GOSSEN METRAWATT

GEOHM®C
Ground Resistance Tester

3-349-088-03
12/8.14

Battery operated tester for the measurement of ground resistance meets international standards for performing such tests. This instrument allows measurement of soil resistivity and ohmic resistance by means of the ammeter-voltmeter test method.

Features

- 3 or 4-wire measurement selectable from menu
- No balancing required
- Continuous monitoring of interference voltage and auxiliary earth electrode resistance with indication of limit value violations
- Indication is displayed if maximum probe resistance is exceeded at the beginning of the measurement
- Voltage measurement with automatic switch-over function between direct voltage and alternating voltage:
  Direct voltage measuring range 1.0 … 250 V
  (with polarity display)
  Alternating voltage measuring range 0 … 300 V

Applications

The GEOHM®C is a compact instrument for the measurement of ground resistance in electrical systems in accordance with:

DIN VDE 0100	Installation of power systems with nominal voltages of up to 1000 V
DIN VDE 0141	Grounding in AC systems with nominal voltages of greater than 1 kV
DIN VDE 0800	Installation and operation of telecommunications systems including data processing systems: equipotential bonding and grounding

Testing of lightning protection systems in accordance with DIN VDE 0185

The instrument is also capable of determining soil resistivity which is essential in calculating dimensions for grounding systems. It can thus be taken advantage of for simple, geological surveys, and for the planning of grounding systems.

Beyond this, ohmic resistance can be measured at both solid and liquid conductors, as well as internal resistance at conductive elements, as long as these are capacitance and induction-free.

Special Functions

- Hold function: The measurement value is frozen at the display after the measurement key is released.
- Storage of measurement values to memory
- Data interface for the transmission of measurement values and for software updates
- Convenient report generating software, can be expanded into a comprehensive database

Display

The LCD consists of a backlit dot matrix display at which menus, setup options, measuring results and online help can be viewed. Various display languages can be selected depending upon the country in which the instrument is used.

Signal Lamps

The instrument automatically recognizes errors which occur during measurement, and signals them with four LEDs as shown in the table below.

LED	Status	Measuring Function	Meaning
$U_{Stör}$/ U_{noise}	red	Interference voltage	U > 10 V
Netz Mains	red	Voltage	Mains voltage is present
R_S>max	red	Probe resistance	Limit value exceeded
R_H>max	red	Auxiliary earth electrode resistance	Limit value exceeded

Operation

The instrument is easy to operate. A multifunction key allows for one-hand operation for menu selections and the initialization of measurements. Basic functions and sub-functions are selected with the help of four softkeys.

The instrument functions in accordance with the ammeter-voltmeter principle, and thus requires no balancing. Automatic measuring range selection, limit value monitoring and direct selection of 3 or 4-wire measurement assure easy operation as well.

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Battery Monitoring and Self-Test

A battery symbol with five segments ranging from depleted to fully charged continuously indicates the charging level of the batteries in the main menu.
Automatic shutdown ensures if the batteries are fully depleted, and the instrument includes an integrated charge monitoring circuit for safe charging of rechargeable NiMH or NiCd batteries. During the self-test, a series of test patterns can be displayed one after the other, and indicator LEDs and relays are tested.

Rugged Housing for Harsh Operating Conditions

Soft plastic jacketing protects the instrument against damage due to impact and dropping.

Data Interface

Measurement data can be uploaded to a PC via the integrated IRDA interface for processing and archiving, or for the generation of official reports

Software Updates

The test instrument can always be kept current thanks to device software updates via the IRDA interface. Software updates are performed during the course of re-calibration by our service department, or by the user himself.

Applicable Regulations and Standards

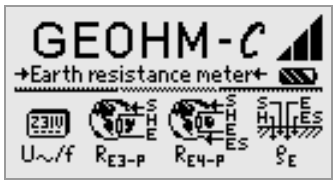
IEC 61010-1/ DIN EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements
IEC 61557/ EN 61557/ VDE 0413	Devices for testing, measuring and monitoring protective measures Part 1: General requirements Part 5: Earth resistance
VDE 0106-1	Protection against electrical shock, classification of electrical and electronic equipment
DIN EN 60529, VDE 0470-1	Test instruments and test procedures, protection provided by enclosures (IP code)
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measuement, control and laboratory use – EMC requirements – Part 1:General requirements

