



Much more than a multifunctional meter

- **the largest 7 „touch panel on the market - remarkable ergonomics and ease of use**
- removable memory card - easy increase of memory capacity
- Li-Ion battery - longer operation of the meter
- the ability to add a voice memo or photo for measurement - a multimedia description of the measurement site*
- **measurement of all parameters related to earthing and protection against electric shock - one device instead of several**
- quick measurement of the short circuit impedance with the RCD without triggering (up to several seconds) – time saver
- auto-tests - the ability to perform automatic measurements in sequence* - simplified measurements
- fast path from measurements to report - saves time
- **three-phase power network data logger - basic power quality diagnostics**
- real time display of network parameters - immediate evaluation of the tested device
- parameters measured in accordance to class S of EN 61000-4-30 standard - high accuracy of measurements
- energy calculator* - quick evaluation of potential savings

* the function will be available after the software update (no additional fees)

Product features

- this device can be used for all measurements for commissioning of electrical installations in accordance with applicable regulations:
 - short circuit loop impedance (also in circuits with RCDs)
 - parameters of RCDs
 - insulation resistance
 - earthing resistance (4 measurement methods + ground resistivity measurement)
 - continuity of protective and equipotential bondings
 - lighting measurement
 - phase sequence tester
 - motor rotation direction tester
- the device can record 50/60 Hz power network parameters in acc. to S class of EN 61000-4-30:
 - voltage L1, L2, L3, - average values in the range up to 500 V,
 - L1, L2, L3 currents, - average values, current measurement in the range up to 3 kA (depending on the current clamps used)
 - frequency in the range of 40Hz - 70Hz
 - active (P), reactive (Q) and apparent (S) power
 - power factor (PF), $\cos\varphi$
 - harmonics (up to 40 in voltage and current)
 - total harmonic distortion (THD) for current and voltage



Application

The MPI-540 meter is designed for checking home and industrial electrical installations. The measurements that can be made, by using the device, provides the results which determine the safety of the installation. In addition, the user has the possibility to register the parameters of electrical networks located at these facilities. This allows verification of the quality of electricity, and measurement of the parameters of protection against electric shock using a single universal device. Significant automation of measurements of the meter makes possible to test functioning of residual current circuit breakers in the Auto mode, as well as in pre-programmed measuring sequences (so-called auto-tests), which can also be extended with own sequences. Automatic measurement of insulation resistance of 3-, 4- and 5-wire conductors is possible by using additional the AUTO ISO-1000C adapter.

Device capabilities

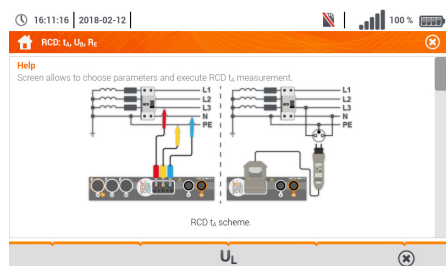
The meter combines the measurement capabilities of several devices, while ensuring equally and accuracy. In terms of functionality and capabilities it all makes the meter characterized as superior.

Ease of reading

The device is equipped with a color TFT LCD touch screen with a resolution of 800x480 pixels and a diagonal of 7", which allows for convenient operation and easy reading of parameters and plotted waveforms. Thanks to this screen size, you can display more information that is available at any time of use. Users will definitely like the right size of displayed symbols and clear results in all conditions.

Built-in help system

The device has built-in help screens with measurement diagrams. Thanks to this you can easily and quickly see and be sure how to connect to a given system depending on the type of measurement being performed.





Increased resistance to environmental conditions

The MPI-540 meter will cope well in difficult environmental conditions. Protection against penetration of dust and water is ensured by a unique housing with a level of protection IP51. It is resistant to mechanical damage, and a special design allows you to easily protect the touch screen by shielding using the cover of the meter. In addition to the fact that it protects against damage, it also allows you to conveniently carry and use the device in different positions.

