



**200 mA**

measurement  
current



soil resistivity  
without manual  
conversion

**CAT IV**

**300 V**



**IP54**

## Multifunctional earthing resistance meter

### Measurement methods

- **3-pole and 4-wire method** – measurement of earthing systems using auxiliary probes
- **3-pole method with clamp** – measurement of earthing systems with multiple earth electrodes
- **Two-clamp method** – measurement of earthing system when the auxiliary probes cannot be used
- **Soil resistivity** – Wenner method
- **Resistance of earth connection and equipotential bonding** measured using current  $\geq 200$  mA with auto-zero function – meets the requirements of EN 61557-4

### Additional features

- **Measurement current of 200 mA** – facilitates earth resistance measurements in difficult areas (sand, stony soil)
- Measurement of resistance of auxiliary electrodes  $R_s$  and  $R_H$
- Measurement of interference voltage
- Measurement in the presence of interference voltage generated by power networks with frequency of 50 Hz and 60 Hz
- Selection of maximum measuring voltage (25 V and 50 V)
- Automatic calculation of soil resistivity in ohm-meters ( $\Omega m$ ) and ohm-feet ( $\Omega ft$ )
- Memory of 990 measurement results (10 banks of 99 cells each)
- Calibration of clamp used
- Real time clock (RTC)
- Data transmission to the computer
- Battery indication





## Application

MRU-120 meter was created for **the most difficult working conditions**. It generates a measuring current exceeding 200 mA, which provides effective measurements of grounding of energy objects such as transformer stations and power stations.

Thanks to the methods using clamps, it is **not necessary to disconnect the control connectors**, which is sometimes a very tedious operation. This plays a special role when performing works on objects exposed to weather conditions, where the connecting elements are sometimes corroded or tarnished.

The graphical user interface provides clear readings and explicit messages. This translates into quick, trouble-free service.



## Protection and equipment

Housing of MRU-120 ensures safe operation in field conditions and inside buildings. Ingress protection rating of IP54 protects the device against water and solids in case of splashes or dusty conditions. Moreover, the design of the device provides very good protection during transport and handling. Extensive standard equipment allows user to perform most measurements without the need to purchase additional accessories. MRU-120 is a versatile solution that offers comprehensive testing of earthing systems.



## Capabilities

The measuring methods available in the device allow for comprehensive control of working and protective grounding. The calibration function of the test leads eliminates the influence of their resistance on the result. However, this is just the beginning.

- **The 4-wire method** provides very accurate measurement of the expected small values of resistance – eliminates the resistance of the test leads connecting the meter to grounding.
- **Measurement of resistance** of earth connection and equipotential bonding with a current exceeding 200 mA meets the requirements of EN 61557-4 standard.
- Before performing the measurement, the meter checks whether the tested object is a subject to excessive **interference voltage**, which may indicate additional problems.

## Memory and results

The results can be saved to the device's memory. It is divided into **10 banks of 99 cells**, each corresponding to one measurement. These results can be easily transferred to the **Sonel Reader** software for archiving or subsequent analysis and research.

## Other useful functions

**Built-in help function** – auxiliary illustrations demonstrate how to properly perform the measurement for each method.

**Correctness of connections** – if the meter detects an error, which prevents a correct measurement, it will indicate this in the top of the screen using the appropriate test socket symbol.

**Complete measurement data** – in addition to earth resistance measurement, the device performs additional measurements on interference voltages and resistance of auxiliary probes. Their results are provided with information about the date and time of testing, which facilitates preparing test documentation.



# Technical specifications

Measurement functions	Measurement range	Display range	Resolution	Accuracy ±(% m.v. + digits)
Interference voltage	0 V...100 V	0 V...100 V	1 V	±(2% m.v. + 3 digits)
Resistance of earth connection and equipotential bonding	0.24 Ω...19.9 kΩ acc. to EN 61557-4	0.00 Ω...19.9 kΩ	from 0.01 Ω	from ±(2% m.v. + 2 digits)
Earth resistance				
3-pole and 4-wire method	0.30 Ω...19.9 kΩ acc. to EN 61557-5	0.00 Ω...19.9 kΩ	from 0.01 Ω	from ±(2% m.v. + 2 digits)
3-pole + clamp method	0.44 Ω...1999 Ω acc. to EN 61557-5	0.00 Ω...1999 Ω	from 0.01 Ω	±(8% m.v. + 3 digits)
two-clamp method	0.00 Ω...149.9 Ω	0.00 Ω...149.9 Ω	from 0.01 Ω	from ±(10% m.v. + 3 digits)
auxiliary electrodes resistance	0 Ω...19.9 kΩ	0 Ω...19.9 kΩ	from 1 Ω	±(5% (R <sub>E</sub> +R <sub>H</sub> +R <sub>S</sub> ) + 8 digits), but ≥10% R <sub>E</sub>
Earth resistivity	0.0 Ωm...999 kΩm	0.0 Ωm...999 kΩm	from 0.1 Ωm	Depends on the accuracy of the R <sub>E</sub> 4p measurement, but not less than ±1 digit

