurement of offset resistance with **OFFSET**.

☞ **Note**

If the difference between RLO+ and RLO– is great than 10% with automatic polarity reversal, no offset is accepted. A pop-up window appears which must be acknowledged by any desired key. The respectively smaller value is otherwise stored to memory as an offset value.
The maximum offset value is 5.00 Ω. Negative resistances may result due to the offset value.

The permissible value for **ROFFSET** is between 0.00 and 5.00 Ω. In the case of values of greater than 5.00 Ω, a pop-up window appears and the value is not accepted. The error message must be acknowledged and/or cleared by any desired key.
The measured **ROFFSET** value will now be deducted from the actual measurement value for all subsequent R_{LO} measurements.
ROFFSET can be deleted at any time by pressing the **OFFSET CLEAR** key.

☞ **Note**

Only use this function when performing measurements with extension cables.
When different extension cables are used, the above described procedure must always be repeated.

Start Measurement

```
BAT ▨ ||||||||   10Ω     POL.
                          ⬛

Rlo              <2.00 Ω

      ---         Ω

                         OFFSET
                         CLEAR

Roffset
      0.24        Ω       OFFSET

 ▯
           Ω →
```
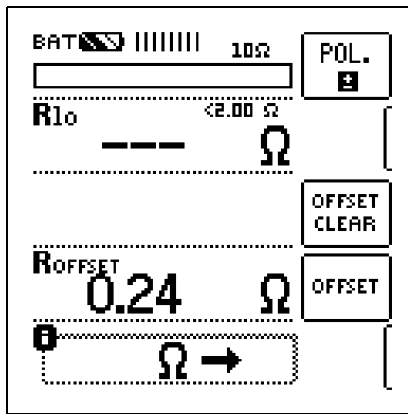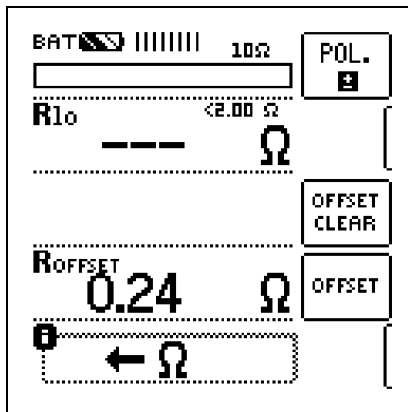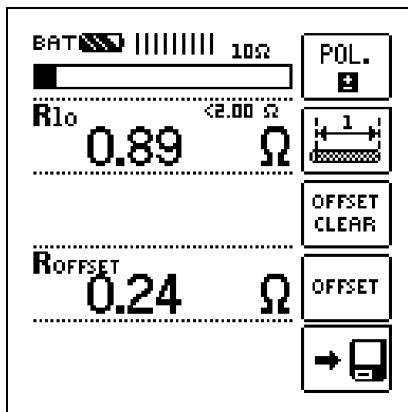
START

Measurement of + pole to PE

```
BAT ▨ ||||||||   10Ω     POL.
                          ⬛

Rlo              <2.00 Ω

      ---         Ω

                         OFFSET
                         CLEAR

Roffset
      0.24        Ω       OFFSET

 ▯
           ← Ω
```

Measurement of – pole to PE

```
BAT ▨ ||||||||   10Ω     POL.
                          ⬛

Rlo              <2.00 Ω
      0.89        Ω       ⊢—1—⊣

                         OFFSET
                         CLEAR

Roffset
      0.24        Ω       OFFSET

                         → ▯
```

Final results

⚠ **Attention!**
The measurement cannot be started until the test probes are in contact with the device under test.
If a voltage of U > approx. 3 V is present at the device under test, a pop-up window appears which warns against interference voltage.
This error message must be acknowledged and/or cleared by any desired key. Eliminate the interference voltage.
If resistance is greater than 10 Ω, OL appears at the display.

In the case of single-pole measurement, the respective value is saved to the database as RLO.

Polarity Selection	Display	Condition
+ pole to PE	**RLO+**	None
– pole to PE	**RLO–**	None
± pole to PE	**RLO**	If Δ**RLO** ≤ 10%
	RLO+ **RLO–**	If Δ**RLO** > 10%

Automatic Polarity Reversal

After the measuring sequence has been started, the instrument performs measurement with automatic polarity reversal, first with current flow in one direction, and then in the other.

If the difference between RLO+ and RLO– is greater than 10% with automatic polarity reversal, RLO+ and RLO– values are displayed instead of RLO. The respectively larger value, RLO+ or RLO–, appears at the top and is saved to the database as the RLO value.

Resistances which do not demonstrate a stable value until after a "settling in period" should not be measured with automatic polarity reversal. Measurement with automatic polarity reversal may lead to varying and/or inflated measurement values, and thus to an ambiguous reading.

Limit Value Indication

If the measured value is less than or equal to 2 Ω, the **limit LED** lights up green. If the measured value is greater than 2 Ω, the LED lights up red.

Evaluating Measurement Results

Differing results for measurements in both directions indicate voltage at the DUT (e.g. thermovoltages or unit voltages).

Measurement results can be distorted by parallel connected impedances at load current circuits and by equalizing current, especially in systems which make use of "overcurrent protection devices" (previous neutralization) without an isolated protective conductor. Resistances which change during measurement (e.g. inductance), or a defective contact, can also cause distorted measurements (double display).

In order to assure unambiguous measurement results, causes of error must be located and eliminated.

In order to find the cause of measuring error, measure resistance in both current flow directions.

☞ **Note**
Measuring Low-Value Resistance
If an extension cable is used its resistance must be measured and deducted from the measurement results.

Resistances which do not demonstrate a stable value until after a "settling in period" should not be measured with automatic polarity reversal, but rather one after the other with positive and negative polarity.
Examples of resistances whose values may change during measurement include:
– Incandescent lamp resistance, whose values change due to warming caused by test current
– Resistances with a large conductive component
– Contact resistance

Evaluating of Measured Values

See table, "Display Values in Consideration of Measuring Uncertainty", on page 30.

Calculation of Cable Lengths for Common Copper Conductors

If the [icon] key is activated after performance of resistance measurement, the cable lengths corresponding to common conductor cross sections are displayed.


```
RLO:
                    l
        |←――――――――――――――――→| |Ø
        ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
              └Cu

    Ø        l   │   Ø        l
   [mm²]    [m]  │  [mm²]    [m]
   .............│..............
   0.14:    1.42 │  2.5:    25.3
   0.25:    2.53 │  4.0:    40.5
   0.50:    5.07 │  6.0:    60.8
   0.75:    7.60 │ 10.0:    101
   1.00:    10.1 │ 16.0:    162
   1.50:    15.2 │ 25.0:    253
```
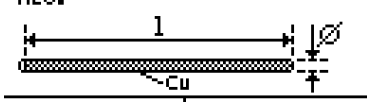
If results vary for the two different directions of current flow, cable length is not displayed. In this case, capacitive or inductive components are apparently present which would distort the calculation.

This table only applies to cables made with commercially available copper conductors and cannot be used for other materials (e.g. aluminum)!

10 Database

10.1 Creating Distributor Structures, General

A complete distributor structure with customer, building and distributor data can be created in the METRISO XTRA test instrument. This structure makes it possible to assign measurements to distributors in various buildings and customer facilities.