Three-phase network parameter recorder - reading current data

The device has a three-phase power network parameter recorder with the LIVE mode display and the possibility to register electrical network parameters such as voltage, current, power, harmonics and THD. The meter enables reading of selected parameters and their graphic presentation on the screen in real time. These parameters are measured and displayed concurrently with the recording on the memory card. In the LIVE mode, the user can see:

- voltage and current waveforms (oscilloscope),
- voltage and current timeplots,
- a phasor graph,
- display of many parameters in tabular form,
- spectrum graph of current and voltage harmonics

Communication and software

A very strong feature of the device is the multitude of communication interfaces and cooperation with external software. You can easily transfer measurement data to your computer via USB port, removable SD memory card, or wireless communication (bluetooth, wi-fi). In order to generate a report on measurements for electric shock protection the Sonel Reports Plus program should be used. Saving the downloaded data to the simplest formats and printing is provided by Sonel Reader program, which is a standard and free software of the meter. The specialist Sonel Analysis program is used to read and analyze data from the recorder and can be used for free.



Measurement of short circuit loop impedance Z_{L-PE} , Z_{L-N} , Z_{L-L}
Test current: 23/40A; measuring range acc. to IEC 61557: **0,13...1999,9 Ω**
(for 1.2m test lead):

Display range	Resolution	Accuracy
0,000...19,999 Ω	0,001 Ω	$\pm(5\% \text{ m.v.} + 30 \text{ digits})$
20,00...199,99 Ω	0,01 Ω	
200,0...1999,9 Ω	0,1 Ω	

• rated voltage: 95...270 V (for Z_{L-PE} and Z_{L-N}) and 95...440 V (for Z_{L-L})
• frequency: 45...65 Hz

Measurement of short circuit loop impedance Z_{L-PE} in RCD mode
Test current: 15mA, measuring range acc. to IEC 61557: **0,50...1999 Ω**

Display range	Resolution	Accuracy
0,00...19,99 Ω	0,01 Ω	$\pm(6\% \text{ m.v.} + 10 \text{ digits})$
20,0...199,9 Ω	0,1 Ω	
200...1999 Ω	1 Ω	$\pm(6\% \text{ m.v.} + 5 \text{ digits})$

• rated voltage: 95...270 V
• frequency: 45...65 Hz

Measurement of earth resistance R_E with the 3p and 4p method
Measuring range acc. to IEC 61557-5:

0,50 Ω ...1,99 k Ω for test voltage 50 V
0,56 Ω ...1,99 k Ω for test voltage 25 V

Display range	Resolution	Accuracy
0,00...9,99 Ω	0,01 Ω	$\pm(2\% \text{ m.v.} + 4 \text{ digits})$
10,0...99,9 Ω	0,1 Ω	
100...999 Ω	1 Ω	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$
1,00...1,99 k Ω	0,01 k Ω	

• test voltage: 25 V or 50 V rms
• test current: 20 mA, sinusoidal rms 125 Hz (for $f_n = 50$ Hz) and 150 Hz (for $f_n = 60$ Hz)
• measurement blocked at interference voltage $U_n > 24$ V
• maximum measured interference voltage $U_{nmax} = 100$ V
• maximum resistance of auxiliary earth electrodes 50 k Ω

Selective earth resistance measurement with clamp (3p + clamp) — Measuring range acc. to IEC 61557-5: 1Ω...1,99 kΩ

Display range	Resolution	Accuracy
0,00...9,99 Ω	0,01 Ω	±(2% m.v. + 4 digits)
10,0...99,9 Ω	0,1 Ω	
100...999 Ω	1 Ω	
1,00...1,99 kΩ	0,01 kΩ	

- measurement with additional current clamp
- interference current measuring range: up to 9,99 A

Selective earth measurement with two clamps —

Display range	Resolution	Accuracy
0,00...9,99 Ω	0,01 Ω	±(10% m.v. + 4 digits)
10,0...19,9 Ω	0,1 Ω	
20,0...99,9 Ω		±(20% m.v. + 4 digits)

- measurement with transmitting and receiving clamps
- interference current measuring range: up to 9,99 A

Soil resistivity mesurement (ρ) —

Display range	Resolution	Accuracy
0,0...99,9 Ωm	0,1 Ωm	Depending on accuracy of R _E measurement
100...999 Ωm	1 Ωm	
1,00...9,99 kΩm	0,01 kΩm	
10,0...99,9 kΩm	0,1 kΩm	

