GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP

METRAOHM 10

Low-Impedance Measuring Instrument

3-447-118-03
1/2.24

Content

1 Safety Instructions

General

- Carefully and completely read and adhere to these operating instructions.
  The document can be found at http://www.gossenmetrawatt.com. Retain this document for future reference.
- Use only the specified accessories (included in delivery or listed as optional) with the instrument.
- Carefully and completely read and adhere to the product documentation of the optional accessories. Retain these documents for future reference.
- Observe and comply with all safety regulations which are applicable for your work environment.

Handling

- Use the instrument in undamaged condition only.
  Inspect the instrument before use. Pay particular attention to damage, interrupted insulation or kinked cables. Damaged components must be replaced immediately.
- Use the accessories and all cables in undamaged condition only.
  Inspect accessories and all cables before use. Pay particular attention to damage, interrupted insulation or kinked cables.
- If the instrument or an accessory doesn't function flawlessly, remove it from operation and secure it against inadvertent use.
- If the instrument or accessory is damaged during use, e.g. through falling, remove it from operation and secure it against inadvertent use.
- If there are any signs of interior damage to the instrument or accessories (e.g. loose parts in the housing), permanently remove the instrument/accessories from operation and secure them against inadvertent use.

Operating conditions

- Do not use the instrument after long periods of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature).
- Do not use the instrument after extraordinary stressing due to transport.
- The instrument must not be exposed to direct sunlight.
- Only use the instrument and the accessories in compliance with the specified technical data and under the specified conditions (ambient conditions, IP protection class, measuring category, etc.).
- Do not use the instrument in potentially explosive atmospheres.
- The instrument and the included accessories may only be used for the tests/measurements described in the instrument's documentation.

Electricity

- Do not use the instrument if the battery/fuse compartment cover has been removed.
  Otherwise you risk touching dangerous voltages.
- Use batteries in undamaged condition only. Risk of explosion and fire in the case of damaged batteries!
  Inspect the batteries before use. Pay particular attention to leaky and damaged batteries.

Fuses

- The instrument may only be used as long as the fuses are in flawless condition. Defective fuses must be replaced. Fuses may only be replaced by our repair service department.
- Never bridge the fuses. Never put the fuses out of operation.

Data Security

- Always create a backup copy of your measurement/test data.

2 Applications

Please read this important information!

2.1 Intended Use / Use for Intended Purpose

METRAOHM 10 is a low-impedance measuring instrument for protective conductors and equipotential bonding conductors. It is designed to perform the following different measurement types:

- R_{LO} four-wire measurement with current 10 A_{AC}
- R_{LO} two-wire measurement with current 200 mA_{DC}
- Contact resistances on lightning protection and grounding systems in accordance with DIN 18014
- Low-resistance continuity on machines in accordance with EN 60204-1 (VDE 0113-1)

Safety of the operator, as well as that of the device, is only assured when it's used for its intended purpose.

2.2 Use for Other than Intended Purpose

Using the instrument for any purposes other than those described in these instrument operating instructions is contrary to use for intended purpose. Use for other than intended purpose may lead to unpredictable damage.

2.3 Liability and Guarantee

Using the instrument for any purposes other than those described in these instrument operating instructions is contrary to use for intended purpose. Use for Other than Intended Purpose may lead to unpredictable damage!

2.4 Opening the Instrument / Repairs

The instrument may only be opened by authorized, trained personnel in order to ensure flawless, safe operation and to assure that the guarantee isn't rendered null and void. Even original replacement parts may only be installed by authorized, trained personnel.

Unauthorized modification of the instrument is prohibited.

If it can be ascertained that the instrument has been opened by unauthorized personnel, no guarantee claims can be honored by the manufacturer with regard to personal safety, measuring accuracy, compliance with applicable safety measures or any consequential damages.

If the guarantee seal is damaged or removed, all guarantee claims are rendered null and void.

3 Documentation

3.1 Identifiers

The following identifiers are used in this documentation:

Identifier	Meaning
Attention! Warning	Safety information that must be complied with
Note! Important	Important information which must be taken into consideration and complied with
✓ Prerequisite	A condition etc. which must be fulfilled before a given action can be taken
1. Procedural step	Steps of a procedure which must be completed in the specified order
↳ Result	Result of a procedural step
• Enumeration	Bullet lists
– Enumeration	
Fig. 1: Caption	Description of the content of a figure
Table 1:	Description of the content of a table
Footnote	Comment

4 Getting Started

1. Read and adhere to the product documentation. In particular observe all safety information in the documentation, on the tester and on the packaging.
   ⇨ "Safety Instructions" 🗎1
   ⇨ "Applications" 🗎2
   ⇨ "Documentation" 🗎3
2. Familiarize yourself with the tester.
   ⇨ "The Instrument" 🗎4
   ⇨ "Menu and Functions" 🗎9
3. Install the tester
   ⇨ "Installation" 🗎12
4. Conduct the measurements
   ⇨ "Operation" 🗎14

5 The Instrument

5.1 Scope of Delivery

Please check for completeness.

1 METRAOHM 10 (M630K)
1 AC mains power supply cable
1 USB type A to type B cable
1 Two-wire measurement standard test leads with alligator clips
1 Four-wire Kelvin test leads with alligator clips
1 Kelvin clip test Ω / 25 W (Z630K)
1 Carrying case with carrying strap and strap on the instrument
1 Test report
1 Calibration certificate

