

## AMRU-120



Also measures continuity of protective and equipotential bonding conductors and auxiliary electrode resistance

## AMRU-120

Earth resistance and soil resistivity meter

amperis

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Earth resistance meter for auxiliary-electrode, clamp and double-clamp methods, plus soil resistivity and continuity.

## Measurement methods



Double-clamp method: earth resistance without disconnecting the installation

### What it measures

- Earth resistance using auxiliary electrodes (3- and 4-wire method).
- Earth resistance using auxiliary electrodes and a clamp, for multiple earth electrodes.
- Earth resistance using two clamps, when auxiliary electrodes cannot be driven into the ground.
- Soil resistivity by the Wenner method.
- Continuity of equipotential bonding and protective conductors, with auto-zero and a test current of 200 mA, meeting IEC 60364-6-61:2000 section 6.12.2.

### Additional functions

- Resistance of the auxiliary electrodes RS and RH.
- Interference voltage and its frequency, with measurement in the presence of 50 Hz or 60 Hz mains interference.
- Selectable maximum measuring voltage, 25 V or 50 V.
- Electrode spacing entry in metres for the resistivity calculation.
- Calibration of the current clamp in use, and a real-time clock for time-stamped readings.



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Battery-powered operation with onboard memory, USB data transfer and optional documentation software.

## Power, memory and data transfer



Reading the result on the graphic display during a measurement

### Power and autonomy

The meter runs from a rechargeable 4.8 V Ni-MH battery pack (3 Ah as standard, 4.2 Ah optional), charged through the supplied Z7 mains adaptor and charging cable, and gives over 500 measurements per charge. Battery status is shown on the display.

### Memory and data transfer

Results are stored in memory for 990 measurements, organised in 10 banks of 99 cells, each with the real-time clock's time stamp. Readings are transferred to a computer over the supplied USB cable; an optional OR-1 USB radio interface adds wireless transfer from the meter.

### Software

Two optional PC applications complete the set: one for creating measurement documentation and one for creating drawings and diagrams, both installed on a computer and used to organise and print the readings downloaded from the meter.



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## Earth resistance (3- and 4-wire method)

| Range          | Resolution | Accuracy              |
|----------------|------------|-----------------------|
| 0.00...19.99Ω  | 0.01Ω      | ±(2% m.v. + 2 digits) |
| 20.0...199.9Ω  | 0.1Ω       | ±(2% m.v. + 2 digits) |
| 200...1999Ω    | 1Ω         | ±(5% m.v. + 4 digits) |
| 2.00k...9.99kΩ | 10Ω        | ±(5% m.v. + 4 digits) |
| 10.0k...19.9kΩ | 100Ω       | ±(5% m.v. + 4 digits) |

## Auxiliary electrode resistance (RH, RS)

| Range           | Resolution | Accuracy                    |
|-----------------|------------|-----------------------------|
| 0...999Ω        | 1Ω         | ±(5% (RS+RE+RH) + 8 digits) |
| 1.00kΩ...9.99kΩ | 10Ω        | ±(5% (RS+RE+RH) + 8 digits) |
| 10.0kΩ...19.9kΩ | 100Ω       | ±(5% (RS+RE+RH) + 8 digits) |

Measurement range to IEC 61557-5: 0.30 Ω...19.9 kΩ.

3- and 4-wire method; test current under short-circuit >200 mA.

Voltage on open terminals: selectable <25 V AC or <50 V AC.

Test current frequency: 125 Hz (50 Hz networks) or 150 Hz (60 Hz networks), selectable in the menu.



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### Continuity of protective and equipotential bonding conductors

| Range          | Resolution | Accuracy              |
|----------------|------------|-----------------------|
| 0.00...19.99Ω  | 0.01Ω      | ±(2% m.v. + 2 digits) |
| 20.0...199.9Ω  | 0.1Ω       | ±(2% m.v. + 2 digits) |
| 200...1999Ω    | 1Ω         | ±(5% m.v. + 2 digits) |
| 2.00k...9.99kΩ | 10Ω        | ±(5% m.v. + 2 digits) |
| 10.0k...19.9kΩ | 100Ω       | ±(5% m.v. + 2 digits) |

### Interference voltage UN (r.m.s.)

| Range    | Resolution | Accuracy              |
|----------|------------|-----------------------|
| 0...100V | 1V         | ±(2% m.v. + 3 digits) |

Measurement range: 0.24 Ω...19.9 kΩ, meeting IEC 60364-6-61:2000 section 6.12.2.