- measurement with Wenner's method
- distance settable in metres or feet
- distance range: 1...30 m (1...90 feet)

Phase sequence indication —

- phase sequence indication: conforming, non-conforming
- mains voltage range U : 100...440 V (45...65 Hz) L-L
- display of phase-to-phase voltage values

Measurements of RCD parameters —

(voltage range 95...270 V):
RCD tripping test and measurement of tripping time t_A
(for t_A measurement function)

RCD type	Current	Range	Resolution	Accuracy	
General and short-time delay	0,5*I _{Δn}	0...300 ms	1 ms	±(2% m.v. + 2 digits)	
	1*I _{Δn}				
	2*I _{Δn}	0...150 ms			
	5*I _{Δn}	0...40 ms			
Selective	0,5*I _{Δn}	0...500 ms		(for RCD with I _{Δn} =10 mA and 0,5xI _{Δn} uncertainty: ±(2% m.v. +3 digits)	
	1*I _{Δn}				
	2*I _{Δn}	0...200 ms			
	5*I _{Δn}	0...150 ms			

- accuracy of residual current application: for 0,5*I_{Δn}: -8...0% for 1*I_{Δn}, 2*I_{Δn}, 5*I_{Δn}: 0...8%
- measurement of RCD tripping current I_{Δn} for sinusoidal residual current (AC type)

Rated current	Meas. range	Resol.	Test current	Accuracy
10 mA	3,3...10,0 mA	0,1 mA	0,3 x I _{Δn} ...1,0 x I _{Δn}	± 5% I _{Δn}
30 mA	9,0...30,0 mA			
100 mA	33...100 mA	1 mA		
300 mA	90...300 mA			
500 mA	150...500 mA			
1000 mA	330...1000 mA			

- the measurement can be started from positive or negative half-period of forced leakage current (AC)

Measurement of RCD tripping current I_A for unidirectional residual current and unidirectional with the 6 mA DC bias (type A)

Rated current	Meas. range	Resol.	Test current	Accuracy
10 mA	3,5...20,0 mA	0,1 mA	$0,35 \times I_{\Delta n}$ $\dots 2,0 \times I_{\Delta n}$	$\pm 10\% I_{\Delta n}$
30 mA	10,5...42,0 mA			
100 mA	35...140 mA	1 mA	$0,35 \times I_{\Delta n}$ $\dots 1,4 \times I_{\Delta n}$	
300 mA	105...420 mA			
500 mA	175...700 mA			

- measurement for positive or negative half-periods of forced leakage current

Measurement of RCD tripping current I for direct residual current (type B)

Rated current	Meas. range	Resol.	Test current	Accuracy
10 mA	2,0...20,0 mA	0,1 mA	0,2 x I _{Δn} ...2,0 x I _{Δn}	±10% I _{Δn}
30 mA	6...60 mA			
100 mA	20...200 mA	1 mA		
300 mA	60...600 mA			
500 mA	100...1000 mA			

- measurement for positive or negative half-periods of forced leakage current
- I_{Δn} - rated residual current

Insulation resistance measurements —

Measuring range acc. to IEC 61557-2:

- for U_n = 50 V: 50 kΩ...250 MΩ
- for U_n = 100 V: 100 kΩ...500 MΩ
- for U_n = 250 V: 250 kΩ...999 MΩ
- for U_n = 500 V: 500 kΩ...2 GΩ
- for U_n = 1000 V: 1 MΩ...9,99 GΩ

Display range *)	Resolution	Accuracy
0...1999 kΩ	1 kΩ	±(3% m.v. + 8 digits)
2,00...19,99 MΩ	0,01 MΩ	
20,0...199,9 MΩ	0,1 MΩ	
200...999 MΩ	1 MΩ	±(4% m.v. + 6 digits)
1,00...9,99 GΩ	0,01 GΩ	