5.2 Instrument Overview

5.2.1 Front

Fig. 2: Front Panel

5.2.2 Back

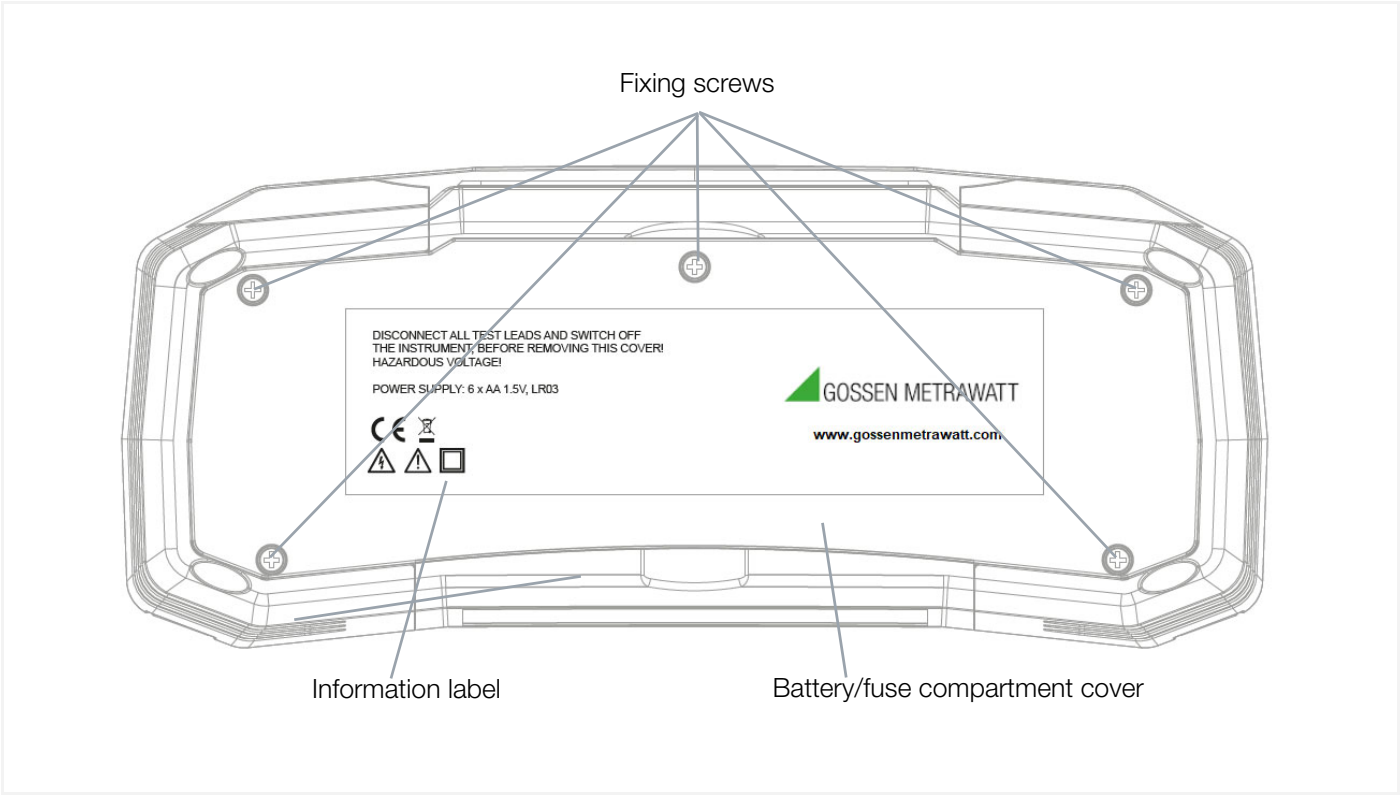


Fig. 3: Back of Instrument

5.2.3 Back, open

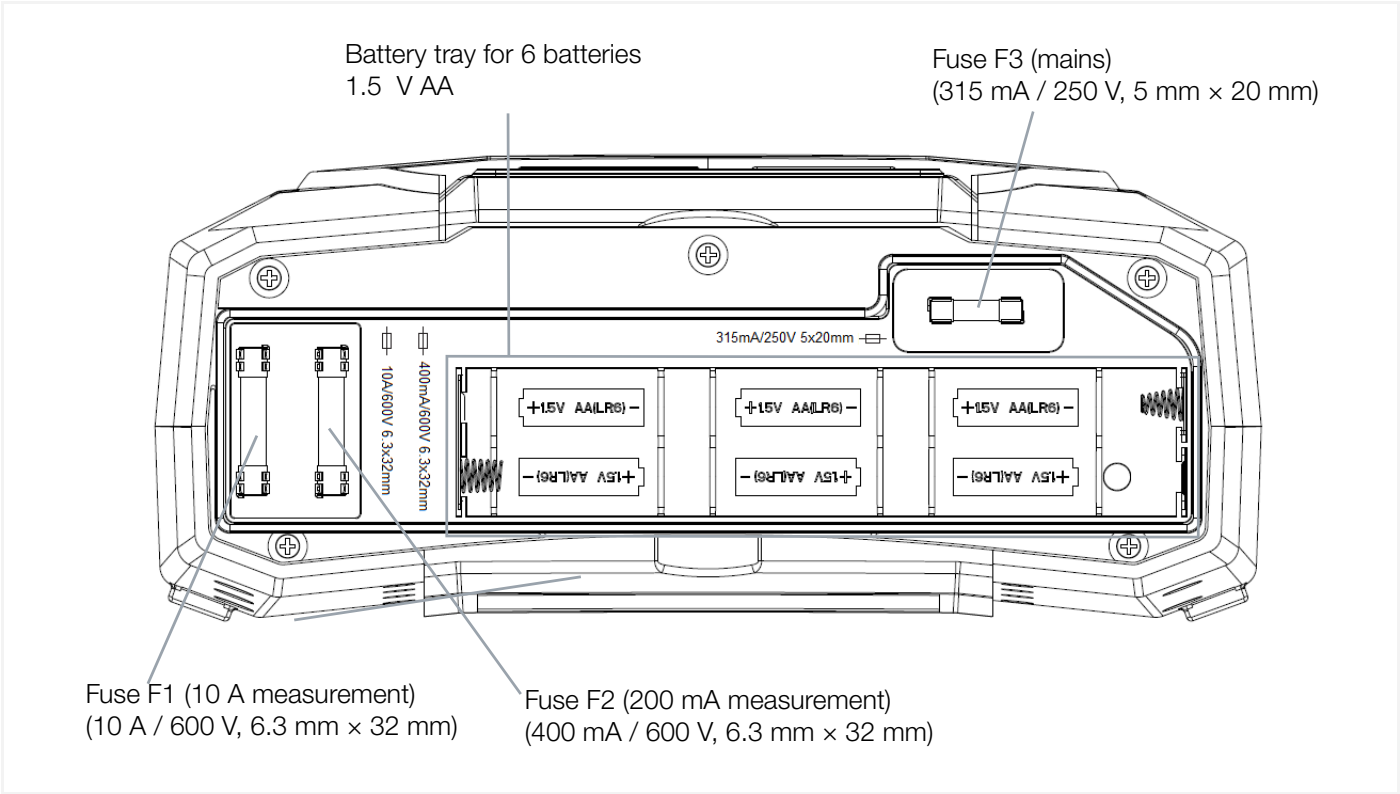


Fig. 4: Back of Instrument, open

5.2.4 Top

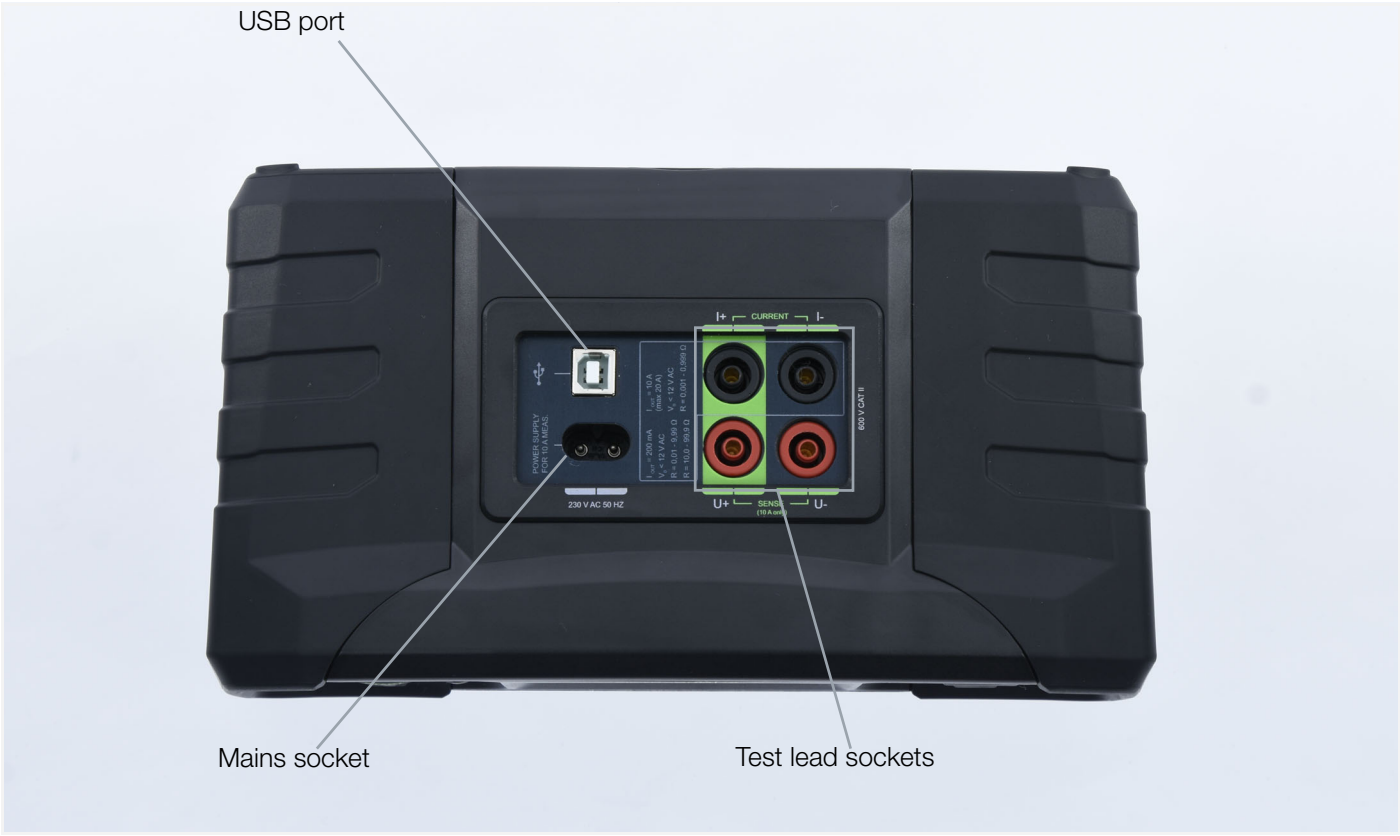


Fig. 5: Top of Instrument

5.2.5 Symbols on the Instrument and the Included Accessories

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

Double insulation (protection category II)

European conformity marking

The tester may not be disposed of with household trash ➪ "Disposal and Environmental Protection" 🗎25.

5.3 Relevant Standards

The tester has been manufactured and tested in accordance with the following safety regulations:

DIN EN 61010-1 IEC 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
IEC/EN 61557-1	Electrical safety in low voltage distribution systems up to 1000 V_{AC} and 1500 V_{DC} – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements
IEC/EN 61557-4	Electrical safety in low voltage distribution systems up to 1000 V_{AC} and 1500 V_{DC} – Equipment for testing, measuring or monitoring of protective measures – Part 4: Resistance of earth connection and equipotential bonding
DIN EN IEC 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements
DIN EN 60529 IEC 60529	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)

5.4 Technical Data

Power Supply	Battery	6 × LR6 AA alkaline battery Voltage: 1.5 V
	Mains power supply	230 V_{AC} 50 Hz
Ambient Conditions	Operating temperature:	+0 ... +40 °C
	Storage temperature:	-10 ... +70 °C (without batteries)
	Relative atmospheric humidity:	Max. 80%, no condensation allowed
	Elevation:	Max. 2000 m
Electrical Safety	Measuring category:	Cat II / 600 V
	Pollution degree:	2
	Protection category:	Cat II
	Fuses:	F1 (10 A measurement): 10 A / 600 V, 6.3 mm × 32 mm F2 (200 mA measurement): 400 mA / 600 V, 6.3 mm × 32 mm F3 (mains): 315 mA / 250 V, 5 mm × 20 mm