There are two possible procedures:

- On location or at the construction site: Create the distributor structure in the test instrument. A distributor structure with up to 50,000 structural elements can be created in the test instrument, which is saved to the instrument's flash memory.
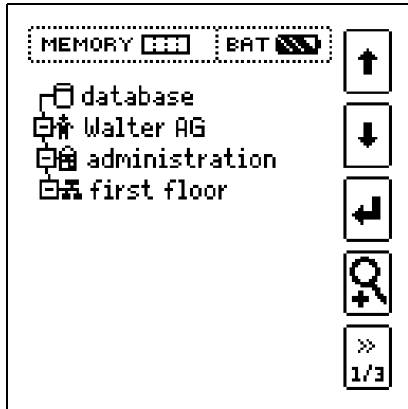
or

- Create and save a distributor structure at a PC with the help of **ETC report generating software** (Electric Testing Center) (see condensed operating instructions for ETC report generating software). The distributor structure is then transferred to the test instrument.
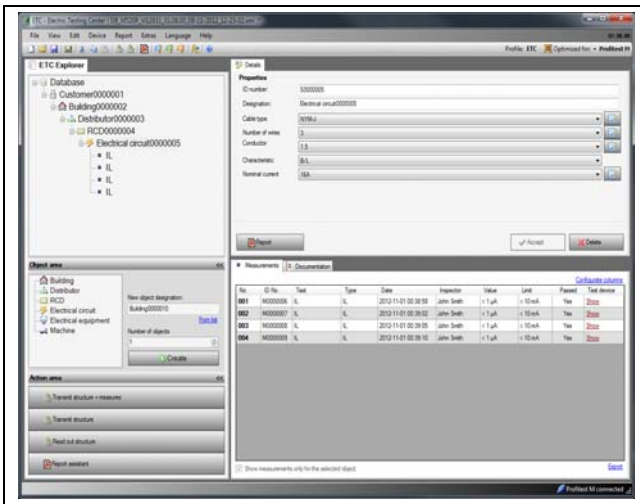
Note regarding ETC Report Generating Software

The following steps must be completed before using the software:

- **Install USB device drivers:**
  (required for operation of the METRISO XTRA at a PC): GMC-I Driver Control software can be downloaded from Gossen Metrawatt's website at: www.gossenmetrawatt.com

- **Install ETC report generating software:**
  You can download the current ETC version free of charge from our homepage under section **myGMC** after registration or login: www.gossenmetrawatt.com

10.2 Transferring Distributor Structures

The following data transfer operations are possible:

- Transfer a distributor structure from the PC to the test instrument.
- Transfer a distributor structure including measured values from the test instrument to the PC.

The test instrument and the PC must be connected with a USB cable in order to transfer distributor structures and data.

The following image appears at the display during transfer of structures and data.
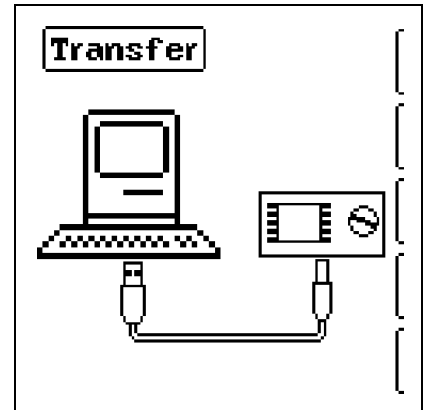
10.3 Creating a Distributor Structure in the Test Instrument

Overview of the Meanings of Icons used to Create Structures

| Icon		Meaning
Main Level	Sub-Level	
		Memory menu, page 1 of 3
⬆		Cursor UP: scroll up
⬇		Cursor DOWN: scroll down
↵	⊞ ⊟	ENTER: acknowledge selection + → − change to sub-level (open directory) or − → + change to main level (close directory)
⚲₊		Display structure designation or ID number
	🌐 ID	Switch back and forth between structure designation and ID number
⚲₋		Hide structure designation or ID number
≫ 1/3		Change display to menu selection
		Memory menu, page 2 of 3
📄⁺		Add a structural element
(icons)		Meaning of icons from top to bottom: **Customer**, **building**, **distributor**, **RCD** and **electrical circuit** (display of the icons depends on the selected structural element). Selection: up/down scroll keys and ↵ In order to add a designation to the selected structural element, refer to the edit menu below.
	EDIT	For additional icons see edit menu below.
🗑		Delete the selected structural element.
📄		Show measurement data, if a measurement has been performed for this structural element.

Icon		Meaning
		Edit the selected structural element.
		Memory menu, page 3 of 3
		Search for ID number. > Enter complete ID number.
		Search for text. > Enter full text (complete word).
		Search for ID number or text.
		Continue searching.
		Edit menu
←		Cursor left: Select an alphanumeric character.
→		Cursor right: Select an alphanumeric character.
↵		ENTER: Accept an individual character.
	☑	Acknowledge entry
	←	Cursor left
	→	Cursor right
DEL		Delete characters.
		Switching amongst different types of alphanumeric characters:
	A	✓ABCDEFGHIJK LMNOPQRSTUVW XYZ␣↔ Upper case letters
	a	✓abcdefghijk lmnopqrstuvw xyz␣↔ Lower case letters
	0	✓0123456789+ -×/=:,;_()<> .!?␣↔ Numbers
	@	✓@äöüÜß€$% &#àáèéìíòóùú Ñ␣↔ Special characters

Distributor Structure Symbology / Tree Structure

A **check mark** to the right of a structural element means that all measurements within the respective hierarchy have been passed.
x: At least one measurement has not been passed.
No symbol: Measurement has not yet been performed.
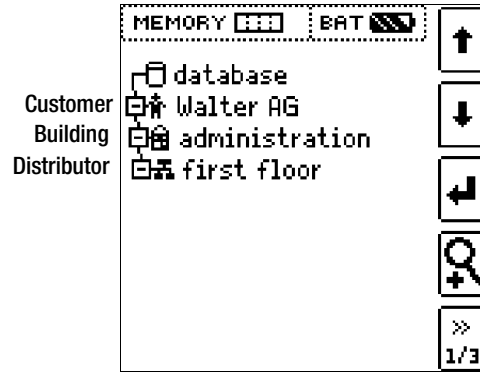
Same type of element as in the Windows Explorer:
+: Sub-object available, display by pressing ↵.
–: Sub-objects are displayed, hide by pressing ↵.

10.3.1 Creating Structures (example for electrical circuit)

After selection with the **MEM** key, all setting options for the creation of a tree structure are made available on three menu pages (1/3, 2/3 and 3/3). The tree structure consists of structural elements, referred to below as objects.

Select the position at which a new object will be added.

Scroll up

Scroll down

Acknowledge selection / change level

Display object or ID number

Next page

Use the ↑↓ keys in order to select structural elements.
Change to the sub-level with the ↵ key.
Go to the next page with the >> key.
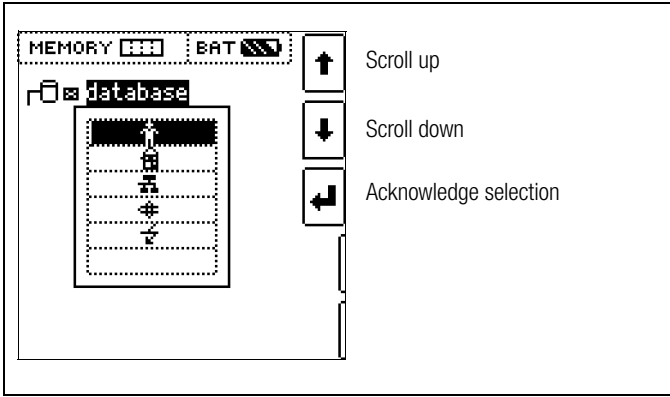
Create a new object.