- *) not greater than measuring range for given voltage

Low-voltage measurement of resistance and circuit continuity

Measurement of protective conductor continuity with the ±200 mA current

Display range	Resolution	Accuracy
0,00...19,99 Ω	0,01 Ω	±(2% m.v. + 3 digits)
20,0...199,9 Ω	0,1 Ω	
200...400 Ω	1 Ω	

- voltage on open terminals: 4...9 V
- output current at R < 2 Ω: min. 200 mA
- autocalibration of test leads
- measurements for both current polarities

Illuminance measurement

Display range	Resolution	Accuracy
0,1...99,9 lx	0,1 lx	±(5% m.v. + 2 digits)
100...999 lx	1 lx	
1,00...9,99 klx	0,01 klx	
10,0...19,9 klx	0,1 klx	

• measurement in luxes (lx) or feet-candles (fc)

Three-phase recorder of electrical network parameters

The device is designed to work with networks:

- with nominal frequency 50/60Hz
- with nominal voltage: 64/110 V; 110/190V; 115/200V; 127/220V; 220/380V; 230/400V; 240/415V; 254/440V; 290/500 V
- DC network

Supported networks:























- single-phase
- two-phase with common N conductor,
- three-phase star connection N with and without conductor
- three-phase delta

Parameters of analyzer:
















Parametr		Measurement range	Max. resolution	Accuracy
alternating voltage (TRMS)	—	0,0...500 V	0,01% U _{nom}	±0,5% U _{nom}
alternating current TRMS	—	depending on clamp*	0,01% I _{nom}	±2% m.v. for m.v. ≥ 10% I _{nom} ±2% I _{nom} for m.v. < 10% I _{nom} (error does not account for clamps error)
frequency	—	40,00...70,00 Hz	0,01Hz	±0,05 Hz
active, reactive, apparent and distortion power	—	depending of configuration (trasformers, clamp)	up to for decimal places	depending of configuration (trasformers, clamp)
active, reactive apparent energy	—	depending of configuration (trasformers, clamp)	up to for decimal places	as power error
cosφ and power factor (PF)	—	0,00...1,00	0,01	±0,03
harmonics	Voltage	as for alternating voltage	as for alternating voltage	±5% m.v. for m.v. ≥ 3% U _{nom} ±0,15% U _{nom} for m.v. < 3% U _{nom}
	Current	as for alternating voltage	as for alternating voltage	±5% m.v. for m.v. ≥ 10% I _{nom} ±0,5% I _{nom} for m.v. < 10% I _{nom}
THD	Voltage	0.0...100.0% (in regards to the rms value)	0,1%	±5%
	Current			
voltage asymmetry	Voltage and current	0,0...10,0%	0,1%	±0,15% (absolute error)

*Clamp F-1A, F-2A, F-3A: 0..3000 A (10000 A) * Clamp C-4A: 0..1000 A (3600 A)* Clamp C-5A: 0..1000 A (3600 A) * Clamp C-6A: 0..10 A (36 A) * Clamp C-7A: 0..100 A (360 A)

Standard accesories

	WS-03 adapter with START button with UNI-SCHUKO plug WAADAWS03		test lead 1,2 m, yellow, 1 kV (banana plugs) WAPRZ1X2YEBB		test lead 1,2 m, red, 1 kV (2,5 mm2, banana plugs) WAPRZ1X2REBB
	test lead 1,2 m, blue, 1 kV (banana plugs) WAPRZ1X2BUBB		test lead 1,2 m, black, 1 kV (ba- nana plugs) WAPRZ1X2BLBBN		test lead 15 m, blue, for MRU (on a reel) WAPRZ015BUBBSZ
	test lead 30 m, red, for MRU (banana plugs, on a reel) WAPRZ030REBBSZ		USB interface cable WAPRZUSB		crocodile clip, yellow, 1 kV, 20 A WAKROYE20K02
	crocodile clip, red, 1 kV, 20 A WAKRORE20K02		crocodile clip, blue, 1 kV, 20 A WAKROBU20K02		crocodile clip, black, 1 kV, 20 A WAKROBL20K02
	pin probe, yellow 1 kV (banana socket) WASONYE0GB1		pin probe, red 1 kV (banana socket) WASONRE0GB1		pin probe, blue 1 kV (banana socket) WASONBU0GB1
	2x earth contact test probe (rod), 30 cm WASONG30		Z7 power supply WAZASZ7		power supply wire (230 V) WAPRZLAD230
	LI-ion battery 11,1 V 3,4 Ah WAAKU15		3x F-3A flexible clamps (Φ=120 mm) WACEGF3AOKR		microSD 4GB
	4x Voltage adapter with M4/M6 thread WAADAM4M6				