Mechanical Design	Protection:	Housing: IP40 per DIN EN 60529 / IEC 60529 (protection against ingress of solid foreign objects: ≥ 1.0 mm ∅; protection against ingress of water: not protected)
	Housing (W × H × D):	approx. 25 cm × 10.7 cm × 13.5 cm
	Weight:	approx. 1.75 kg (with batteries, without cables)
	Display:	TFT LCD display, 480 × 320, 3.5"
Data Interfaces	COM-Port	USB type B

5.5 Measurement Specifications

R_{LO} 200 mA (Auto mode)	
Measuring range	0.01 ... 9.99 Ω
	10.0 ... 99.9 Ω
Resolution	0.01 Ω
	0.1 Ω
Accuracy	± (2% m.v. + 2 dgt)
Test current	> 200 mA_{DC} for R ≤ 5 Ω (including compensation value)
Test current resolution	1 mA
Open circuit voltage	4 V ≤ V_0 ≤ 12 V_{DC}
Measurement method	2 wires
Standard	IEC/EN 61557-4 (for R > 0.10 Ω)

R_{LO} 200 mA (Continuous mode)	
Measuring range	0.01 ... 9.99 Ω
	10.0 ... 99.9 Ω
Resolution	0.01 Ω
	0.1 Ω
Accuracy	± (2% m.v. + 2 dgt)
Test current	> 200 mA_{DC} for R ≤ 5 Ω (including compensation value)
Test current resolution	1 mA
Open circuit voltage	4 V ≤ V_0 ≤ 12 V_{DC}
Measurement method	2 wires
Continuous mode	Cont+ (R+) and Cont- (R-)
Duration of continuous test	1 – 15 s

Standard	IEC/EN 61557-4 (for R > 0.10 Ω)

R_{LO} 10 A Limit MAN	
Measuring range	0.001 ... 0.999 Ω
Resolution	0.001 Ω
Accuracy	± (1% m.v. + 2 dgt)
Test current	> 10 A_{AC} for R ≤ 0.45 Ω
Test current resolution	0.1 A
Open circuit voltage	V_0 ≤ 12 V_{AC}
Measurement method	4 wires
Power supply	230 V AC 50 Hz
Standard	IEC/EN 61439-1

R_{LO} 10 A Limit AUTO	
Measuring range	0.001 ... 0.999 Ω
Resolution	0.001 Ω
Accuracy	± (1% m.v. + 2 dgt)
Test current	> 10 A_{AC} for R ≤ 0.45 Ω
Test current resolution	0.1 A
Open circuit voltage	V_0 ≤ 12 V_{AC}
Measurement method	4 wires
Selectable section	0.5, 1.0, 1.5, 2.5, 4.0, 6.0, 10 and 16 mm^2 (p[Cu] = 0.017 Ω mm^2/m)
Length measuring range	0.1 m ... 999.9 m
Power supply	230 V_{AC} 50 Hz
Standard	IEC/EN 60204-1

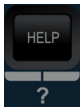
6 Menu and Functions

The instrument is operated via function keys on the front panel.
The settings and values are displayed on the display.