Create object

Edit designation
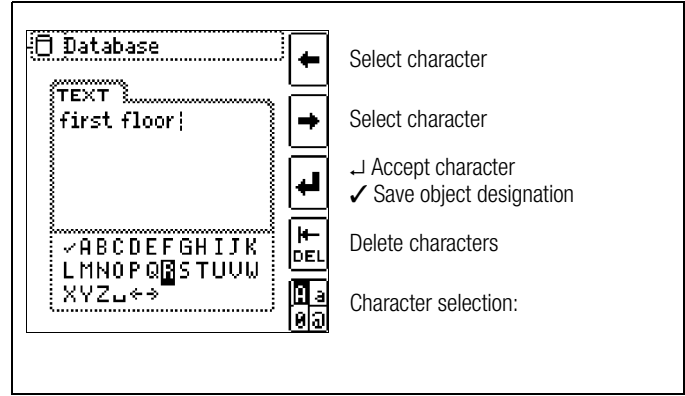
VΩA: show measurement data

Delete object

Press the key in order to create a new object.
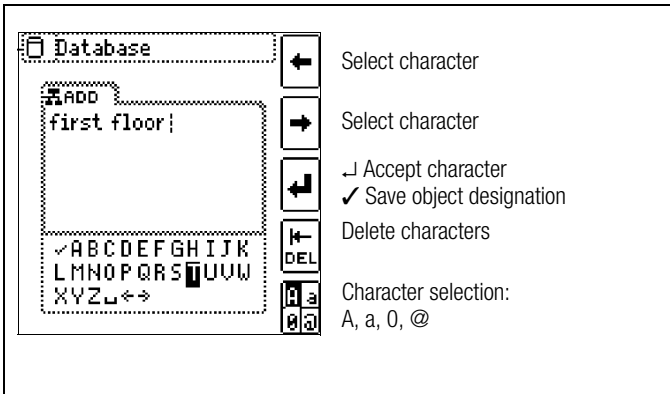
Select a new object from a list.

Scroll up

Scroll down

Acknowledge selection

Select the desired object from the list with the ↑↓ keys and acknowledge with the ↵ key.

Enter a designation (Example Distributor).

← Select character

→ Select character

↵ Accept character
✓ Save object designation

Delete characters

Character selection:
A, a, 0, @

Enter a designation and then acknowledge it by entering a ✓.

10.3.2 Searching for Structural Elements

Scroll up

Scroll down

Acknowledge selection / change level

Display object or ID number

Menu selection → page 3/3

Mark the structural element from which the search will be started. Objects located underneath or next to this object will be included in the search.

Go to page 3/3 in the database menu.

Search for ID number

Search for text

Search for ID number or text

After selecting text search ...

← Select character

→ Select character

↵ Accept character
✓ Save object designation

Delete characters

Character selection:

... and entering the desired text (only full matches are found – no wild cards, case sensitive) ...

Search for ID number

Search for text

Search for ID number or text

Continue searching
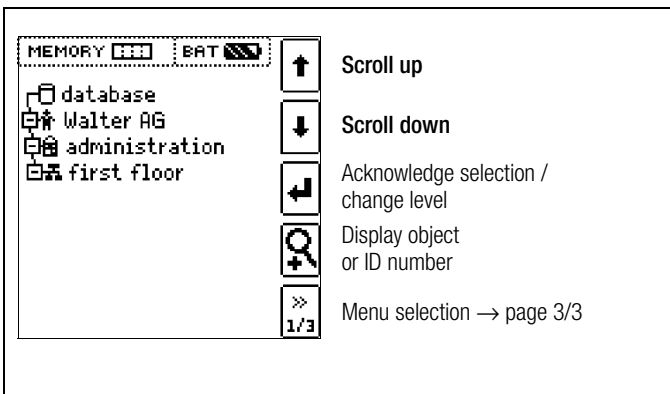
... the first match is displayed.
Further matches can be found by selecting the icon shown at the right.

Search for ID number

Search for text

Search for ID number or text

End search

If no further matches are found, the message shown above is displayed.

10.4 Saving Data and Generating Reports

Preparing and Executing a Measurement

Measurements can be performed and stored to memory for each structural element. Proceed as follows, adhering to the prescribed sequence:

➪ Select the desired measurement with the function selector switch.

➪ Start the measurement by pressing the **START** key.

Upon completion of measurement, the "→ Floppy Disk" softkey is displayed.

➪ **Briefly** press the "Save Value" key.

The display is switched to the memory menu or the structural view.

➪ Navigate to the desired memory location, i.e. to the desired structural element / object, for which the measurement data will be saved.

➪ If you would like to save a comment along with the measurement, press the key shown at the right and enter a designation via the "EDIT" menu as described in section 10.3.1.

➪ Complete data storage by pressing the "STORE" key.

Alternative Storage Procedure

➪ The measured value can be saved to the last selected object in the structural diagram by **pressing and holding** the "Save Value" key, without switching the display to the memory menu.
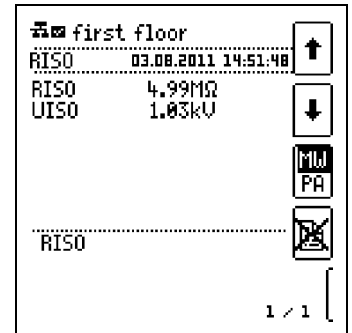
> ☞ **Note**
>
> If you change the parameters in the measurement view, they are not saved for the structural element. A measurement with changed parameters can nevertheless be saved to the structural element, and any changed parameters are documented in the report for each measurement.

Retrieving Saved Measured Values

➪ Switch the display to the distributor structure by pressing the **MEM** key and select the desired electrical circuit with the scroll keys.

➪ Switch to page 2 by pressing the key shown here:

➪ Display the measurement data by pressing the key shown here:

One measurement with date and time, as well as any comment you might have entered, is displayed in each screen.

Example:
RCD Measurement

> ☞ **Note**
>
> An inverse displayed **check mark** in the header means that the respective measurement has been passed.
> An inverse displayed **X** means that the measurement has not been passed.

➪ Scrolling amongst measurements is possible with the keys shown here:

➪ The measurement can be deleted with the key shown here:

A prompt window asks you to confirm deletion.

With the help of the key shown at the right (MW: measured value / PA: parameter), the setting parameters can be displayed for this measurement.

➪ Scrolling amongst measurements is possible with the keys shown here:

Data Evaluation and Report Generation with ETC Software

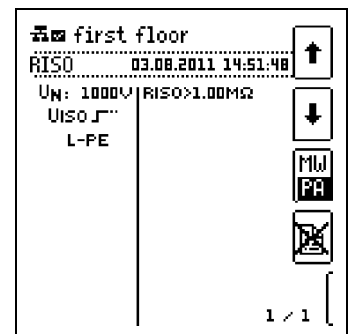All data, including the distributor structure, can be transferred to the PC and evaluated with the help of ETC software. Additional information can be entered here subsequently for the individual measurements. After pressing the appropriate key, a report including all measurements within a given distributor structure is generated, or the data are exported to an Excel spreadsheet.

☞ **Note**

The database is exited when the rotary selector switch is turned. Previously selected parameters in the database are not used for the measurement.