Regulations and Standards for Use of the Test Instrument

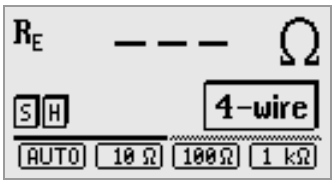
DIN VDE 0413 Part 5	Devices for testing, measuring and monitoring protective measures ; earth resistance
DIN VDE 0100	Regulations for the installation of power systems with nominal voltages of up to 1000 V
DIN VDE 0141	Earthing in AC systems with nominal voltages of greater than 1 kV
DIN VDE 0800	Setup and operation of telecommunications systems including electronic data processing: equipotential bonding and grounding
DIN VDE 0185	Lightning protection systems – general installation regulations
International regulations and standards	
BS 7430 + BS 7671, NFC 15-100, IEC 60364	

Sample Displays

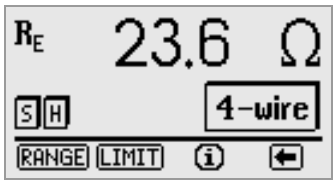
Main Menu



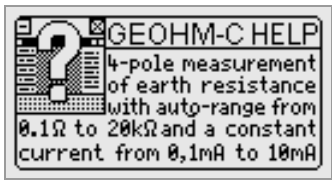
Measuring Range Selection



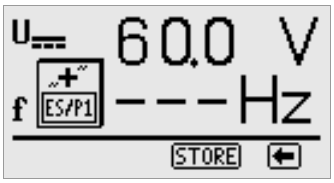
4-Wire Measurement



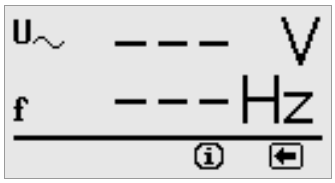
Online Help



Direct Voltage Measurement



Alternating Voltage Measurement



Characteristic Values

Measured Quantity	Display Range	Measuring Range	Impedance / Test Current
R_E	0.01 ... 20 Ω 0.1 ... 200 Ω 1 Ω ... 2 kΩ 10 Ω ... 20 kΩ 10 Ω ... 50 kΩ	1.0 ... 20 Ω 5 ... 200 Ω 50 Ω ... 2 kΩ 500 Ω ... 20 kΩ 500 Ω ... 50 kΩ [1]	10 mA 1 mA 100 µA 100 µA 100 µA
U⎓ [2]	1,0 ... 99.9 V 100 ... 250 V	10 ... 250 V	500 kΩ
U~ [3]	0 ... 99.9 V 100 ... 300 V		
f [3]	15 ... 99.9 Hz 100 ... 400 Hz	45 ... 200 Hz	500 kΩ

Measured Quantity	Intrinsic Uncertainty	Measuring Uncertainty
R_E	±(3% rdg.+6d)	±(10% rdg. + 6d) ±(10% rdg. + 6d) ±(10% rdg. + 6d) ±(10% rdg. + 6d) ±(16% rdg. + 10d)
U⎓ [2]	±(2% rdg.+2d)	±(4% rdg. + 3d)
U~ [3]		
f [3]	±(0.1% rdg.+1d)	±(0,2% rdg. + 1d)

[1] manual measuring range selection only
[2] as from software version AD
[3] For sinusoidal measured quantities only

Output voltage max. 50 V_{rms} at 128 Hz ±0.5 Hz

Reference Conditions

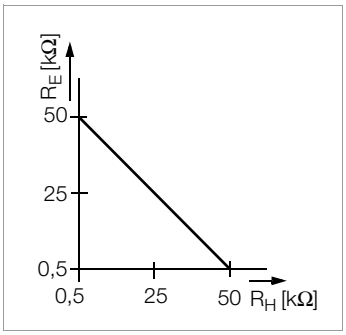
Battery Voltage	5.5 V ± 1%
Ambient Temperature	+ 23 °C ± 2 K
Relative Humidity	40 ... 60%

Nominal Ranges of Use

Temperature Range	0 °C ... + 40 °C
Battery Voltage	4.5 ... 6.5 V
Line Frequency	50 Hz ±0.2 Hz
Line Voltage Waveshape	sine (deviation between RMS and rectified value < 1%)

Nominal Conditions of Use

Series Mode Interference Voltage	< 3 V AC DC
Additional Error caused by Probe and Auxiliary Earth Electrode Resistance	< 5% of (R_E + R_A + R_P)
Max. Probe Resistance	< 70 kΩ
Max. Auxiliary Earth Electrode Resistance	< 50 kΩ
Max. Earth and Auxiliary Earth Electrode Resistance	≤ 50 kΩ, see Figure R_E as a function of R_H



Ambient Conditions

Operating Temperature	–10 ... + 50 °C
Storage Temperature	–20 ... + 60 °C (without batteries)
Relative Humidity	max. 75%, no condensation allowed
Elevation	max. 2000 m