6.1 User Interface

6.1.1 Display

6.1.2 Function keys

Key	Description
	**ON/OFF** Short keystroke: Instrument on Long keystroke: Instrument off
	**Function selection** Switch beween R_{LO} 200 mA, R_{LO} 10 A Limit MAN or R_{LO} 10 A Limit AUTO measurement modes
	**BRIGHTNESS** Turn on or off the display backlight
	**SETTINGS** Access the setup menu
	**ESC** Exit a menu and return to the previous level
	**SAVE** Short keystroke: Saves the result of the measurement Long keystroke: Displays a list of all recorded measurements
	**ZERO** Start compensation for the test leads resistance in two-wire resistance measurements
	**HELP** Access the help menu

Key	Description
	**Up / Down** Select the options mode, limit or measurement time Scroll upwards or downwards in a list
	**Left / Right** Select measurement modes Increase or decrease a values
	**START/ENTER** Start the measurement Enter a submenu Confirm an action

6.1.3 Indicators

Indicator	Description
	Battery life indicator
	Battery completely charged
	Battery partially charged
	Battery empty
	**OK** The measured resistance ranges below the limit
	**NOT OK** The measured resistance exceeds the limit

6.2 Navigation

The menu can be navigated via the function keys.

- Use **Up / Down** to scroll upwards or downwards in a list.
- Use **START/ENTER** to enter the selected submenu.
- Use **Left / Right** to scroll forward or backward in the list of options or to increase or decrease a value.
- Use **START/ENTER** to confirm an action.
- Use **ESC** to abort an action or return to the previous level.

6.3 Measurement Settings

Parameters	Description
Mode	Sets the measurement mode for R_{LO} 200 mA: **Auto**, **Cont+** or **Cont-**
Limit	Sets the pass/fail threshold: **0.01** to **99.9** Ω If the limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
In continuous measurement modes	
Time	Sets the duration of a continuous measurement test: **1** to **15** seconds
In operation mode R_{LO} 10 A Limit AUTO	
Lenght	Sets the length of the protective conductor under test in meters: **0.1** to **999.9** m
Section	Section is the cross-section surface of the protective conductor under test: **0.5 mm²**, **1.0 mm²**, **1.5 mm²**, **2.5 mm²**, **4.0 mm²**, **6.0 mm²**, **10 mm²** and **16 mm²**

6.4 Setup Menu

The setup menu offers user configurable options. The setup menu can be accessed at any time by pressing **SETTINGS**.

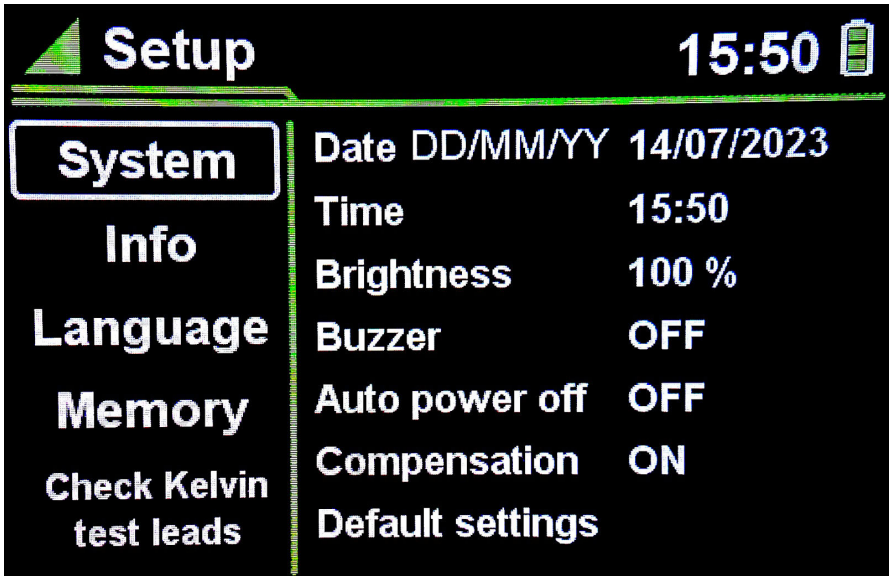
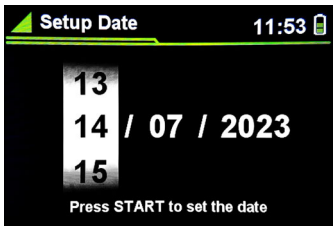


Fig. 6: Setup Menu

Submenu		Description
System	Date	Sets the date
	Time	Sets the time
	Brightness	Increases or decreases the brightness from **0** to **100** % in steps of 10 %
	Buzzer	Turns the buzzer **ON** or **OFF**
	Auto power off	Sets the time after which the device automatically turns off: **2 min**, **5 min**, 1**0 min**
	Compensation	Activates (**ON**) or deactivates (**OFF**) compensation
	Default settings	Restores the default settings
Info	Firmware	Displays the firmware version
	Batteries	Displays the battery voltage
	RTC battery	Displays the RTC battery voltage
Language	English	Changes the language of the user interface
	German	
Memory	Memory status	Shows the memory status
	Clear memory	Deletes all records from the memory
Check Kelvin test leads	Check Kelvin test leads before first 10A measurement	
	Check Kelvin test leads now	

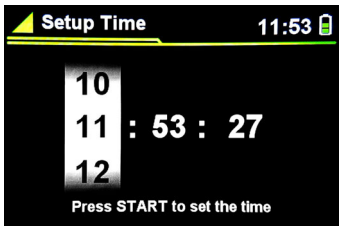
6.4.1 Setting the Date



1. Press the key **SETTINGS.**
2. Use **Up / Down** to select the submenu **System**.
3. Press **START/ENTER** to enter the submenu **System**.
4. Use **Up / Down** to select **Date**.
5. Press **START/ENTER** to enter the date settings.
6. Use **Up / Down** to select the day.
7. Use **Left / Right** to switch to the month.
8. Use **Up / Down** to select the month.
9. Use **Left / Right** to switch to the year.
10. Use **Up / Down** to select the year.
11. Press **START/ENTER** to confirm the set date.

↳ The date is set.

6.4.2 Setting the Time



1. Press the key **SETTINGS.**
2. Use **Up / Down** to select the submenu **System**.
3. Press **START/ENTER** to enter the submenu **System**.
4. Use **Up / Down** to select **Time**.
5. Press **START/ENTER** to enter the time settings.
6. Use **Up / Down** to select the hour.
7. Use **Left / Right** to switch to the minutes.
8. Use **Up / Down** to select the minutes.
9. Use **Left / Right** to switch to the seconds.
10. Use **Up / Down** to select the seconds.
11. Press **START/ENTER** to confirm the set time.

↳ The time is set.

7 Installation

7.1 Unpacking the Instrument

1. Carefully remove instrument and accessories from the packaging.
2. Check delivery for completeness and possible damage.
3. In case of detected damages, hidden defects and short deliveries, document type and scope and contact the manufacturer or supplier immediately.
4. Keep packing material for further transport.

7.2 Power Supply

The instrument is powered by battery and via AC power supply cable.

- 10 A measurement: The instrument is supplied from via AC power supply plus battery.
- 200 mA measurement: The instrument is supplied by battery only.