10.4.1 Use of Barcode Scanners and RFID Readers

Search for an Already Scanned Barcode

The search can be started from any switch setting and menu.

↳ Scan the object's barcode.

The search is started based on the currently selected structural element down though lower hierarchical levels. The found barcode is displayed inversely.

↳ This value is accepted after pressing the ENTER key.

☞ **Note**

An already selected object cannot be found.

Continued Searching in General

Regardless of whether or not an object has been found, searching can be continued by pressing this key:

– Object found: Searching is continued underneath the previously selected object.
– No further object found: The entire database is searched at all levels.

Reading In a Barcode for Editing

If the menu for alphanumeric entry is active, any value scanned by means of a barcode or RFID reader is accepted directly.

Using a Barcode Printer (accessory)

A barcode printer allows for the following applications:

• Read-out of ID numbers as encrypted barcodes; for quick and convenient acquisition for periodic testing
• Read-out of repeatedly occurring designations, such as test object types, encrypted as barcodes in a list, allowing them to be read in as required for comments.

11 Characteristic Values

METRISO XTRA

Meas. Qty.	U$_{iso}$				Range	Measuring Range	Reso-lution	Open-Circuit Voltage U$_{0max}$	Test Current	Intrinsic Uncertainty	Measuring Uncertainty	Overload Capacity
R$_{ISO}$	50 V	100 V	250 V / 500 V	1000 V	100 k	10 kΩ ... 99.9 kΩ	0.1 k	50 V/100 V: 1.25 U$_{ISO}$ 250 V / 500 V / 1000 V: 1.1 U$_{ISO}$	I$_N$ = 1 mA I$_K$ ≤ 5 mA	±(5% rdg. + 3 d)	±(7% rdg. + 3 d)	1000 V AC/DC TRMS
					1 M	100 kΩ ... 999 kΩ	1 k					
					10 M	1.00 MΩ ... 9.99 MΩ	10 k					
					100 M	10.0 MΩ ... 99,9 MΩ	100 k					
					1 G	100 MΩ ... 999 MΩ	1 M					
					10 G	1.00 GΩ ... 9.99 GΩ	10 M					
					100 G	10,0 GΩ ... 99.9 GΩ	100 M			±(8% rdg. + 3 d) [1]	±(10% rdg. + 3 d) [1]	
					1 T	100 GΩ ... 999 GΩ	1 G			±(25% rdg. + 5 d) [1]	±(50% rdg. + 20 d) [1] [2]	
U AC/DC					100 V	10.0 V ... 99.9 V	0.1 V	—	—	±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	1000 V AC/DC TRMS [3]
					1000 V	100 V ... 999 V	1 V					
R$_{LO}$					10 Ω	0.17 ... 9.99 Ω	0.01 Ω	4 V < U$_0$ < 6 V	200 mA ≤ I I ≤ 260 mA [4]	±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	1000 V AC/DC TRMS
R	Display range as of 01.0 Ω				100 Ω	10.0 ... 99.9 Ω	0.1 Ω	U$_0$ max. 15 V	1 mA ≤ I I ≤ 1.3 mA	±(2.5% rdg. + 3 d)	±(5% rdg. + 3 d)	1000 V AC/DC TRMS
					1 kΩ	100 ... 999 Ω	1 Ω					
					10 kΩ	1.00 ... 9.99 kΩ	10 Ω					

[1] the indicated accuracy is only achieved with the optional accessory „shielded high-resistance measuring cable KS-C (article number Z541F)"
[4] up to 5 Ω

[2] does not conform to DIN EN 61557-2
[3] Display range up to 1.2 kV

Breakdown Voltage (Uramp)

Parameter	Range	Intrinsic Uncertainty	Measuring Uncertainty
Voltage range	100 ... 1000 V	±(10% rdg. + 8 d)	±(15% rdg. + 10 d)
Rise time	5 ... 300 s	—	—
Measuring time	1 ... 120 s / auto / cont. measurement	—	—

Polarization Index (PI), Absorption Ratio (DAR)

	t1 [min.]	t2 [min.]	Limit [min.]
PI	01:00	10:00	> 4.0 / > 3.0 / > 2.0 / > 1.5 / > 1.1 / > 1.0
DAR	00:30	01:00	> 1.60 / > 1.25

PI and DAR are calculated values. Insulation measurement specifications apply.

Reference Conditions

Reference temperature	+ 23 °C ±3 K
Relative humidity	40 to 75%
Measured quantity frequency	45 to 65 Hz
Measured quantity waveshape	Sine, deviation between TRMS and rectified value < 1%
Battery voltage	9.5 V ±0.1 V
Test resistance	10 MΩ ±1%

Electrical Safety

Protection class	II per IEC/EN 61010-1/VDE 0411-1
Pollution degree	2
Measuring category	CAT II 1000 V / CAT III 600 V / CAT IV 300 V
Fuses	
Fuse link	FF315mA/1000V, effective in all resistance measuring ranges, 1 additional replacement fuse in the battery compartment
Electronic fuse	Protects low-resistance and resistance measurements R$_{LO}$ and R

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326-1:2013, class B
Interference immunity	EN 61326-1:2013

Power Supply

Batteries	8 ea. 1.5 V mignon cell (8 ea. size AA) (alkaline manganese per IEC LR14) or 8 rechargeable NiMH batteries (must be recharged externally)
Z502R charger	Broad-range charger with barrel connector, input: 100 to 240 V AC, output: 16.5 V DC, 1 A (Mascot)
Nominal range of use	8.5 to 12 V
Battery test	Battery capacity display with battery symbol in 4 segments: ▰▰. Querying of momentary battery voltage via menu function.
Battery saver circuit	Automatic shutdown of display illumination after 10 to 30 seconds (after the last time the rotary switch is actuated) can be selected in the setup menu (see page 8). The test instrument is automatically switched to the **standby mode** if the measured value remains unchanged for approximately 15 minutes, and if none of the controls are activated during this time. The instrument is switched **off automatically** if the measured value remains unchanged for a long period of time and if none of the keys or the rotary switch have been activated during on-time (specified in seconds).
Service life	For R$_{INS}$ (1000 V / 1 MΩ) and R$_{LO}$ with 25 s on-time and 1 subsequent measurement each for a duration of 5 s – With batteries (alkaline manganese): 700 measurements – With rechargeable batteries (2000 mAh): 650 measurements
Safety shutdown	If supply voltage is too low (U < 8 V), the instrument is switched off, or cannot be switched on.
Recharging socket	Installed rechargeable batteries can be recharged directly by connecting a charger to the recharging socket: charger Z502R
Charging time	Approx. 2 hours *

* Maximum charging time with fully depleted rechargeable batteries. A timer in the charger limits charging time to no more than 4 hours.

Displays

Digital display	Multiple display with dot matrix 128 x 128 pixels, backlit (transflective), dimensions: 65 x 65 mm
Limit LED	LED lights up red to indicate an exceeded limit value. LED lights up green to indicate adherence to the limit value.
LED ⚠	LED lights up red to indicate the presence of an external voltage (with the instrument switched off) or high test voltage during insulation measurement (Riso/Rins, PI and DAR) at the measuring terminals
Uramp LED	LED lights up green to indicate ramp sequence in progress. LED lights up red to indicate interrupted ramp sequence (e.g. in case of breakdown).