Two-wire method; voltage on open terminals <24 V r.m.s. but >4 V r.m.s.; test current under short-circuit >200 mA.

Test current frequency: 125 Hz (50 Hz networks) or 150 Hz (60 Hz networks), selectable in the menu; auto-zero of the test leads.



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### Multiple earth resistance with clamp and auxiliary electrodes (3-wire + clamp)

| Range         | Resolution | Accuracy              |
|---------------|------------|-----------------------|
| 0.00...19.99Ω | 0.01Ω      | ±(8% m.v. + 3 digits) |
| 20.0...199.9Ω | 0.1Ω       | ±(8% m.v. + 3 digits) |
| 200...1999Ω   | 1Ω         | ±(8% m.v. + 3 digits) |

### Multiple earth resistance with the double-clamp method

| Range         | Resolution | Accuracy               |
|---------------|------------|------------------------|
| 0.00...19.99Ω | 0.01Ω      | ±(10% m.v. + 3 digits) |
| 20.0...149.9Ω | 0.1Ω       | ±(20% m.v. + 3 digits) |

Measurement range to IEC 61557-5: 0.44 Ω...1999 Ω.

3- and 4-wire method; test current under short-circuit >200 mA; voltage on open terminals selectable <25 V AC or <50 V AC.

Test current frequency: 125 Hz (50 Hz networks) or 150 Hz (60 Hz networks), selectable in the menu.



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### Soil resistivity (Wenner method)

|                  |       |
|------------------|-------|
| 0.00...199.9Ωm   | 0.1Ωm |
| 200...1999Ωm     | 1Ωm   |
| 2.00k...19.99kΩm | 10Ωm  |
| 20.0k...99.9kΩm  | 100Ωm |
| 100k...999kΩm    | 1kΩm  |

$\rho = 2\pi L R_E$ . Accuracy depends on the  $R_E$  accuracy in the 4-wire method, and is never less than  $\pm 1$  digit.  
L: distance between the test probes, 1 to 50 m.



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### Safety, environmental and general specifications

|                              |                                                                              |
|------------------------------|------------------------------------------------------------------------------|
| Type of insulation           | Double insulation, to EN 61010-1 and IEC 61557                               |
| Measurement category         | CAT III 600 V, to EN 61010-1                                                 |
| Protection rating (EN 60529) | IP54                                                                         |
| Display                      | Backlit graphic LCD                                                          |
| Data interface               | USB cable, standard; optional OR-1 USB radio interface for wireless transfer |
| Autonomy                     | More than 500 measurements per battery set                                   |
| Memory                       | 990 measurements, in 10 banks of 99 cells, with real-time clock time stamp   |
| Warranty                     | 36 months                                                                    |
| Operating temperature        | -10...+50°C                                                                  |
| Storage temperature          | -20...+70°C                                                                  |
| Humidity                     | 20...80 %                                                                    |



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### Standard and optional accessories

#### Standard accessories

50 m reel test lead, yellow; 25 m reel test lead, red; 25 m reel test lead, blue; pin probe with banana plug, yellow; 1.2 m banana-plug test lead, yellow; 2.2 m banana-plug test lead, black; K01 crocodile clip, black; 0.30 m earth contact test probes (4 pcs); L2 carrying case; USB transmission cable; 4.8 V 3 Ah Ni-MH battery pack; Z7 power supply adaptor; battery charger cable; carrying strap; calibration certificate; operating manual.

#### Optional accessories

Documentation-creation PC software; drawing and diagram PC software; USB key for the software; K02 crocodile clip, black; 0.80 m earth contact test probe; 2 m two-wire banana-plug test lead; L3 carrying case; C-3 current clamps (Ø 52 mm); N-1 current clamps (Ø 52 mm); 4.8 V 4.2 Ah Ni-MH battery pack; cramp; LR14 (size C) battery case; car cigarette-lighter charging cable (12 V); OR-1 USB radio interface.



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