7.2.1 Establishing Power Supply via AC power supply cable

1. Connect the plug of the power supply cable to the mains socket of the instrument.
2. Connect the other side of the power supply cable to the AC power socket.

7.2.2 Establishing Power Supply by Batteries

Required Materials:

- a Phillips screwdriver for opening the battery/fuse compartment
- batteries which comply with the specifications in the technical data (⇨🗎7) respectively the labeling on the instrument

⚠ Attention!
When connected to an installation, the instruments battery/fuse compartment can contain hazardous voltage inside! When replacing battery cells or before opening the battery/fuse compartment cover, disconnect any measuring accessory connected to the instrument and turn off the instrument.

1. Remove the screws of the battery/fuse compartment cover on the back side of the instrument.
2. Remove the battery/fuse compartment cover.
3. Insert 6 1.5 V AA batteries into the battery tray. Ensure the correct polarity.
4. Place the battery/fuse compartment cover onto the battery tray.
5. Fix the screws of the battery/fuse compartment cover.

Note!
If the instrument is not to be used for a long period of time, remove all batteries from the battery/fuse compartment.

8 Operation

8.1 Switching on/off

8.1.1 Switching on the Instrument

1. Briefly press the key **ON/OFF**.

↳ The firmware version is displayed on the screen for a few seconds. Afterwards, the last set mode is displayed on the screen. The instrument is ready for operation.

8.1.2 Switching off the Instrument

1. Press the key **ON/OFF** for a few seconds.

↳ The instrument is switched off.

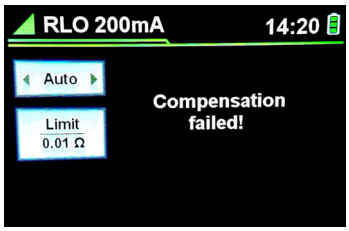
8.2 Performing R_{LO} 200 mA Measurement

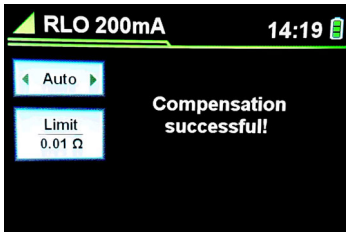
8.2.1 Compensation of Test Leads

Before carrying out a R_{LO} 200 mA measurement it is necessary to perform a test leads compensation.

1. Briefly press the key **ON/OFF** to switch on the instrument.
2. Press **FUNC** and select **R_{LO} 200mA**.
3. Plug in the two test leads to the test lead sockets **I+** and **U+** on the top of the instrument.
4. Connect the test probes (alligator clips) to each other.
5. Press the key **ZERO**.
   The compensation start screen is displayed.
6. Press the key **START/ENTER**.

↳ **Compensation started!** is displayed on the screen.
The compensation is carried out.
When the compensation has failed, **Compensation failed!** is displayed on the screen.
When the compensation is completed successfully, **Compensation successful!** is displayed on the screen.
Once performed successfully, compensation will be valid until the device is powered off.

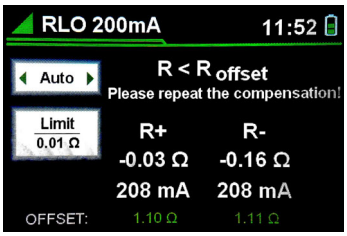


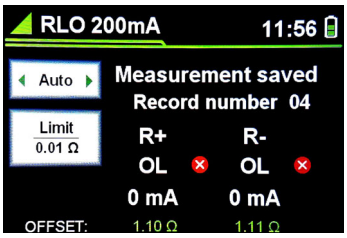


Note!
Compensation fails if the measured resistance of the test leads is too high (> 5 Ω).

8.2.2 Performing R_{LO} Measurement R_{LO} 200 mA in Auto Mode

✓ Compensation has been performed successfully.





1. Connect the test probes (alligator clips) to the DUT.
2. Press the keys **Up** or **Down** to select **Auto** mode.
3. Press the keys **Left** or **Right** to select the limit value.
   If the limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
4. Press the key **START/ENTER**.

↳ An R_{LO} +/– test is carried out.
The result of the measurement and the information about the applied test current is displayed on the screen.

8.2.3 Performing R_{LO} Measurement R_{LO} 200 mA in Continuous Plus Mode

✓ Compensation has been performed successfully.

1. Connect the test probes (alligator clips) to the DUT.
2. Press the keys **Up** or **Down** to select **Cont+** mode.
3. Press the keys **Left** or **Right** to select the limit value.
   If the limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
4. Press the keys **Left** or **Right** to select the time of duration of the measurement.
5. Press the key **START/ENTER**.

↳ An R_{LO} + test is carried out.
The result of the measurement, the information about the applied test current, and the continuous measurement timer are displayed on the screen.
When the countdown of the continuous measurement timer is complete, the maximum R_{LO} + value is displayed.

8.2.4 Performing R_{LO} Measurement R_{LO} 200 mA in Continuous Minus Mode

✓ Compensation has been performed successfully.

1. Connect the test probes (alligator clips) to the DUT.
2. Press the keys **Up** or **Down** to select **Cont-** mode.
3. Press the keys **Left** or **Right** to select the limit value.
   If the limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
4. Press the keys **Left** or **Right** to select the time of duration of the measurement.
5. Press the key **START/ENTER**.
   An R_{LO} – test is carried out.
   The result of the measurement, the information about the applied test current, and the continuous measurement timer are displayed on the screen.
   When the countdown of the continuous measurement timer is complete, the maximum R_{LO} – value is displayed.

8.3 Performing R_{LO} 10A Limit Measurement

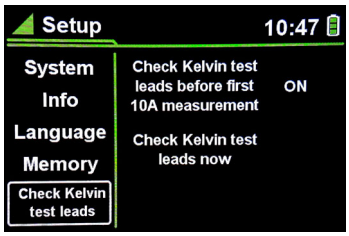
The R_{LO} 10A Limit measurement is a four-wire (Kelvin method) resistance measurement in the range from 0.001 Ω to 0.999 Ω. In order to provide a 10 A testing current, the instrument must be additionally powered from the mains power supply.

METRAOHM 10 supports two R_{LO} 10A Limit operation modes: R_{LO} 10A Limit MAN and R_{LO} 10A Limit AUTO.

8.3.1 Checking Kelvin test leads

Before performing an R_{LO} 10A Limit measurement, the Kelvin test leads must be checked.

Activate or deactivate the Kelvin test leads check



1. Press the key **SETTINGS** to enter the setup menu.
2. Press **Down** to select **Check Kelvin test leads**.
3. Press the key **START/ENTER**.

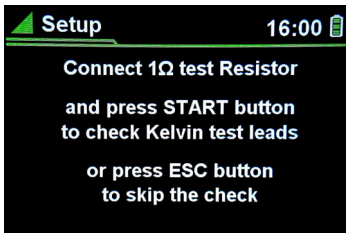
↳ The settings for the Kelvin text leads check are displayed.

4. Select **Check Kelvin test leads before first 10A measurement** > **ON.**

↳ The Kelvin test leads check is activated.
The message **Connect 1Ω test Resistor and press START button to check Kelvin test leads** is displayed when starting the instrument.