Ambient Conditions

Accuracy temperature range	0 ... +40 °C
Operating temperature	–10 ... +50 °C
Storage temp. range	–25 ... +70 °C (without batteries)
Relative humidity	Up to 75% (max. 85 % during storage/transport), no condensation allowed
Elevation	Max. 2000 m
Calibration interval	1 year (recommended)

Mechanical Design

Dimensions	225 x 130 x 140 mm
Weight	Approx. 1.4 kg with batteries
Protection	Housing: IP 52, measurement cables and connectors: IP 40 per DIN VDE 0470, part 1 / EN 60529, housing category 2

Excerpt from Table on the Meaning of IP Codes

IP XY (1st digit X)	Protection Against Foreign Object Entry	IP XY (2nd digit Y)	Protection Against Penetration by Water
2	≥ 12.5 mm dia.	2	Dripping (at 15° angle)
3	≥ 2.5 mm dia.	3	Spraying water
4	≥ 1.0 mm dia.	4	Splashing water
5	Dust protected	5	Jet-water
6	Dust-proof	6	Powerful water jets

Display Values in Consideration of Measuring Uncertainty

Table for determining minimum display values for insulation resistance in consideration of the instrument's measuring uncertainty.

Limit Value	Minimum Display Value	Limit Value	Minimum Display Value
020 kΩ	025 kΩ		
100 kΩ	111 kΩ	100 MΩ	111 MΩ
200 kΩ	219 kΩ	200 MΩ	219 MΩ
500 kΩ	541 kΩ	500 MΩ	541 MΩ
0.20 MΩ	0.25 MΩ		
0.50 MΩ	0.57 MΩ		
1.00 MΩ	1.11 MΩ	1.00 GΩ	1.11 GΩ
2.00 MΩ	2.19 MΩ	2.00 GΩ	2.19 GΩ
5.00 MΩ	5.41 MΩ	5.00 GΩ	5.41 GΩ
10.0 MΩ	11.1 MΩ	10.0 GΩ	11.1GΩ
20.0 MΩ	21.9 MΩ	20.0 GΩ	22.6 GΩ
50.0 MΩ	54.1 MΩ	50.0 GΩ	55.9 GΩ

Table for determining maximum display values for low-value resistance in consideration of the instrument's measuring uncertainty.

Limit Value	Maximum Display Value	Limit Value	Maximum Display Value
0.15 Ω	0.11 Ω		
0.20 Ω	0.16 Ω	5.00 Ω	4.72 Ω
0.50 Ω	0.44 Ω	10.0 Ω	9.47 Ω
1.00 Ω	0.92 Ω	20.0 Ω	17.7 Ω
2.00 Ω	1.87 Ω	50.0 Ω	44.7 Ω

Voltage at Device Under Test During Insulation Resistance Measurement

Measuring voltage Ux at the device under test depending upon its resistance Rx at nominal voltages of 100, 250, 500 and 1000 V:
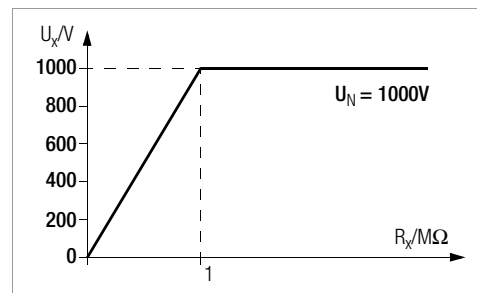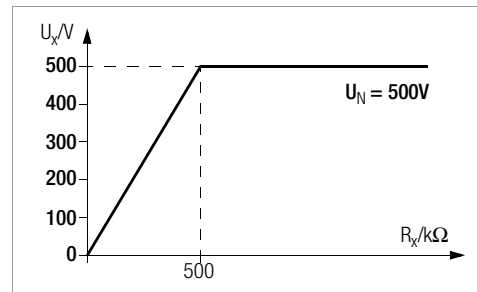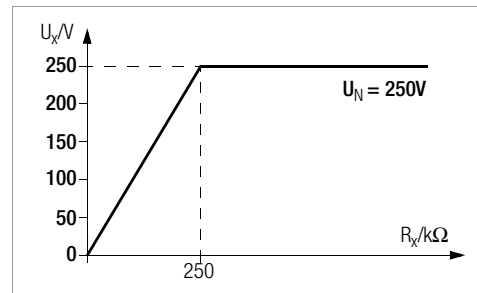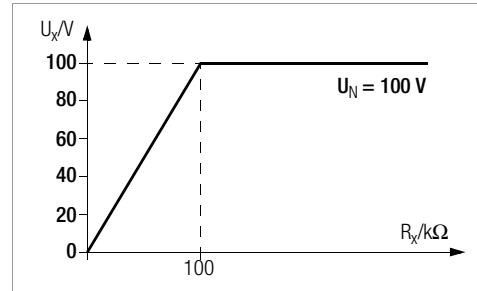
12 Maintenance

12.1 Firmware Revision and Calibration Information

See section 3.4.

12.2 Rechargeable Battery Operation and Charging

Check to make sure that no leakage has occurred at the rechargeable batteries in the Z502H battery pack at short, regular intervals, or after the instrument has been in storage for a lengthy period of time.

☞ **Note**

> Prior to lengthy periods of rest (e. g. holiday), we recommend removing the (rechargeable) batteries. This helps to prevent excessive depletion or leakage of batteries, which, under unfavourable circumstances, may cause damage to the instrument.

If battery voltage has fallen below the allowable lower limit, the pictograph shown at the right appears. "Low Batt!!!" is also displayed along with a battery icon. The instrument does not function if the batteries have been depleted excessively, and no display appears.

⚠ **Attention!**

> Use only the Z502H battery pack.

⚠ **Attention!**

> Use only the Z502R charger (available as an accessory) to charge batteries which have already been inserted into the test instrument.
> **Make sure that the following conditions have been fulfilled before connecting the charger to the charging socket:**
> – Rechargeable batteries have been installed with correct polarity (not standard batteries).
> – The test instrument has been disconnected from the measuring circuit at all poles.
> – The instrument must remain off during charging.

If the batteries or the battery pack have not been used or recharged for a lengthy period of time, thus resulting in excessive depletion:

Observe the charging sequence (indicated by the LED at the charger) and initiate a second charging sequence if necessary (disconnect the charger from the mains and from the test instrument to this end, and then reconnect it).

12.2.1 Charging Procedure with the Z502R Charger (accessory)

↪ Insert the correct mains plug for your country into the charger.

⚠ **Attention!**

> Make sure that rechargeable batteries have been inserted (not normal batteries). We recommend the use of rechargeable NiMH batteries (eneloop type).

↪ Connect the charger to the test instrument with the barrel connector, and then to the 230 V mains with the interchangeable plug.

⚠ **Attention!**

> **Do not switch the test instrument on during charging.** Monitoring of the charging process by the microprocessor might otherwise be disturbed, in which case the charging times specified in the technical data can no longer be assured.

↪ Please refer to the operating instructions included with the charger regarding the meanings of LED displays during the charging process.

↪ Do not disconnect the charger from the test instrument until the LED lights up green.

12.3 Fuses

If a fuse has blown due to overload, a corresponding error message appears at the display panel. The instrument's voltage measuring ranges are nevertheless still functional.

12.3.1 Melting Fuse

This fuse is active in all resistance measuring ranges except for voltage measurement. A replacement fuse is included in the battery compartment (FF315mA/1000V).

Checking the Fuse

If a resistance measuring range is selected with the rotary switch with a blown or defective fuse in the instrument, and if measurement is started with the **START** or **CONTIN.** key, a pop-up window with the "blown fuse" icon appears. Prerequisite: The **+** and **COM** measurement jacks are not short circuited.

