

EARTH RESISTANCE METER MRU-200



MRU-200
is the unique meter in the market
which uses all measurement methods.

Possible measurements:

- earth resistance measurement with 2-pole, 3-pole, 4-pole method,
- selective earth resistance measurement with clamp (no influence from parallel earths; no opening of rusty junctions is needed),
- impulse earth resistance measurement, three kinds of measuring impulse 4/10 μ s, 8/20 μ s, 10/350 μ s,
- two clamps earth resistance measurement without auxiliary test prods,
- earth resistivity measurement,
- leakage current measurement,

Standard accessories of the meter MRU-200:

- Test lead with banana plug; 1,2m; red
- Test lead with banana plugs 2,2m; black
- Test lead on a reel with banana plugs; 25m red
- Test lead on a reel with banana plugs; 25m blue
- Shielded test lead on a reel with banana plugs; 50m yellow
- USB transmission cable
- charger for battery loading from the socket of car lighter (12V)
- Earth contact test probe (rod); 0,30m - (4 pcs.)

WAPRZ1X2REBB
WAPRZ2X2BLBB
WAPRZ025REBBSZ
WAPRZ025BUBBSZ

WAPRZ050YEBBSZE
WAPRZUSB

WAPRZLAD12SAM
WASONG30

- Carrying case L2
- Ni-MH battery package 4,8V 4,2Ah
- „Crocodile” clip K01; black
- „Crocodile” clip K02; red
- Cramp
- Power supply adaptor Z7
- Cable for battery charger
- Hanging straps
- Calibration certificate issued by calibration laboratory

WAFUTL2
WAAKU07
WAKROBL20K01
WAKRORE20K02
WAZACIMA1
WAZASZ7
WAPRZLAD230
WAPRZSZKPL

Optional accessories of the meter MRU-200:

- Earth contact test probe (rod); 0,80m
- Test lead with banana plugs 2m (N-1)
- Current clamp C-3 ($\varnothing=52$ mm)
- Current clamp N-1 ($\varnothing=52$ mm)
- Current flexible clamp (Rogowsky coil) F-1 ($\varnothing=400$ mm)

WASONG80
WAPRZ002DZBB

WACEG630KR
WACEGN1BB
WACEGF10KR

- Battery case LR14 (size C)
- Software for creation of documentation from electrical measurements „SONEL PE4”
- Carrying case L3

WAP0J1
WAPROSONPE4
WAFUTL3

Sonel S.A.
ul. Wokulskiego 11
58-100 Świdnica, PL
tel. +48 74 85 83 860
fax +48 74 85 83 809

export@sonel.pl
www.sonel.pl



MRU-200

• It allows to take the measurements of:

- earthing resistance using auxiliary electrodes,
- earthing resistance using auxiliary electrodes and clamp (for measurements of multiple earthing)
- earthing resistance using double clamps (for measurement of earthing when it is impossible to use auxiliary electrodes),
- impulse earth resistance (without disconnecting measured earthing),
- ground resistivity (Wenner method),
- current using the clamp (e.g. leakage) and flexible clamp (Rogowsky coil),
- measurement of continuity of equipotential bondings and protective conductors (meeting the requirements of IEC 60364-6-61:2000 section 6.12.2) with auto-zero function – with current 200mA.

• Additionally:

- measurement of resistance of auxiliary electrodes R_s and R_H ,
- measurement of interference voltage,
- measurement of interference frequency,
- measurement in the presence of interference voltage in the power network with frequency 16 2/3 Hz, 50Hz, 60Hz and 400Hz (with automatic selection of proper frequency of measuring signal or with manual selection),
- selection of maximum measuring voltage (25V and 50V)
- introducing the distance between the electrodes for the resistivity in metres (m) and feet (ft),
- memory of 990 measurements (10 banks of 99 cells each),
- calibration of clamp used,
- real time clock (RTC),
- data transmission to the computer (USB),
- indication of battery state.