5. Select **Check Kelvin test leads before first 10A measurement** > **OFF.**

↳ The Kelvin test leads check is deactivated.
The message **Connect 1Ω test Resistor and press START button to check Kelvin test leads** is not displayed when starting the instrument.

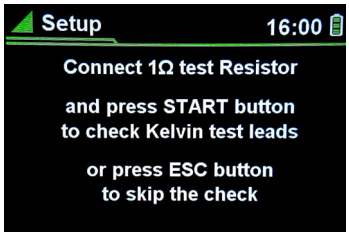


Make connections for Kelvin test leads check

1. Connect the first Kelvin test lead to the **U+** and **I+** sockets.
2. Connect the second Kelvin test lead to the **U-** and **I-** sockets.
3. Connect the Kelvin test leads on the left and right to the 1Ω test resistor supplied.
4. Connect the power supply via the mains cable.

Start Kelvin test leads check manually

✓ The Kelvin test leads check is not activated or has been skipped.
✓ The connections for Kelvin test leads check have been made.
✓ The power supply has been established.



5. Press the key **SETTINGS** to enter the setup menu.
6. Press **Down** to select **Check Kelvin test leads**.
7. Press the key **START/ENTER**.
8. Press **Down** to select **Check Kelvin test leads now**.
9. Press the key **START/ENTER**.

↳ The message **Connect 1Ω test Resistor and press START button to check Kelvin test leads** is displayed.

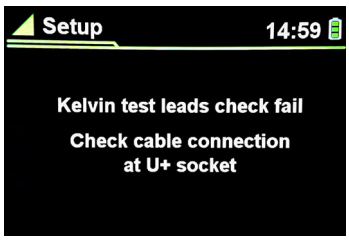
10. Press the key **START/ENTER**.
11. The Kelvin test leads check is carried out.

↳ The result of the Kelvin test leads check is displayed.

12. If the Kelvin test leads check fails, correct the reported error.
13. Repeat the Kelvin test leads check, until the check result **Kelvin test leads check pass** is displayed.

Perform Kelvin test leads check on instrument startup

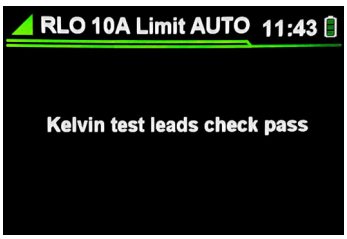
✓ The Kelvin test leads check is activated.
✓ The connections for Kelvin test leads check have been made.
✓ The power supply has been established.
✓ The message **Connect 1Ω test Resistor and press START button to check Kelvin test leads** is displayed.



1. Press the key **START/ENTER**.
2. The Kelvin test leads check is carried out.

↳ The result of the Kelvin test leads check is displayed.

3. If the Kelvin test leads check fails, correct the reported error.
4. Repeat the Kelvin test leads check, until the check result **Kelvin test leads check pass** is displayed.



Results of Kelvin Test Leads Check

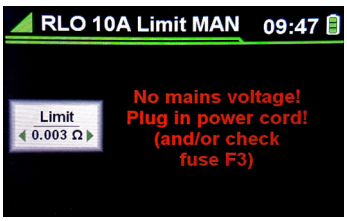
Test result messages	Description
Kelvin test leads check pass	Test successful
Check cable connection at I+ and I- sockets	Kelvin test lead damaged or not properly connected
Check cable connection at U- socket	Kelvin test lead damaged or not properly connected
Check cable connection at U+ sockets	Kelvin test lead damaged or not properly connected
Check 1Ω test Resistor	Resistor damaged or not properly connected

8.3.2 Performing R_{LO} Measurement R_{LO} 10A Limit MAN

✓ Kelvin test leads check has been performed successfully.

1. Connect the plug of the power supply cable to the mains socket of the instrument.
2. Connect the other side of the power supply cable to the AC power socket.
3. Briefly press the key **ON/OFF** to switch on the instrument.
4. Press **FUNC** and select R_{LO} **10A Limit MAN**.
5. If the instrument has not been connected to the mains power supply the instrument emits an acoustical alarm and a warning is displayed.
6. Plug in the four test leads to the test lead sockets **I+, I-, U+** and **U-** on the top of the instrument.
7. Connect the test probes (Kelvin clips) to the DUT.
8. Press the keys **Left** or **Right** to select the limit value.
   If the limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
9. Press the key **START/ENTER**.

↳ The test is carried out.
The result of the measurement and the information about the applied test current is displayed on the screen.



8.3.3 Performing R_{LO} Measurement R_{LO} 10A Limit AUTO

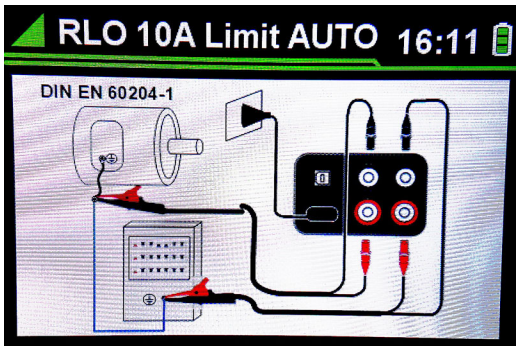
✓ Kelvin test leads check has been performed successfully.

1. Connect the plug of the power supply cable to the mains socket of the instrument.
2. Connect the other side of the power supply cable to the AC power socket.
3. Briefly press the key **ON/OFF** to switch on the instrument.
4. Press **FUNC** and select R_{LO} **10A Limit MAN**.
5. If the instrument has not been connected to the mains power supply the instrument emits an acoustical alarm and a warning is displayed.
6. Plug in the four test leads to the test lead sockets **I+, I-, U+** and **U-** on the top of the instrument.
7. Connect the test probes (Kelvin clips) to the DUT.
8. Press the keys **Up** or **Down** to select **Length**.
9. Press the keys **Left** or **Right** to select the length value.
10. Press the keys **Up** or **Down** to select **Section**.
11. Press the keys **Left** or **Right** to select the section value.
    The DUT evaluates the pass/fail limit threshold of the measured resistance. Assumed resistivity (p) of copper used in internal calculations is the standard average value of 0.017 mm^2/m.
12. Press the key **START/ENTER**.

↳ The test is carried out.
If the calculated limit value is exceeded, the instrument emits an acoustical alarm and a warning is displayed.
The result of the measurement and the information about the applied test current is displayed on the screen.

8.4 Accessing the Help menu

1. Press the key **HELP**.
   The help diagram for the selected measurement mode is displayed on the screen.
2. Press the key **ESC** to exit the help menu and to return to the last measurement mode.



8.5 Saving Measurement Results

✓ The test result is displayed on the screen.

1. Briefly press the key **SAVE**.

↳ **Measurement saved** and **Record number [n]** are displayed on the screen.
The measurement result is saved in the instrument's internal memory.
When trying to save a measurement that has already been saved, the message **Measurement already saved** is displayed on the screen.
When trying to save a measurement and the memory is already full, the message **Out of memory** is displayed on the screen.

