



## Measure winding resistance and low resistance with MMR-650

### Product features

- measurement of winding resistance (inductive objects including amorphous core transformers)
- measurement of very low resistance
- transformer core demagnetization function
- automatic temperature compensation function (temperature probe)
- function of determining the temperature of a motor under load
- high immunity to disturbances



## Application

The MMR-650 winding resistance and low resistance meter is designed to measure very low very low resistance of both windings - including amorphous core transformers - and resistive objects. This product is made to be used in power plants, railways and maintenance companies to measure resistance of:

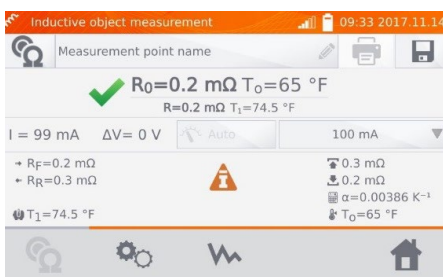
- windings of power transformers and motors,
- breakers, contacts,
- earthing conductors, equipotential bondings,
- welded and soldered connections,
- bolted connections,
- and other resistive and inductive objects.

MMR-650 can be also utilized on production lines (eg. at the final production control stage).



## Device capabilities

The MMR-650 winding resistance and low resistance meter provides an innovative combination of a high-performance measuring device with a modern user interface and advanced data management system. Wireless data transmission, enhanced system of 2D codes and ability to print labels to identify test items, all contribute to bringing new quality of work and allow the user to perform a wide range of measurements.



## Easy readout

The MMR-650 winding resistance and low resistance meter is equipped with a readable colour touchscreen that, due to its 800 x 480 pixel resolution, provides both high comfort of interacting with the interface and high readability of the measurement results.



## Durable and practical casing

In response to the customers needs the MMR-650 microohmmeter has been designed to operate in difficult environmental conditions. A unique casing with the IP67 ingress protection rating ensures that the device is both waterproof and dustproof.

## Resistance measurement

Range	Resolution	Test current	Accuracy
0...999.9 $\mu\Omega$	0.1 $\mu\Omega$	10 A	$\pm(0.25\% \text{ m.v.} + 2 \text{ digits})$
1.0000...1.9999 m $\Omega$	0.0001 m $\Omega$		
2.000...19.999 m $\Omega$	0.001 m $\Omega$	10 A / 1 A	
20.00...199.99 m $\Omega$	0.01 m $\Omega$		
200.0...999.9 m $\Omega$	0.1 m $\Omega$	1 A / 0.1 A	
1.0000...1.9999 $\Omega$	0.0001 $\Omega$		
2.000...19.999 $\Omega$	0.001 $\Omega$	0.1 A	
20.00...199.99 $\Omega$	0.01 $\Omega$	10 mA	
200.0...1999.9 $\Omega$	0.1 $\Omega$	1 mA	

# Technical specification

<b>insulation type</b>	double, according to EN 61010-1:2011	
<b>measurement category</b>	III 600 V acc. to EN 61010-2-030:2011	
<b>ingress protection according to EN 60529</b>	with closed housing	IP67
	with open housing, powered from the battery pack, installed plugs	IP54
	with open housing, powered from mains and/or without plugs	P40
<b>protection against external voltage</b>	up to 600 V AC for 10 s	
<b>power supply to battery charger</b>	90 V...265 V/50 Hz...60 Hz, 2 A	
<b>battery charging time</b>	approximately 3.5 hours	
<b>number of measurements (of resistive objects) with 10 A current performed when powered from the battery pack</b>	700...800 depending on the ambient temperature	
<b>maximum wire resistance for 10 A current</b>	300 mΩ	
<b>accuracy of measuring current setting</b>	± 10%	
<b>time of performing the resistance measurement</b>	with selected resistive object type and bidirectional current flow	3 s
	with selected inductive object type, dependent on the resistance and inductance of the object	5 s or more
<b>dimensions</b>	318 x 257 x 152 mm)	
<b>meter weight</b>	approx. 3.5 kg	
<b>operating temperature</b>	-10°C...+50°C	
<b>charger operating temperature</b>	0°C...+45°C	
<b>storage temperature</b>	-20°C...+60°C	
<b>humidity</b>	20%...90%	
<b>reference temperature</b>	+23°C ± 2°C	
<b>reference humidity</b>	40%...60%	
<b>altitude (above sea level)</b>	<2000 m	
<b>temperature coefficient</b>	±0.01% of d.v./°C ± 0.1 digit/°C	
<b>time to AUTO-OFF</b>	5...45 minutes or option not active, depending on the setting	
<b>TFT graphic display</b>	800 x 480 pixels	
<b>interface standard</b>	USB, LAN, Wi-Fi	
<b>quality standard</b>	design and manufacturing are ISO 9001 compliant	
<b>the product meets the EMC requirements (emission for industrial environment) according to</b>	EN 61326-1 and EN 61326-2-2	
<b>compliance with FCC Rules</b>	Class A digital device	

"d.v." - displayed value

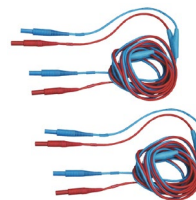
## Standard accessories



**Double pin Kelvin probe (2 pcs.)**  
WASONKEL20GB



**Kelvin crocodile (2 pcs.)**  
WAKROKELK06



**3 m double-wire cable**  
U1/I1  
WAPRZ003DZBBU111  
U2/I2  
WAPRZ003DZBBU212



**temperature probe ST-3**  
WASONT3



**Mains cable - IEC C13 plug**  
WAPRZ1X8BLIEC



**L-11 carrying case**  
WAFUTL11



**Li-Ion rechargeable battery 7.2 V**  
WAAKU27



**USB cable**  
WAPRZUSB



**Sonel Reader PC software**  
WAPRORREADER

## Additional accessories



**Kelvin vice with cables**  
WAZACKEL1



**10 m double-wire test lead (Kelvin crocodile clip / banana plug)**  
WAPRZ010DZBKEL



**25 m double-wire test lead (Kelvin crocodile clip / banana plug)**  
WAPRZ025DZBKEL



**D2 portable USB report / barcode printer (Sato)**  
WAADAD2



**label roll – black on white for D2 printer (SATO)**  
WANAKD2



**ribbon for D2 printer (SATO)**  
WANAKD2BAR



**barcode scanner 2D (USB)**  
WAADACK2D



**ST-1 temperature probe**  
WASONT1



**LAN cable (RJ45)**  
WAPRZRJ45