This error message must be acknowledged and cleared by pressing the **ESC** key.

↪ Eliminate the cause of failure and replace the blown fuse.

Replacing the Fuse

⚠ **Attention!**

> Disconnect the instrument from the measuring circuit before opening the battery compartment lid in order to replace the fuse (refer to page 3 for location)!
> The rotary switch must be in the OFF position when the fuse is replaced.

⚠ **Attention!**

> **Incorrect fuses** may cause sever damage to the instrument.
> Only **original fuses** from GMC-I Messtechnik GmbH assure the required protection by means of suitable blowing characteristics.
> Short-circuiting of fuse terminals or the repair of fuses is prohibited!
> The instrument may be damaged if fuses with incorrect ampere ratings, breaking capacities or blowing characteristics are used!

↪ Open the battery compartment lid by loosening the two screws.

↪ Remove the defective fuse and replace it with a new one. A replacement fuse is included in the battery compartment.

↪ Insert the new fuse.

↪ Replace the battery compartment lid and retighten the screws.

12.3.2 Electronic Fuse

This fuse protects low-resistance (Rlo) and resistance measurements (kΩ) from overloading (electronic hardware circuit).

A pop-up window appears when the fuse blows.

This error message must be acknowledged and/or cleared by pressing any desired key.

↪ Eliminate the cause of overloading.

12.4 Housing

No special maintenance is required for the housing. Keep outside surfaces clean. Use a slightly dampened cloth for cleaning. In particular for the protective rubber surfaces, we recommend a moist, lint-free microfiber cloth. Avoid the use of cleansers, abrasives or solvents.

12.5 Return and Environmentally Sound Disposal

The instrument is a category 9 product (monitoring and control instrument) in accordance with ElektroG (German electrical and electronic device law). This device is subject to the RoHS directive. Furthermore, we make reference to the fact that the current status in this regard can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term WEEE.

In accordance with WEEE 2012/19EU and ElektroG, we identify our electrical and electronic devices with the symbol in accordance with DIN EN 50419 which is shown at the right. Devices identified with this symbol may not be disposed of with the trash. Please contact our service department regarding the return of old devices (see address in section 14).

If the **batteries** used in your instrument or accessory product are depleted, they must be disposed of properly in accordance with valid national regulations.
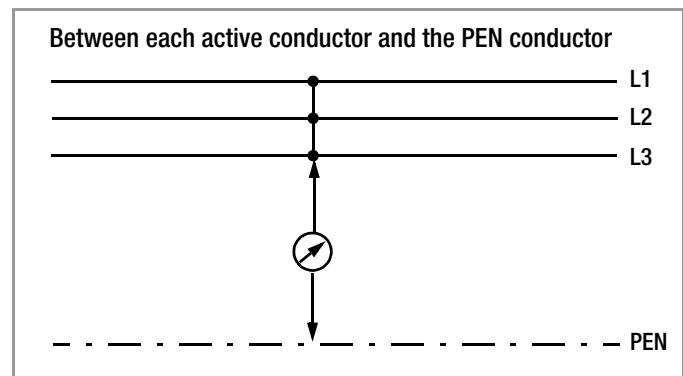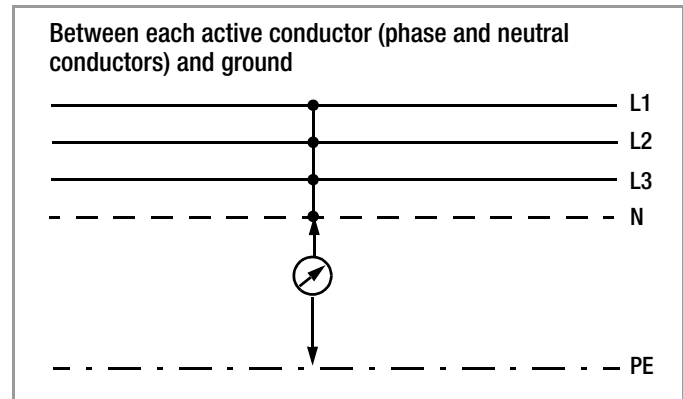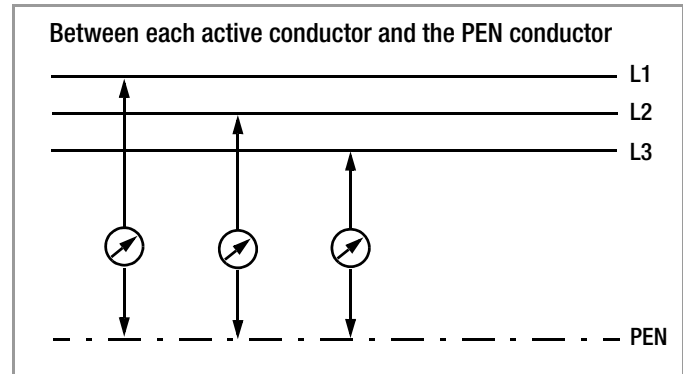Batteries may contain pollutants and heavy metals such as lead (Pb), cadmium (Cd) and mercury (Hg).
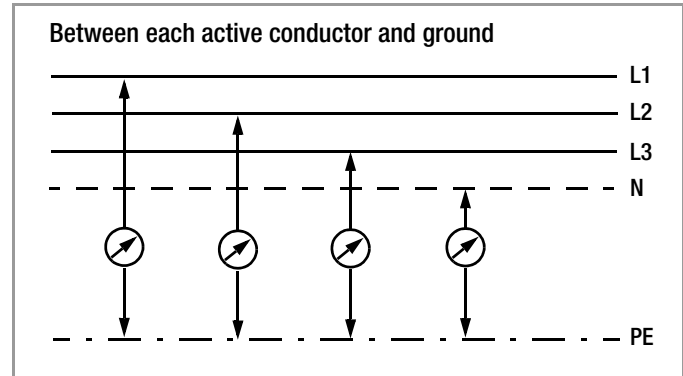
The symbol at the right indicates that batteries must not be disposed of with the trash, and must be brought to a designated collection point.