8.6 Browsing Measurement Results

✓ The test result is displayed on the screen.

1. Press the key **SAVE** for a few seconds.
   A list of recorded measurements is displayed on the screen.
2. Press the keys **Up** or **Down** to select the desired measurement record.
3. Press the key **START/ENTER**.
   The details of the selected measurement with all relevant parameters are displayed on the screen.
4. Press the key **ESC** to return to the previous menu level.

8.7 Saving Measurement Results to a PC

System requirements:

- Windows 10 or Windows 11
- .NET Framework 4.8

8.7.1 Installing the R_{LO} GM Logger

In the user's personal area **myGMC** you can register your devices and download related software for free.

1. Go to the website https://www.gmc-instruments.de/services/mygmc.
2. Create an account for the myGMC personal area.
3. Register your instrument in the myGMC personal area.
4. Download the software **R_{LO} GM Logger**.
5. Unpack the software **R_{LO} GM Logger** on the PC.
6. Follow the installing instructions on the PC.

8.7.2 Connecting the Instrument to a PC

✓ All test objects and test leads have been removed from the instrument.

1. Insert in the USB-B plug into the USB port of the instrument.
2. Insert the USB-A Plug into the USB port of the PC.

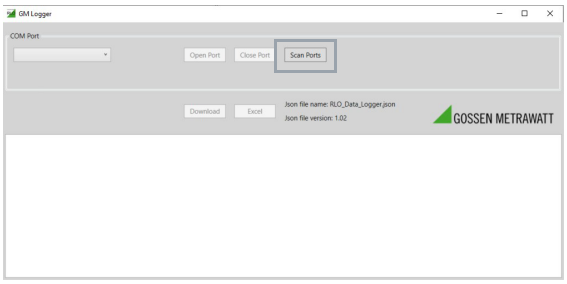
↳ The USB driver is installed automatically on the PC.
The message **Do not unplug the USB until the process is complete.** is displayed on the screen of the instrument.

8.7.3 Copy Measurement Results to the PC

✓ The instrument is connected to the PC.

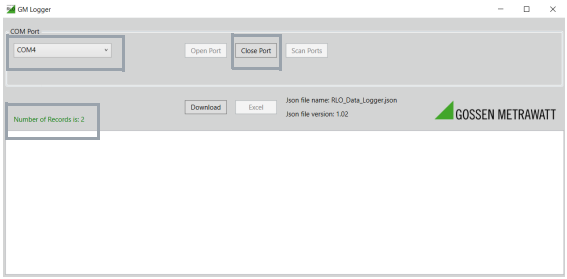
1. Start the **R_{LO} GM Logger** on the PC.

↳ The **R_{LO} GM Logger** home screen is displayed.



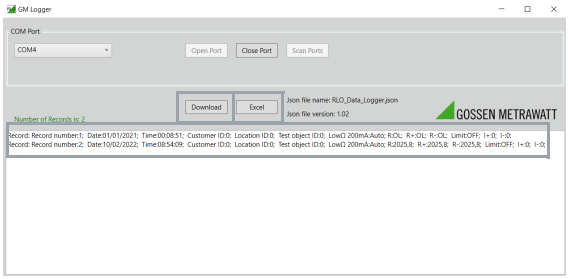
2. Click on the button **Scan Ports**.
3. In the dropdown menu **Com Port**, select the COM port the USB plug has been assigned to.
4. Click on the button **Open Port**.

↳ The number of records saved in the instrument's internal memory is displayed.



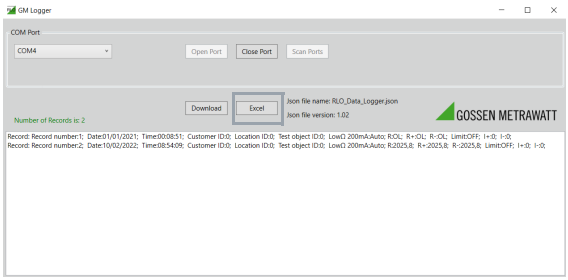
5. Click on the button **Download**.

↳ The records saved in the instrument's internal memory are listed.



6. Click on the button **Excel**.
   The records are copied from the instrument to the PC als xlsx-files.
7. Save the xlsx-file on the PC.

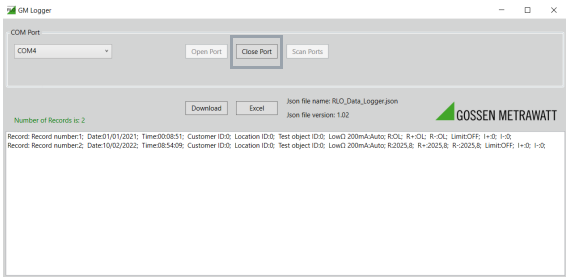
↳ The message **File [path].xlsx saved!** is displayed.
The download is completed.



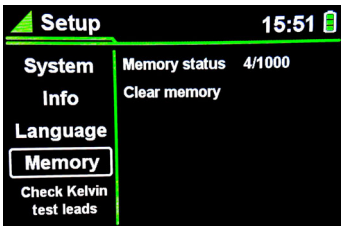
8.7.4 Disconnecting the Instrument from the PC

1. Click on the button **Close Port**.

↳ The PC disconnects from the instrument.
The device returns to the last measurement mode.



8.8 Delete Measurement Results from the Memory



1. Press the key **SETTINGS.**
2. Use **Up / Down** to select the submenu **Memory**.
3. Press **START/ENTER** to enter the submenu **Memory**.
4. Use **Up / Down** to select **Clear memory**.
5. Press **START/ENTER** to delete all records from the memory.

↳ All records are deleted.

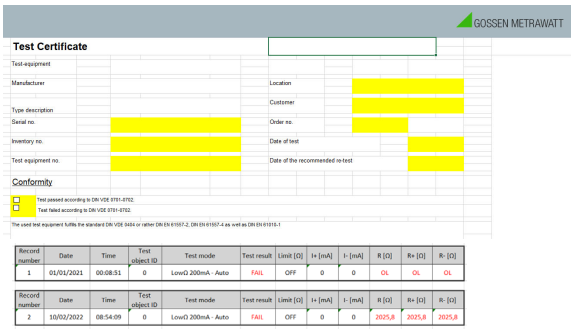
6. In order to return to the previous level without deleting the records from the memory, press **ESC**.

8.9 Reading Test Results on a PC

1. Open the xlsx-file you have saved on the PC ⇨ "Saving Measurement Results to a PC" 🗎19.

↳ A test certificate with the test results is displayed.

2. Complete the test certificate with further details about the test.


GOSSEN METRAWATT

Test Certificate

Test-equipment

Manufacturer | Location

Type description | Customer

Serial no. | Order no.

