GOSSEN METRAWATT

GEOHM C
Ground Resistance Tester

3-349-088-03
14/5.21

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 0185	Lightning protection systems
DIN 18014	Foundation earth electrode - Planning, execution and documentation

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.
- Buffer memory storage of measurement values

Display

The LCD consists of a backlit dot matrix display at which menus, setup options, measuring results and online help can be viewed.

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.

GEOHM C
Ground Resistance Tester

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 of the test instrument when the batteries are fully depleted.
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.

Applicable Regulations and Standards

The instrument has been manufactured and tested in compliance with the following safety regulations:

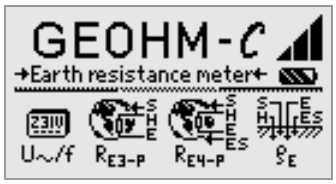
DIN EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements
DIN EN 61140 VDE 0140-1	Protection against electric shock Common aspects for installation and equipment
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measuement, control and laboratory use – EMC requirements – Part 1:General requirements
IEC 61557/ EN 61557/ VDE 0413	Equipment for testing, measuring and monitoring of protective measures Part 1: General requirements Part 5: Resistance to earth

Regulations and Standards for Use of the Test Instrument:

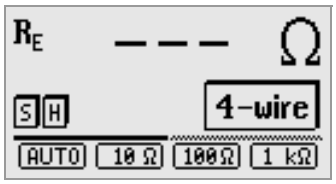
DIN VDE 0100	Regulations for the installation of power systems with nominal voltages of up to 1000 V
DIN VDE 0141	Earthing in AC systems with nominal voltages of greater than 1 kV
DIN VDE 0185	Lightning protection systems
DIN 18014	Foundation earth electrode - Planning, execution and documentation

Sample Displays

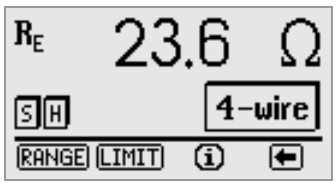
Main Menu



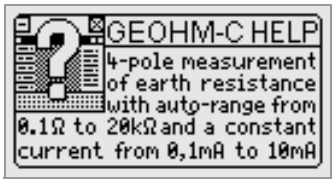
Measuring Range Selection



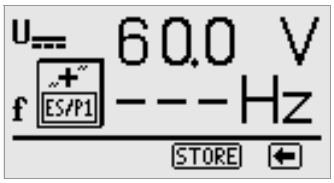
4-Wire Measurement



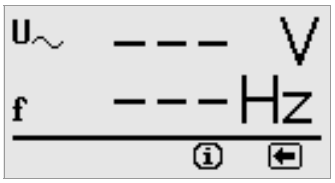
Online Help



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
$U_{\sim}$ [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)
$U_{\sim}$ [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

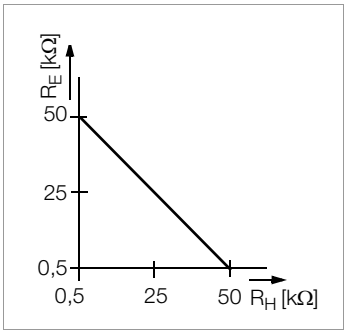
Battery Voltage	5.5 V ± 1%
Ambient Temperature	+ 23 °C ± 2 K
Relative Humidity	40 ... 60%

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	NA 102 (Article No. Z501N), [1] 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.

[1] Battery charger NA102 Z501N is not included in the standard equipment and is no longer available as an optional accessory.

Electrical Safety

Safety Class	II per DIN EN 61140/VDE 0140-1
Operating Voltage	250 V
Test Voltage	2.3 kV
Measuring Category	250 V CAT II
Pollution Degree	2
Fuse	F0.1H250V 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 ∅	3	spraying water
4	≥ 1.0 mm ∅	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

GEOHM C
Ground Resistance Tester

Accessories

Cable reel TR25II (Z503X) — TR50II (Z503Y)

Earth Drill SP500 (Z503Z)

E-SET PROFESSIONAL (Z592A)

Order Information

Designation	Type	Article Number
Basic Instrument		
Digital Earth Tester	GEOHM C	M590A
Accessories		
Hard-shell case with compartment for one C series test instrument and accessories	HC30-C	Z541C
Hard-shell case with compartment for two C Series test instruments and accessories	HC40	Z541D
Cable reel for low-resistance and earth-resistance measurement, 25 m	TR25II	Z503X
Cable reel for low-resistance and earth-resistance measurement, 50 m	TR50II	Z503Y
Earth Drill 420 mm for earth-resistance measurement	SP500	Z503Z
Measuring accessories set for earth-resistance measurements in sturdy outdoor carrying bag with 2 earth spikes 420 mm long, 1 blue measurement cable 40 m long on cable reel with hand strap,1 kV CAT III, 1 red measurement cable 20 m long on cable reel with hand strap, 1 kV CAT III, 1 black measurement cable 2 m long, 1 kV CAT IV, 1 green measurement cable 2 m long, 1 kV CAT IV, 1 red measurement cable 30 cm long, 1 kV CAT IV, 1 blue measurement cable 30 cm long, 1 kV CAT IV, 1 black test clamp with 4 mm socket, 1 green test clamp with 4 mm socket	E-SET BASIC	Z593A
Accessories for earthing measurement consisting of 1 x carrier bag, 4 earth spikes 500 mm, 1 x measuring cable 40 m blue on cable drum with hand strap, 1 x measuring cable 20 m red on cable drum with hand strap, 1 x measuring cable 5 m black, 1 x measuring cable 5 m green, 1 x test clamp with black 4 mm socket, 1 x test clamp with green 4 mm socket, 1 x hammer, 1 x roller tape measure, 1 x duster, 1 x writing pad with pen	E-SET PROFESSIONAL	Z592Z
Earth measurement case consisting of imitation leather case with 1 drum with 25 m measurement cable, 2 drums with 50 m measurement cable each, 3 measurement cables 0.5 m long, 1 measurement cable 2 m long, 1 test clamp, 4 earth drills, each 350 mm long, 1 dust cloth, 2 writing pads with forms	E-Set 5	Z590B

For additional information on accessories, please refer to

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

GOSSEN METRAWATT

Gossen Metrawatt GmbH
Südwestpark 15
90449 Nürnberg • Germany

Phone +49 911 8602-111
Fax +49 911 8602-777
E-Mail info@gossenmetrawatt.com
www.gossenmetrawatt.com