Pb Cd Hg

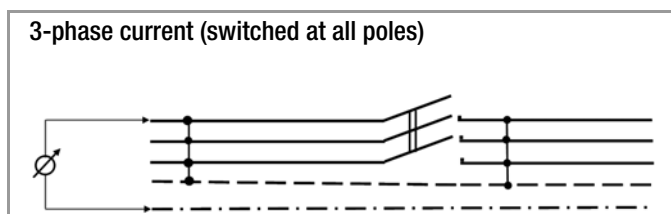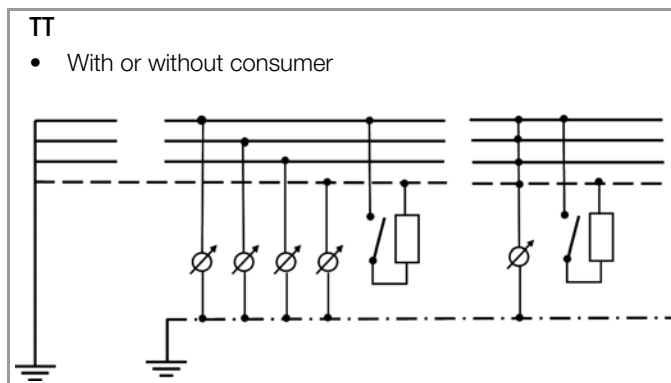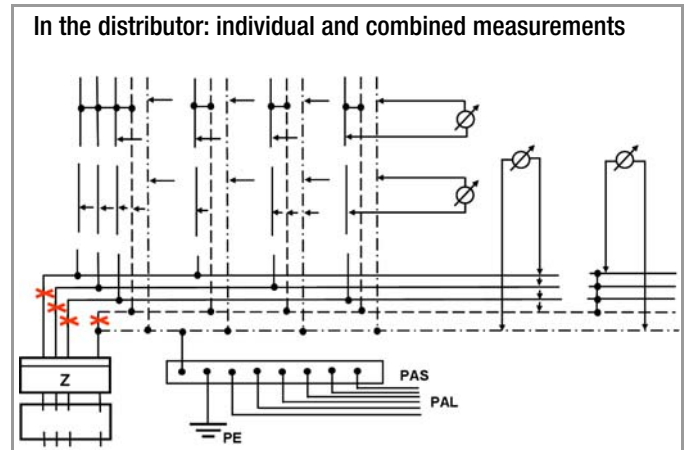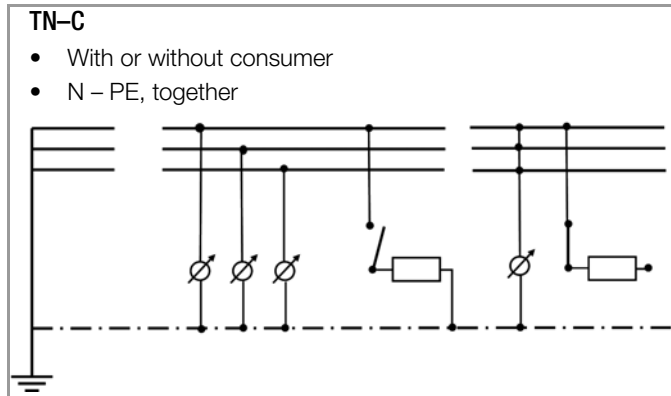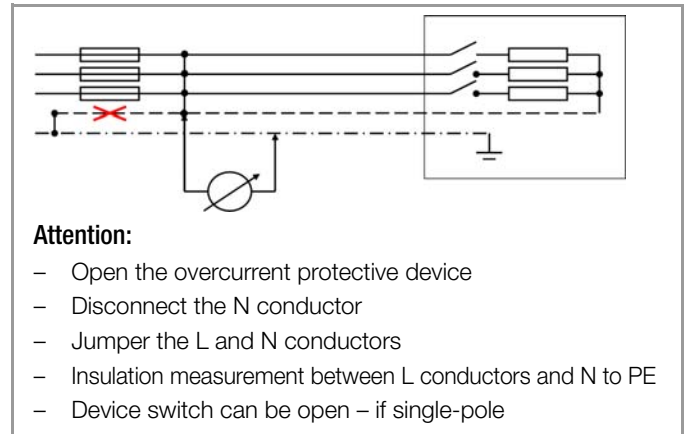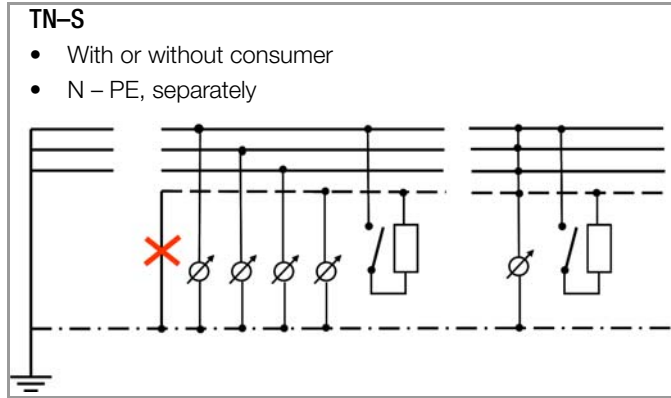## 13 Appendix

13.1 Sample Connection Layouts for Insulation Resistance Measurement

Insulation Resistance Measurement per DIN VDE 0100, Part 600

Between each active conductor and ground

L1
L2
L3
N
PE

Between each active conductor and the PEN conductor

L1
L2
L3
PEN

Between each active conductor (phase and neutral conductors) and ground

L1
L2
L3
N
PE

Between each active conductor and the PEN conductor

L1
L2
L3
PEN
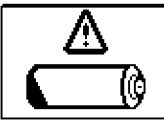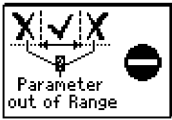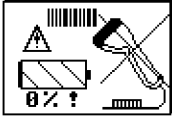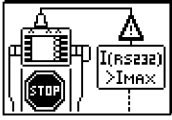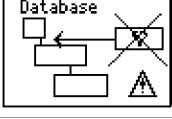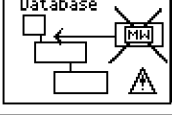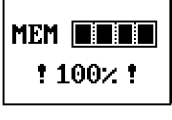
Insulation Resistance Measurement in Different Types of Systems

TN–S

- With or without consumer
- N – PE, separately

TN–C

- With or without consumer
- N – PE, together

TT

- With or without consumer

3-phase current (switched at all poles)

Attention:

- Open the overcurrent protective device
- Disconnect the N conductor
- Jumper the L and N conductors
- Insulation measurement between L conductors and N to PE
- Device switch can be open – if single-pole

In the distributor: individual and combined measurements

13.2 Error Messages

The following pop-up windows must be acknowledged and/or cleared by any desired key and the cause of the error must be eliminated.

Pop-Up	Function Switch Position	Function / Meaning
STOP U_{EXT}	All except U	Interference voltage Remedy: Device under test must be disconnected from all sources of voltage.
⚠ Difference > 10% \<any key to continue\>	R_{LO}	OFFSET measurement does not make sense. Remedy: Check system. OFFSET measurement of **R**LO+ and **R**LO− is still possible.
⚠ Offset > 5.00 Ω! \<any key to continue\>	R_{LO}	$R_{OFFSET} > 50\ \Omega$: OFFSET measurement does not make sense. Remedy: Check system.
STOP ✗	R_{INS} / kΩ / R_{LO}	Externally accessible fuse is blown. The voltage ranges remain functional even if the fuse has blown. **Special case, R$_{L0}$:** Interference voltage during measurement may result in a blown fuse. Remedy: Replace fuse (replacement fuse in battery compartment). **Observe notes regarding fuse replacement in section 12.3.1.**
STOP U_{EXT} ➡ ELECTRONIC-FUSE	R_{LO} / kΩ	The electronic fuse protects low-resistance (Rlo) and resistance measurements (kΩ) from overloading (electronic hardware circuit). The voltage ranges remain functional even if the fuse has blown. Remedy: This error message must be acknowledged and cleared by pressing the **ESC** key.
⚠ (battery)	All	Battery voltage is less than or equal to 8 V. Reliable measurement is no longer possible. Storage of measured values to memory is disabled. Remedy: Rechargeable batteries must be recharged, or replaced towards the end of their service life.