Inventory no. | Date of test

Test equipment no. | Date of the recommended re-test

Conformity

Test passed according to DIN VDE 0701-0702

Test failed according to DIN VDE 0701-0702

The used test equipment fulfills the standard DIN VDE 0404 or rather DIN EN 61557-2, DIN EN 61557-4 as well as DIN EN 61010-1

Record number	Date	Time	Test object ID	Test mode	Test result	Limit [Ω]	I+ [mA]	I- [mA]	R [Ω]	R+ [Ω]	R- [Ω]
1	01/01/2021	00:08:51	0	LowΩ 200mA - Auto	FAIL	OFF	0	0	OL	OL	OL

Record number	Date	Time	Test object ID	Test mode	Test result	Limit [Ω]	I+ [mA]	I- [mA]	R [Ω]	R+ [Ω]	R- [Ω]
2	10/02/2022	08:54:09	0	LowΩ 200mA - Auto	FAIL	OFF	0	0	2025,8	2025,8	2025,8

9 Maintenance

9.1 Cleaning

Attention!
Do not immerse.

Before cleaning, disconnect the device from the mains and remove all test leads.

Clean the instrument by wiping it gently with a damp, lint-free cloth. Do not use any cleaning agents.

9.2 Troubleshooting

In the following we list common problems that may occur during operation and suggest remedies for the elimination of simple faults. If the recommended procedures do not succeed, please contact our support
⇨ "Contact, Support and Service" 🗎24

Problem	Remedy
The display remains dark after switching on.	Power supply by battery: – Check if batteries are inserted. – Check if the batteries are inserted correctly (polarity).
The instrument issues an error message and does not start the measurement.	– Check if a valid mains voltage is applied – Exclude the presence of potentially hazardous voltage on the test probes

9.3 Fuse Replacement

The device has 3 fuses (⇨ "Instrument Overview" 🗎4) which must be replaced when defective.

Required Materials

- a Phillips screwdriver for opening the fuse compartment
- a replacement fuse which complies with the specifications in the technical data (⇨🗎7) respectively the labeling on the instrument

1. Switch the test instrument off and disconnect it from mains power.
2. Disconnect all test leads.
3. Remove the screws of the battery/fuse compartment cover on the back side of the instrument.
4. Remove the battery/fuse compartment cover.

Attention!
Only use replacement fuses which comply with the specifications in the technical data (⇨🗎7) respectively the labeling on the instrument!
No other fuses may not be used in the test instrument.

5. Replace the fuse(s).
6. Place the battery/fuse compartment cover onto the battery tray.
7. Fix the screws of the battery/fuse compartment cover.

↳ The fuse(s) have been replaced.

9.4 Repair

The instrument is intended to be serviced only by authorized service personnel. Service procedures should only be performed by qualified technical personnel ⇨ "Contact, Support and Service" 🗎24.

9.5 Calibration

Using your device and the stressing it is subjected to in doing so may result in deviation from the specified levels of accuracy.

In the case of strict measuring accuracy requirements, as well as frequent stress (such as considerable climatic or mechanical stressing), we recommend a relatively short calibration interval of once per year. If this is not the case, a calibration interval of once every 2 to 3 years is sufficient as a rule.

For calibrations please contact GMC-I Service GmbH ⇨ "Contact, Support and Service" 🗎24.

You can find a sticker on your device with the device-specific standard calibration interval and information of the service provider on it.

Note!

Date on the calibration certificate / Calibration interval starts upon receipt

Your devices comes with a calibration certificate that has a date. It may date back some time if your device was stored a certain time before being sold.

The devices are stored according to the defined conditions. The developing drift therefore is negligible for a time period of approximately 1 year.

The characteristics of the device are thus within the specifications and you can set the first calibration interval as from receipt.

10 Contact, Support and Service

You can reach Gossen Metrawatt GmbH directly and uncomplicated, we have one number for everything!
Whether it's a support question, or individual desire, we answer every request at:

+49-911-8602-0	Monday–Thursday: Friday:	8:00 a.m. – 4:00 p.m. 8:00 a.m. – 2:00 p.m.
You can also e-mail to:	info@gossenmetrawatt.com	

Do you prefer support via e-mail?

Measuring and test instruments:	support@gossenmetrawatt.com
Industrial equipment:	support.industrie@gossenmetrawatt.com

For repairs, replacement parts, and calibrations[1] please contact GMC-I Service GmbH:

+49-911-817718-0
service@gossenmetrawatt.com
www.gmci-service.com

Beuthener Str. 41
90471 Nürnberg
Germany

1. DAkkS calibration laboratory per DIN EN ISO/IEC 17025.
Accredited at the Deutsche Akkreditierungsstelle GmbH under registration no. D-K-15080-01-01.

11 CE Declaration

The instrument fulfills all requirements of applicable EU directives and national regulations. We confirm this with the CE mark. The CE declaration is available upon request.

A calibration certificate is included with the instrument.

A test report is included with the instrument.

12 Disposal and Environmental Protection

Proper disposal makes an important contribution to the protection of our environment and the conservation of natural resources.

Attention!
Environmental Damage!
Improper disposal results in environmental damage.
Follow the instructions concerning return and disposal included in this section.

The following comments refer specifically to the legal situation in the Federal Republic of Germany. Owners or end users who are subject to other regulations must comply with the respective local requirements and implement them correctly on site. Further information can be obtained, for example, from the responsible authorities or the local distributor.

Waste Electrical Equipment, Electrical or Electronic Accessories and Waste Batteries (including rechargeable batteries)

Electrical equipment and batteries (including rechargeable batteries) contain valuable raw materials that can be recycled, as well as hazardous substances which can cause serious harm to human health and the environment, and they must be recycled and disposed of correctly.

The symbol at the left depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end user (German electrical and electronic equipment act ElektroG and German battery act BattG) not to dispose of used electrical equipment and batteries with unsorted municipal waste (“household trash”). Waste batteries must be removed from the old device (where possible) without destroying them and the old device and the waste batteries must be disposed of separately. The battery type and its chemical composition are indicated on the battery’s labelling. If the abbreviations “Pb” for lead, “Cd” for cadmium or “Hg” for mercury are included, the battery exceeds the limit value for the respective metal.

Please observe the owner’s or end user’s responsibility with regard to deleting personal data, as well as any other sensitive data, from old devices before disposal.

Old devices, electrical or electronic accessories and waste batteries (including rechargeable batteries) used in Germany can be returned free of charge to Gossen Metrawatt GmbH or the service provider responsible for their disposal in compliance with applicable regulations, in particular laws concerning packaging and hazardous goods. Waste batteries must be handed over in discharged state and/or with appropriate precautionary measures against short-circuiting. Further information regarding returns can be found on our website.

Packaging Materials

We recommend retaining the respective packaging materials for the case that you might require servicing or calibration in the future.

Attention!
Danger of Asphyxiation Resulting from Foils and Other Packaging Materials!
Children and other vulnerable persons may suffocate if they wrap themselves in packaging materials, or their components or foils, or if they pull them over their heads or swallow them.
Keep packaging materials, as well as their components and foils, out of the reach of babies, children and other vulnerable persons.

In accordance with German packaging law (VerpackG), the user is obligated to correctly dispose of packaging and its components separately, and not together with unsorted municipal waste (“household trash”).

Private end consumers can dispose of packaging free of charge at the responsible collection point. Packaging which is not subject to so-called system participation is returned to the appointed service provider. Further information regarding returns can be found on our website.

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90449 Nürnberg
Germany

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www.gossenmetrawatt.com