

## MEASURING EQUIPMENT

### Earth resistance and resistivity tester MRU-120

Document No.: 11-304-R0

Sheet: 1 of 2

German Cathodic Protection



#### Possible measurements:

- earth resistance measurement with 3-pole, 4-pole method
- selective earth resistance measurement with clamp (no influence from parallel earths; no opening of rusty junctions is needed)
- continuity of equipotential bondings and protecting conductors
- two clamps earth resistance measurement without auxiliary test prods
- earth resistivity measurement

#### MRU-120 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)
- ground resistivity (Wenner method)
- measurement of continuity of equipotential bondings and protective conductors (meeting the requirements of IEC 60364-6-61:2000 6.12.2) with auto-zero function – with current 200 mA

#### 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, wireless
- number of measurements carried out of set of batteries > 500
- warranty 24 months

#### Measurement of interference voltage

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

- signalling overvoltage 24 V or 40 V rms
- measurement for DC and AC 45...65 Hz

#### Measurement of continuity of equipotential bondings and protective conductors ( $R_{cont}$ ) measurement range to IEC61557-5: 0.24 Ω...19.9 kΩ

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

- voltage on open terminals: <24 Vrms but >4 Vrms
- measurement current: under short circuit >200 mA
- frequency of measurement current: 125 (for networks 50 Hz) or 150Hz (for networks 60 Hz), possible choice of measurement frequency in menu
- auto-zero function measurement leads



#### Measurement of earthing resistance (method 3- and 4-pole) measurement range to IEC61557-5: 0.30 Ω...19.9 kΩ

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

- measurement current: under short circuit >200 mA
- voltage on open terminals: selectable <25 V AC or <50 V AC,
- frequency of measurement current: 125 (for networks 50 Hz) or 150 Hz (for 60 Hz)

#### Measurement of resistance of auxiliary electrodes $R_H$ and $R_S$

Range	Resolution	Accuracy
0 Ω...999 Ω	1 Ω	±(5% ( $R_S + R_E + R_H$ ) + 8 digits)
1.0 kΩ ... 9.99 kΩ	0.01 kΩ	
10.0 kΩ ...19.9 kΩ	0.1 kΩ	

#### Measurement of multiple earthing resistance with using the clamp and auxiliary electrodes (3p + clamp) measurement range to IEC61557-5: 0.44Ω...1999Ω

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

- selectable <25 V AC or <50 V AC
- measurement current: under short circuit > 200 mA
- frequency of measurement current: 125 (for networks 50 Hz) or 150 Hz (for 60 Hz)

#### Measurement of ground resistivity

Measurement method: Wenner,  $\rho = 2\pi LR_E$

Range	Resolution	Accuracy
0.0 Ω...199.9 Ω	0.01 Ω	depending on measurement accuracy $R_E$ with 4p method but not less than ± 1 digit
200 Ω...1999 Ω	0.1 Ω	
2.0 kΩ ... 19.99 kΩ	1 Ω	
20.0 kΩ ... 99.99 kΩ	0.01 kΩ	
100 kΩ ...999 kΩ	0.1 kΩ	

L= distance between probes: 1...50 m

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Document No.: 11-304-R0

Sheet: 2 of 2

**German Cathodic Protection****Measurement of multiple earthing resistance with using double clamps**

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

- frequency of measurement current 125 (for networks 50 Hz) or 150 Hz (for networks 60 Hz)

**Standard accessories of the meter MRU-120**

- |  |                |
|--|----------------|
| - Test lead with banana plug; 1.2 m; red                   | WAPRZ1X2REBB   |
| - Test lead with banana plugs 2.2 m; black                 | WAPRZ2X2BLBB   |
| - Test lead on a reel with banana plugs; 25 m red          | WAPRZ025REBBSZ |
| - Test lead on a reel with banana plugs; 25 m blue         | WAPRZ025BUBBSZ |
| - Test lead on a reel with banana plugs; 50 m yellow       | WAPRZ050YEBBSZ |
| - USB transmission cable                                   | WAPRZUSB       |
| - Pin probe with banana plug; yellow                       | WASONYEOG1     |
| - Earth contact test probe (rod); 0.30 m                   | WASONG30       |
| - Carrying case L2   | WAFUTL2        |
| - Ni-MH battery package 4.8 V 3 Ah                         | WAAKU03        |
| - Crocodile clip K01; black                                | WAKROBL20K01   |
| - Power supply adaptor Z7                                  | WAZASZ7        |
| - Cable for battery charger                                | WAPRZLAD230    |
| - Hanging straps   | WAPOZSZEKPL    |
| - Calibration certificate issued by calibration laboratory |                |

**Optional accessories of the meter MRU-120**

- |   |               |
|---|---------------|
| - Earth contact test probe (rod); 0.80 m                                    | WASONG80      |
| - Test lead with banana plugs 2 m (N-1)                                     | WAPRZ002DZBB  |
| - Carrying case L3  | WAFUTL3       |
| - Current clamp C-3 (Ø=52 mm)   | WACEGC3OKR    |
| - Current clamp N-1 (Ø=52 mm)   | WACEGN1BB     |
| - Akumulator Ni-MH 4.8V 4.2Ah   | WAAKU07       |
| - Battery case LR14 (size C)  | WAPOJ1        |
| - USB radio interface   | WAADAUSBOR1   |
| - Crocodile clip K02; red   | WAKRORE20K02  |
| - Cramp   | WAZACIMA1     |
| - Software for creation of documentation from electrical measurements „PE4” | WAPROSONPE4   |
| - Charger for battery loading from the socket of car lighter (12V)          | WAPRZLAD12SAM |