Power Supply

Batteries	4 ea. 1.5 V C-size (4 x C-Size) (alcaline-manganese per IEC LR14)
Battery Voltage	4.6 … 6.5 V
Battery Service Life	30 h or 1000 measurements at R_E (with 10 s on-time, each measurement performed until the instrument switches off automatically, without display illumination)
Rechargeable Batteries	NiCd or NiMH
Battery Charger (not included)	NA 102 (Article No. Z501N), 3.5 mm jack plug
Charging Voltage	9 V
Charging Time	approx. 9 hours

As a rule, fewer measurements can be performed with rechargeable batteries due to their limited charging capacity.

Electrical Safety

Safety Class	II per IEC 61010-1
Operating Voltage	250 V
Test Voltage	2.3 kV
Measuring Category	250 V CAT II
Pollution Degree	2
Fuse	F0.1H250V

Data Interface

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

Mechanical Design

Display	multiple dot matrix display, 128 x 64 pixels (65 mm x 38 mm), illuminated
Dimensions	275 mm x 140 mm x 65 mm
Weight	approx. 1.2 kg with batteries
Protection	housing: IP 54 per EN 60529 with pressure compensating diaphragm of microporous ePTFE, non-ageing, 8 mm dia. in battery compartment lid

Extract 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 the penetration of water
3	≥ 2.5 mm Ø	3	spraying water
4	≥ 1.0 mm Ø	4	splashing water
5	dust protected	5	water jets

Standard Equipment

1 GEOHM®C test instrument
1 carrying strap
1 set of batteries
1 factory calibration certificate
1 set of comprehensive instructions covering the following topics:
– Measurement of earth resistance
with instructions for 3 and 4-wire methods,
with physical considerations regarding the potential gradient area as related to dissipation resistance of grounding systems of various size,
with important tips for the performance of measurements on difficult terrain
– Measurement of soil resistivity with geologic analysis and calculation of dissipation resistance
– Measurement of ohmic resistance

The free PC starter software WinProfi is used for communication with GEOHM®C.
WinProfi is available on our website (web address is indicated under item „Order Information“) with the following content and functions:

- up-to-date test instrument software
  – for loading other user interface languages
  – for loading firmware version updates
- Transmission of measured data from test instrument to PC

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Accessories

E-Set 3, Earth Testing Set

E-Set 4, Earth Testing Set

E-Set 5, Earth Testing Set

Order Information

Designation	Type	Article Number
Basic Instrument		
Digital Earth Tester	GEOHM®C	M590A
Add-Ons		
IR interface for connection to a USB port at a PC for data exchange between the PC and the GEOHM®C, e.g. for software updates to the tester or visualization of measurement values at the PC	IrDa-USB Converter	Z501J
Accessories		
Adapter for charging batteries inside the GEOHM®C	NA102	Z501N
Hard-shell case with compartment for one C series test instrument and accessories	HC30-C	Z541C
Earth testing set: Synthetic leather case with 2 reels, two 25 measurement cables, one 40 m measurement cable, two 3 m measurement cables, 4 earth spikes (zinc plated), 2 spike pullers and 1 hammer	E-Set 3	GTZ3301005R0001
Earth testing set: Synthetic leather case with 2 reels, two 25 m cables, one 40 m cable, two 3 m measurement cables and 4 earth drills	E-Set 4	Z590A
Earth testing set: Carrying case accommodating GEOHM®C 1 drum with 25 m measurement cable 2 drums with 50 m measurement cable each, 4 measurement cables, 3 x 0.5 m long, 1 x 2 m long 1 test clamp 4 earth drills, each 350 mm long 1 dust cloth 2 pads of earth testing measurement data forms	E-Set 5	Z590B
Reel with 25 m measurement cable and banana plugs at both ends	TR25	GTZ3303000R0001
Drum with 50 m measurement cable, banana plug / jack socket	TR50	GTY1040014E34
Earth drill, 35 cm long, can be connected by means of 4 mm banana plugs	SP350	GTZ3304000R0001
PC Analysis Software		
http://www.gossenmetrawatt.com (→ Products → Electrical Testing → Insulation, Grounding, Low Ohmic ... → GEOHM C) *or* http://www.gossenmetrawatt.com (→ Produts → Software → Software for Testers)		

For additional information on accessories, please refer to

- *our Measuring Instruments and Testers Catalog*
- *our website www.gossenmetrawatt.com*

Edited in Germany • Subject to change without notice • A pdf version is available on the internet.

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