Additional accessories

	<p>WS-04 adapter with UNI-SCHUKO angular plug</p> <p>WAADAWS04</p>		<p>test lead, 5 kV (banana plugs, shielded)</p> <p>5 m / 10 m / 20 m</p> <p>WAPRZ005REBB WAPRZ010REBB WAPRZ020REBB</p>		<p>three-phase socket adapter 16 A</p> <p>AGT-16P three-phase socket adapter 16 A WAADAAGT16P</p> <p>AGT-16C three-phase socket adapter 16 A (PEN) WAADAAGT16C</p>								
	<p>three-phase socket adapter 32 A</p> <p>AGT-32P three-phase socket adapter 32 A - WAADAAGT32P</p> <p>AGT-32C three-phase socket adapter 32 A (PEN) - WAADAAGT32C</p>		<p>three-phase socket adapter 63 A</p> <p>AGT-63P three-phase socket adapter 63 A - WAADAAGT63P</p>		<p>AGT-16T industrial socket adapter 16 A</p> <p>WAADAAGT16T</p>								
	<p>AGT-32T industrial socket adapter 32 A</p> <p>WAADAAGT32T</p>		<p>test lead 25 m, blue, for MRU (banana plugs, on a reel)</p> <p>WAPRZ025BUBBSZ</p>		<p>test lead 50 m, yellow, for MRU (banana plugs, on a reel)</p> <p>WAPRZ050YEBBSZ</p>								
	<p>AutoISO-1000C adapter</p> <p>WAADAAISO10C</p>		<p>light meter probe</p> <p>LP-1 light meter probe (PS/2 plug) - WAADALP1KPL LP-1 light meter probe for MPI (set, WS-06 plug) - WAADALP1 WS-06 adapter with UNI-SCHUKO - WAADAWS06</p>		<p>light meter probe</p> <p>LP-10B light meter probe for MPI (set, WS-06 plug) - WAADALP10BKPL LP-10B light meter probe (PS/2 plug) - WAADALP10B WS-05 adapter with UNI-SCHUKO angular plug - WAADAWS06</p>								
	<p>C-4A</p> <p>WACEGC4AOKR</p>		<p>C-5A</p> <p>WACEGC5AOKR</p>		<p>C-6A</p> <p>WACEGC6AOKR</p>		<p>C-7A</p> <p>WACEGC7AOKR</p>		<p>F-1A</p> <p>WACEGF1AOKR</p>		<p>F-2A</p> <p>WACEGF2AOKR</p>		<p>F-3A</p> <p>WACEGF3AOKR</p>
Clamps													
Rated current	1000 A AC	1000 A AC 1400 A DC	0 A AC	100 A AC		3000 A AC							
Max. overload current	1200 A AC	1000 A AC 3000 A DC	20 A AC	100 A AC		10k A AC							
Minimal measurable current	100 mA	500 mA	10 mA	20 mA		1 A							
Frequency	30Hz...10k Hz	DC...5k Hz	40 Hz...10k Hz	40 Hz...1 kHz		40 Hz...10k Hz							
Input signal level	1 mV / 1 A	1 mV / 1 A	100 mV / 1 A	500 mV / 1A		38,8 µV / 1 A							
Max. diameter of measured cord	52 mm	39 mm	20 mm	24 mm	360 mm	235 mm	120 mm						
Minimal basic accuracy	≤0,5%	≤1,5%	≤1%	0,5%		1%							
Battery power supply	—	+	—	—		—							
Lead length	2,2 m	2,2 m	2,2 m	3 m		2,2 m							
Measurement category	IV 300 V	IV 300 V	IV 300 V	III 300 V		IV 600 V							