

# EM4058

## Digital Earth Tester

Equipment with remote control through an Android App and Frequency SCAN feature that performs an earth resistance measure with all available frequencies (270 Hz, 570 Hz, 870 Hz, 1170 Hz and 1470 Hz).



Illustrative Photo. Smartphone not included.

### Features

- Earth resistance measurement
- Ground resistivity (Wenner's method)
- Measure with multiples frequencies (270 Hz, 570 Hz, 870 Hz, 1170 Hz, 1470 Hz)
- Remote control through an Android App
- High spurious voltage rejection
- Spurious voltage measurement
- Up to 20 kΩ resistance range
- 0.01 Ω resolution
- Auto-range
- Alphanumerical display
- Automatic interference detection
- Rechargeable battery
- Built-in printer
- Direct reading of ground resistivity
- Up to 50 m selectable distance
- Built-in memory
- USB data output
- IP54 protection

### Description

The **EM4058** earth tester is a digital, microprocessor controlled instrument that allows to measure the earth resistance and ground resistivity (using Wenner's method), as well as to detect parasitic voltages present in the ground. This instrument is suitable to measure earth systems in power substations, industries, distribution networks, etc., according to IEC 61557-5.

It is also suitable for soil resistivity measurements, in order to optimize the earth systems project. It is a fully automatic and easy-to-operate equipment. Before starting each measurement, the equipment will check that conditions are within appropriate limits and will notify the operator in case any abnormality turns up (too high interference voltage, too much resistance in test spikes, very low test current, etc). Then, it will look for the most suitable range and show measurement results in an alphanumeric display.

In order to conveniently test the earth system, **EM4058** allows to perform measurements using the test current which frequency may be operator-selected (270 Hz, 570Hz, 870Hz, 1170Hz or 1470 Hz). On one hand, the lowest frequency will allow to analyze the earth system behavior related to fault currents of industrial frequency, while on the other hand, the measurement performed with the highest frequency will best show the behavior in connection with electrical currents caused by lightning and will offer a very high immunity related to interference voltages that are usually present in soils, specially near substations.

The **EM4058** has a Frequency Scan feature that performs an earth resistance measure with all available frequencies automatically and calculates, displays and prints the average result besides the individual result of each frequency. Those results are saved on the internal memory.

The instrument has four ranges that are automatically selected, covering measurements from 0.01 Ω up to 20 kΩ, which allows to obtain very accurate measurements for any kind of soils. During ground resistivity measurement, the operator may indicate the distance between spikes in order for the equipment to apply Wenner's formula and to show the resistivity value directly.

The **EM4058** has a built-in memory to store measurements and a built-in printer, besides the USB interface that allows to communicate measured values to a computer or data logger for their later analysis and has a remote interface that allows remote control of it through an Android device. It is a portable, strong and lightweight equipment, suitable to be used out in the field and under severe weather conditions. It is powered by a rechargeable battery and it is supplied with all the necessary accessories for measurements (test spikes, leads, etc) within an auxiliary case that makes it simple to carry.



### Rechargeable battery (LiFePO4)

**Expected lifetime:** 2000 charge / discharge cycles (average).

**Low self-discharge:** when the equipment is not in use, battery charge decreases with time at a much lower rate than other battery technologies.

**Safety:** in contrast to other lithium battery technologies commonly used, LFP batteries are thermally and chemically stable, significantly improving battery safety.

## Technical Specifications

# EM4058

### OPERATION FREQUENCY

270 Hz (resistance or resistivity measurement)  
570 Hz, 870 Hz, 1170 Hz or 1470 Hz (resistance measurement)  
Max. variation:  $\pm 1$  Hz (both cases).

### VOLTMETER

In the voltmeter function, the equipment operates as a conventional voltmeter, making it possible to measure voltages generated by parasitic currents.

### MEASUREMENT RANGES

Resistance: 0-20  $\Omega$ ; 0-200  $\Omega$ ; 0-2000  $\Omega$  y 0-20 k $\Omega$  (auto ranging).  
Resistivity: 0-50 k $\Omega$ m (auto ranging)  
Voltage: 0-60 V~

### ACCURACY

Resistance and Resistivity measurements:  
 $R \leq 2$  k $\Omega$ :  $\pm$  (2% of the measured value  $\pm$  2 digits).  
 $R > 2$  k $\Omega$ :  $\pm$  (5% of the measured value  $\pm$  2 digits).

Voltage measurement:  
 $\pm$  (3% of the measured value  $\pm$  2 digits).

### READING RESOLUTION

0.01  $\Omega$  in the resistance measurement;  
0.01  $\Omega$ m in the resistivity measurement;  
0.1 V in the voltage measurement.

### OUTPUT CURRENT

The short-circuit current is limited to less than 20.0 mARMS (according the IEC 61557-5 - 4.5).

### IMMUNITY TO SPURIOUS VOLTAGE INTERFERENCE

During the R measurement, it allows for the presence of spurious voltage up to 7 V~, with a error  $< 10\%$ .

### EARTH RESISTANCE OF AUXILIARY RODS

In the R measurement it allows Raux up to 50 k $\Omega$  with error  $< 30\%$ .

### ADVANCED FEATURES

Automated detection of abnormal conditions that may cause excessive errors (low battery, too high noise interference, too high test spikes resistance).

### SOIL RESISTIVITY COMPUTING

When performing soil resistivity measurements, the operator informs to the EM4058 the distance between spikes and the equipment automatically computes soil resistivity using the Wenner full equation.

### INTERFACE

USB.

### BUILT-IN PRINTER

For a printed register document of measured values.

### POWER SUPPLY

Internal rechargeable LFP battery (LiFePO4 12 V - 3000 mAh).

### BATTERY CHARGER

AC Adapter (12 V - 2.0 A).

### SAFETY CLASS

In accordance with IEC 61010-1.

### E.M.C.

In accordance with IEC 61326-1.

### ELECTROSTATIC IMMUNITY

In accordance with IEC 61000-4-2.

### ELECTROMAGNETIC IRRADIATION IMMUNITY

In accordance with IEC 61000-4-3.

### ENVIRONMENTAL PROTECTION

IP54 with closed lid.

### OPERATION TEMPERATURE

-10°C to 50°C.

### STORAGE TEMPERATURE

-25°C to 65°C.

### HUMIDITY

95% RH (without condensation).

### EQUIPMENT WEIGHT

Approx. 3 kg.

### DIMENSION

274 x 250 x 124 mm.

## Included accessories

- 4 Steel rods
- Charger power cord
- USB cable
- 40 meters cable
- 20 meters cable
- 20 meters cable
- 5 meters cable
- 5 meters cable to connect to the grounding system to be measured
- Connection wire to supply the charger with a 12 V external battery (the car battery)
- User guide
- Canvas bag



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