Electric security:

- type of insulation double, according to EN 61010-1 and IEC 61557
- measurement category CAT IV 300V acc. to EN 61010-1
- protection class acc. to EN 60529 IP54

Rated operational conditions:

- operation temperature -10...+50°C
- storage temperature -20...+70°C
- humidity 20...80%

Other technical data:

- LCD display graphic, backlighted
- interface USB
- number of measurements carried out of set of batteries > 1200
- warranty 36 months

Measurement of interference voltage

Range	Resolution	Accuracy
0...100V	1V	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$

Measurement of interference frequency

Range	Resolution	Accuracy
15...450Hz	1Hz	$\pm(1\% \text{ m.v.} + 2 \text{ digits})$

Measurement of earthing resistance (method 3- and 4-pole)

measurement range to IEC61557-5: **0,100Ω...19,9kΩ**

Range	Resolution	Accuracy
0,000...3,999Ω	0,001Ω	$\pm(2\% \text{ m.v.} + 4 \text{ digits})$
4,0...39,99Ω	0,01Ω	$\pm(2\% \text{ m.v.} + 2 \text{ digits})$
40...399,9Ω	0,1Ω	
400...3999Ω	1Ω	
4,00k...19,99kΩ	0,01kΩ	$\pm(5\% \text{ m.v.} + 2 \text{ digits})$

Measurement of continuity of equipotential bondings and protective conductors (R_{cont}) measurement range to IEC61557-4: **0,045Ω...19,99kΩ**

Range	Resolution	Accuracy
0,00...3,999Ω*	0,001Ω	$\pm(2\% \text{ m.v.} + 4 \text{ digits})$
4,0...39,99Ω	0,01Ω	$\pm(2\% \text{ m.v.} + 2 \text{ digits})$
40,0...399,9Ω	0,1Ω	
400...3999Ω	1Ω	
4,0k...19,99kΩ	0,01kΩ	$\pm(5\% \text{ m.v.} + 2 \text{ digits})$

* - in range 0,000...0,045Ω the accuracy is not specified.

Measurement of resistance of auxiliary electrodes R_H and R_s

Range	Resolution	Accuracy
0...999Ω	1Ω	$\pm(5\% (R_s + R_e + R_H) + 8 \text{ digits})$
1,00k...9,99kΩ	0,01kΩ	
10,0k...19,9kΩ	0,1kΩ	

Measurement of multiple earthing resistance with using the clamp and auxiliary electrodes (3p + clamp) measurement range to IEC61557-5: **0,120Ω...1999Ω**

Range	Resolution	Accuracy
0,00...3,999Ω*	0,001Ω	$\pm(8\% \text{ m.v.} + 4 \text{ digits})$
4,0...39,99Ω	0,01Ω	$\pm(8\% \text{ m.v.} + 3 \text{ digits})$
40...399,9Ω	0,1Ω	
400...1999Ω	1Ω	

* - in range 0,000...0,045Ω the accuracy is not specified.

Measurement of multiple earthing resistance with using double clamps

Range	Resolution	Accuracy
0,00...19,99Ω	0,01Ω	$\pm(10\% \text{ m.v.} + 3 \text{ digits})$
20,0...149,9Ω	0,1Ω	$\pm(20\% \text{ m.v.} + 3 \text{ digits})$

Measurement of ground resistivity Measurement method: Wenner, $\rho=2\pi LR_e$

Range	Resolution	Accuracy
0,0...199,9Ωm	0,1Ωm	depending on measurement accuracy R_e with 4p method, but not less than ± 1 digit
200...1999Ωm	1Ωm	
2,00k...19,99kΩm	0,01kΩm	
20,0k...99,9kΩm	0,1kΩm	
100k...999kΩm	1kΩm	

L – distance between probes: 1...50m

Measurement of AC current (leakage)

Range	Resolution	Accuracy
0,1...99,9mA ¹	0,1mA	$\pm(8\% \text{ m.v.} + 5 \text{ digits})$
100...999mA ¹	1mA	$\pm(8\% \text{ m.v.} + 3 \text{ digits})$
1,00...4,99A ^{1,2}	0,01A	$\pm(5\% \text{ m.v.} + 5 \text{ digits})^1$ unspecified ²
5,00...9,99A ^{1,2}	0,01A	$\pm(5\% \text{ m.v.} + 5 \text{ digits})$
10,0...99,9A ^{1,2}	0,1A	
100...300A ^{1,2}	1A	

¹ – receiving clamp (diameter 52mm) – C-3

² – flexible clamp (Rogowsky coil) with diameter 400 mm – F-1

Measurement of dynamic earthing resistance (R_b) with impulse wave method (4 p¹)

Range	Resolution	Accuracy
0,0...99,9Ω	0,1Ω	$\pm(2,5\% \text{ m.v.} + 3 \text{ digits})$
100...199Ω	1Ω	

choice impulse edges: 4/10μs, 8/20μs, 10/350μs

„m.v.”- measured value