Pop-Up	Function Switch Position	Function / Meaning
Database and Entry Operations		
Parameter out of Range	All	The parameters you have selected do not make sense in combination with previously configured parameters. The selected parameter settings will not be saved. Remedy: Enter other parameter settings.
TXT = ? Abc...123 !	All	Please enter a designation (alphanumeric).
0% !	All	Operation with a Barcode Scanner Error message appears when the "EDIT" entry field is opened and battery voltage is less than 8 V. Output voltage is generally switched off during barcode scanner operation if U is less than 8 V in order to assure that remaining battery capacity is adequate for entering designations for devices under test and saving the measurement. Remedy: Rechargeable batteries must be recharged, or replaced towards the end of their service life.
I(RS232) >IMAX	All	Operation with a Barcode Scanner Current flowing through the RS 232 port is too high. Remedy: **The connected device is not suitable for this port.**
CODE ?	All	Operation with a Barcode Scanner Barcode not recognized, incorrect syntax
Database	All	Data cannot be entered at this location within the structure. Remedy: Observe profile for preselected PC software (see SETUP menu).
Database	All	Measured value cannot be saved at this location within the structure. Remedy: Make sure that you have selected the right profile for you PC evaluation program in the SETUP menu (see section 3.4).
MEM ! 100% !	All	Memory is full. Remedy: Save your measurement data to a PC and then clear memory at the test instrument by deleting the database or by importing an empty database.
Delete? YES NO	All	Delete measurement or database. This prompt window asks you to confirm deletion.
ESC database Delete all data? YES NO	SETUP	**Data loss after changing language or profile, or after restoring default settings.** Back up your measurement data to a PC before pressing the respective key. This prompt window asks you to confirm deletion.

13.3 Attaching the Test Probe Holder to the Carrying Strap

① Detach the strap from the instrument: Turn out the slotted screw (M3) at the bottom.

Bottom Left   Bottom Right

② Slide the strap through the test probe holder.

Front View   Side View

Strap

Clasp

Clasp

Eyelet for Attachment to Tester (METRISO INTRO, BASE, TECH, PRO, XTRA)

③ Feed the strap through from the front of the test instrument and secure it with the slotted screw (M3).

Front   Back

13.4 Technical Data for Measurement Cables (scope of delivery: KS17-4 safety cable set)

Electrical Safety

	600 V	1000 V	1000 V
Maximum rated voltage	600 V	1000 V	1000 V
Measuring category	CAT IV	CAT III	CAT II
Max. rated current:	1 A	1 A	16 A
With safety cap attached	•	•	—
Without safety cap	—	—	•

Ambient Conditions (EN 61010-031)

Temperature	−20 °C ... + 50 °C
Relative humidity	Max. 80%
Pollution degree	2

Using the KS17-4

⚠ **Attention!**
Observe the instrument's maximum values for electrical safety.
Measurements per DIN EN 61010-031 may only be performed in environments in accordance with measuring categories III and IV with the safety cap attached to the test probe at the end of the measurement cable.

In order to establish contact inside 4 mm jacks, the safety caps have to be removed by prying open the snap fastener with a pointed object (e.g. the other test probe).

13.5   Optional Accessories (not included)

Master Battery Pack (material no. Z502H)

8 LSD NiMH rechargeable batteries with reduced self-discharging (AA) (eneloop/Sanyo), 2000 mAh with sealed cells

Charger (material no. Z502R)

Broad-range charger for charging batteries in the measuring instrument

Input: 100 to 240 V AC, output: 16.5 V DC, 0.6 A

IS0 Calibrator 1 (material no. M662A)

Calibration adapter for testing the accuracy of instruments used for measuring insulation resistance and low-resistance for test voltages of up to 1000 V (per VDE 0413, parts 1, 2, 4 and 10).

KS-C   (material no. Z541F)

Cable set consisting of measurement cable and shielded high-resistance measurement cable for measurements in the GΩ range

1081 Probe (material no. GTZ3196000R0001)

Triangular probe for floor measurements per EN 1081, DIN VDE 0100-600 (standing surface insulation)

KS24   (material no. GTZ3201000R0001)

Cable set consisting of a 4 m long extension cable with a permanently attached test probe at one end and a contact protected socket at the other end, and 1 alligator clip which can be plugged onto the test probe.

Test Probe for Remote Triggering

(material no. Z550A)

Optional plug-on measurement cable with a triggering key on the test probe and an additional key for illuminating the measuring point, including shielded, plug-in connector cable.

Barcode-Profiscanner-RS232

(material no. Z502F)

Barcode scanner for RS 232 connection (laser sensor), variable barcode length, enhanced reading accuracy, with coil cable

Barcodeleser B3261

(material no. GTZ3261000R0001)

Barcode scanner for RS 232 connection (LED sensor)

SCANBASE RFID

(material no. Z751G)

RFID read/write for RS 232 port

(13.56 MHz)

14 Repair and Replacement Parts Service Calibration Center* and Rental Instrument Service

If required please contact:

GMC-I Service GmbH
Service-Center
Beuthener Str. 41
90471 Nürnberg • Germany
Phone: +49 911 817718-0
Fax: +49 911 817718-253
E-mail service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany. Please contact our representatives or subsidiaries for service in other countries.

* DAkkS Calibration Laboratory for Electrical Quantities
D-K-15080-01-01 accredited per DIN EN ISO/IEC 17025

Accredited quantities: direct voltage, direct current value, direct current resistance, alternating voltage, alternating current value, AC active power, AC apparent power, DC power, capacitance, frequency and temperature

Competent Partner

GMC-I Messtechnik GmbH is certified in accordance with DIN EN ISO 9001.

Our DAkkS calibration laboratory is accredited by the Deutsche Akkreditierungsstelle GmbH (National accreditation body for the Federal Republic of Germany) in accordance with DIN EN ISO/IEC 17025 under registration number D-K-15080-01-01.

We offer a complete range of expertise in the field of metrology: from **test reports** and **proprietary calibration certificates** right on up to **DAkkS calibration certificates**.

Our spectrum of offerings is rounded out with free **test equipment management**.

An on-site **DAkkS calibration station** is an integral part of our service department. If errors are discovered during calibration, our specialized personnel are capable of completing repairs using original replacement parts.

As a full service calibration laboratory, we can calibrate instruments from other manufacturers as well.

15 Recalibration

The measuring tasks performed with your instrument, and the stressing it's subjected to, influence aging of its components and may result in deviation from the specified levels of accuracy.

In the case of strict measuring accuracy requirements, as well as in the event of use at construction sites with frequent stress due to transport and considerable temperature fluctuation, we recommend a relatively short calibration interval of once per year. If your instrument is used primarily in the laboratory and indoors without considerable climatic or mechanical stressing, a calibration interval of once every 2 to 3 years is sufficient as a rule.

During recalibration* at an accredited calibration laboratory (DIN EN ISO/IEC 17025), deviations from traceable standards demonstrated by your measuring instrument are documented. Ascertained deviations are used to correct displayed values during later use of the instrument.

We would be happy to perform DAkkS or factory calibration for you at our calibration laboratory. Further information is available at our website:

www.gossenmetrawatt.com (→ COMPANY → Quality and Certificates → DAkkS-Calibration Center).

Recalibration of your instrument at regular intervals is essential for the fulfillment of requirements according to quality management systems per DIN EN ISO 9001.

☞ **Note**

The device should be regularly calibrated in a calibration laboratory which is certified according DIN EN ISO/IEC 17025.

* Examination of the specification, as well as adjustment, are not included in calibration. However, in the case of our own products, any required adjustment is performed and adherence to the specification is confirmed.

16 Product Support

If required please contact:

GMC-I Messtechnik GmbH
Product Support Hotline
Phone: +49-911-8602-0
Fax: +49 911 8602-709
E-mail: support@gossenmetrawatt.com