## Safety and work conditions

Measuring category according to EN 61010	III 600 V / IV 300 V
Ingress protection	IP54
Type of insulation according to EN 61010-1 and IEC 61557	double
Dimensions	288 x 223 x 75 mm 11.3" x 8.8" x 3.0"
Weight	ca. 2 kg ca. 4.4 lbs
Operating temperature	-10...+50°C 14...122°F
Storage temperature	-20...+80°C -4... 176°F
Humidity	20...90%
Nominal temperature	23 ± 2°C 73.4°F ± 3.6°F
Reference humidity	40%...60%

## Memory and communication

Memory of measurement results	990 results
Data transmission	USB

## Other information

Quality standard – development, design and production	ISO 9001
The product meets the EMC (emission for industrial environment) requirements according to standards	EN 61326-1 EN 61326-2-2



## Standard accessories



**Test lead 2.2 m  
(banana plugs) black**

WAPRZ2X2BLBB



**Test lead 1.2 m  
(banana plugs) red**

WAPRZ1X2REBB



**Hanging straps**

WAPOZSZEKPL



**Crocodile clip  
1 kV 20 A black**

WAKROBL20K01



**Pin probe 1 kV  
(banana socket) red**

WASONREOGB1



**4x earth contact  
test probe (30 cm)**

WASONG30



**Test lead 25 m for  
earth resistance  
measurements  
(on a reel, banana  
plugs) blue / red**

WAPRZ025BUBBSZ  
WAPRZ025REBBSZ



**Test lead 50 m for  
earth resistance  
measurements  
(on a reel, banana  
plugs) yellow**

WAPRZ050YEBBSZ



**USB cable**

WAPRZUSB



**NiMH battery 4.8 V  
3.2 Ah**

WAAKU08



**Z-7 Power supply  
adapter + 230 V  
mains power cable**

WAZASZ7



**L-2 carrying case**

WAFUTL2



**Factory calibration  
certificate**



## Optional accessories

	<b>ERP-1 adapter</b> WAADAERP1		<b>FS-2 flexible coil</b> (Ø 1260 mm), output level 100 mV / 1 A WACEGFS20KR		<b>FSX-3 flexible coil</b> (Ø 630 mm), output level 300 mV / 1 A WACEGFSX30KR
	<b>F-1A flexible coil</b> (Ø 360 mm) WACEGF1A0KR		<b>F-2A flexible coil</b> (Ø 235 mm) WACEGF2A0KR		<b>F-3A flexible coil</b> (Ø 120 mm) WACEGF3A0KR
	<b>C-3 current clamps</b> (Ø 52 mm) WACEGC30KR		<b>N-1 transmitting clamps (Ø 52 mm, incl. 2-wire cable)</b> WACEGN1BB		<b>Double-wire test lead 2 m for N-1 clamps</b> WAPRZ002DZBB
	<b>Crocodile clip</b> 1 kV 20 A red / blue / yellow WAKRORE20K02 WAKROBU20K02 WAKROYE20K02		<b>Test lead 1.2 m</b> (banana plugs) black / blue / yellow WAPRZ1X2BLBB WAPRZ1X2BUBB WAPRZ1X2YEBB		<b>Pin probe 1 kV</b> (banana socket) black / blue / yellow WASONBLOGB1 WASONBUOGB1 WASONYEOGB1
	<b>Earth contact test probe 25 cm</b> WASONG25		<b>Earth contact test probe 80 cm</b> WASONG80V2		<b>L-3 carrying case (for 80 cm test probes)</b> WAFUTL3
	<b>Test lead on a reel red 75 m / 100 m / 200 m</b> WAPRZ075REBBSZ WAPRZ100REBBSZ WAPRZ200REBBSZ		<b>Test lead on a reel blue 75 m / 100 m / 200 m</b> WAPRZ075BUBBSZ WAPRZ100BUBBSZ WAPRZ200BUBBSZ		<b>Test lead on a reel yellow 75 m / 100 m / 200 m</b> WAPRZ075YEBBSZ WAPRZ100YEBBSZ WAPRZ200YEBBSZ
	<b>Test lead 30 m</b> (banana plugs) red WAPRZ030REBBSZ		<b>Test lead 15 m</b> (banana plugs) blue WAPRZ015BUBBSZ		<b>Test lead 40 m / / 60 m / 80 m (on a reel, banana plugs) yellow</b> WAPRZ040YEBBSZ WAPRZ060YEBBSZ WAPRZ080YEBBSZ
	<b>Test wire reel</b> WAPOZSZP1		<b>NiMH battery</b> 4.8 V 4.2 Ah WAAKU07		<b>Cable for battery charging from car cigarette lighter socket (12 V)</b> WAPRZLAD12SAM
	<b>XL-3 carrying case (MRU)</b> WAWALXL3		<b>XL-8 carrying case (ERP-1)</b> WAWALXL8		<b>Calibration certificate with accreditation</b>