

MULTIFUNCTION ELECTRICAL INSTALATIONS METER



MPI-530



CAT III
600V

CAT IV
300V

IP 54



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Multifunction electrical installations meter

• Measurement of short circuit loop impedance:

- impedance measurement with resolution 0,001 Ω and 23 A current (44 A phase-to-phase) - short-circuit resistor $R_{ZW} \geq 10 \Omega$
- measurement range: 95...440 V, frequency 45...65 Hz,
- **measurement of short circuit loop impedance with resolution 0,01 Ω , in protected systems without tripping the RCD's with $I_{\Delta n} \geq 30$ mA**
- automatic calculation of short-circuit current, differentiating between phase-to-phase and phase-to-neutral voltage,
- measurements using UNI-Schuko plug with measurement triggering button (also when L and N leads are exchangeable) or 1,2 m, 5 m, 10 m, 20 m test leads, with optional use of 3-phase socket adapters (AGT),
- selection of installation protections and automatic evaluation of measurements results.

• Tests of residual current devices (RCD), types AC, A and B:

- measurement of general, short-time delay and selective RCD's with rated residual current of 10, 30, 100, 300, 500 and 1000 mA,
- **automatic measurement of all RCD parameters (when the START button is pressed, the meter performs the whole measurement cycle, including the L-PE short circuit loop impedance measurement with 15 mA current),**
- user selected waveform of forced leakage current: sinusoidal (start from increasing or decreasing edge), unidirectional pulsating (positive or negative), unidirectional pulsating with DC bias (positive and negative), direct (positive and negative),
- measurement of tripping current I_{Δ} using the ramp current,
- measurement of tripping time t_{Δ} at $\frac{1}{2}I_{\Delta n}$, $1I_{\Delta n}$, $2I_{\Delta n}$ and $5I_{\Delta n}$,
- measurement of touch voltage U_b and protective conductor resistance R_E without the RCD tripping,
- detection that L and N conductors are switched in the socket; will not affect the measurement,
- measurement of tripping current I_{Δ} and actual tripping time t_{Δ} at single activation of RCD,
- measurement for 95...270 V voltage.

• Insulation resistance measurements:

- test voltage values: 50 V, 100 V, 250 V, 500 V and 1000 V,
- insulation resistance measurements up to 10 G Ω ,
- **in-socket measurements using the UNI-Schuko adapter,**
- meter is protected against voltage on the tested object and voltage appearing during the measurement,
- auto-discharge of the object after the measurement,
- automatic measurement of all resistance combinations in three-, four- and five core leads using the additional AutoISO-1000C adapter,



MPI-530 meter allows automatic resistance measurement of 3-, 4- and 5-core cables using the additional AutoISO-1000C adapter?

Standard accessories of the meter MPI-530:

- Adapter with START button with UNI-Schuko (WS-03)
- Test lead with banana plug; 1,2m; yellow
- Test lead with banana plug; 1,2m; blue
- Test lead with banana plug; 1,2m; red
- Test lead on a reel with banana plugs; 15m; blue
- Test lead on a reel with banana plugs; 30m; red
- USB cable
- Pin probe with banana connector; yellow
- Pin probe with banana connector; red
- Pin probe with banana connector; blue
- "Crocodile" clip K02; yellow
- "Crocodile" clip K02; red
- Earth contact test probe (rod); 0,30m
- Carrying case L1
- Set of hanging straps
- Power supply adaptor Z7
- Cable for battery charger
- Cable for battery charge with car plug 12V
- NiMH 4,8V 4,2Ah rechargeable battery
- Software „Sonel Reader“
- Calibration Certificate

WAADAWS03
WAPRZ1X2YEBB
WAPRZ1X2BUBB
WAPRZ1X2REBB
WAPRZ015BUBBSZ
WAPRZ030REBBSZ
WAPRZUSB
WASONYE0GB1
WASONRE0GB1
WASONBU0GB1
WAKROYE20K02
WAKRORE20K02
WASONG30
WAFUTL1
WAPOZSZEKPL
WAZASZ7
WAPRZLAD230
WAPRZLAD12SAM
WAAKU07

- acoustic signalling of five-second periods to enable determining the time profile during the insulation resistance measurements

• Low-voltage resistance measurement of equipotential and protective bonding:

- continuity measurement of protective conductor with ≥ 200 mA current in both directions,
- low current measurement with sound signal,
- autocalibration of test leads – leads of any length can be used.

• Earth resistance measurements:

- measurement with 3- and 4-pole methods with 2 additional electrodes,
- measurement with the 3-pole method using and additional clamp,
- measurement with 2-clamp method using and additional clamp.

• Soil resistivity measurements.

• Illuminance measurements

• Quick check of connection correctness of the PE protective conductor using the contact electrode.

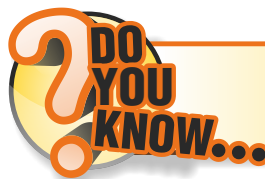
• Measurement and recording of voltage, frequency, current, $\cos\phi$ and power (active, passive and apparent), voltage and current harmonics up to 40, THD.

• Checking reactive phase sequence and motor direction of rotation.

• Innovative memory with possibility of description of: measurement points, facilities, names of customers.

• Power supply from rechargeable or disposable batteries (optional)

• The meter conforms to EN 61557.



MPI-530 to analyse, record, and visualize the power supply parameters on the screen?

Electric security:

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

Other technical data:

- power supply: Ni-MH rechargeable or LR14 alkaline disposable batteries (4 pcs.) (optional)

MPI-530 is equipment to perform complete test and verify on electrical installations according to the most common safety standards (IEC 61557, VDE 0100, BS7671).

Optional accessories of the meter MPI-530:

- Adapter WS-04 with UNI-Schuko
- Adapter AutoISO 1000C
- Test lead on a reel with banana plugs; 50m;
- Test lead on a reel with banana plugs; 25m; blue
- Test lead with banana plug 5m; red
- Test lead with banana plugs; 10m; red
- Test lead with banana plug 20m; red
- Receiving clamp C-3
- Receiving clamp C-6
- Transmitting clamp N1 (with test lead)
- Flexible clamp F-1 $\varnothing 40$ cm
- Flexible clamp F-2 $\varnothing 25$ cm
- Flexible clamp F-3 $\varnothing 13$ cm
- Triple phase socket adapter AGT-16P
- Triple phase socket adapter AGT-32P
- Triple phase socket adapter AGT-63P
- Triple phase socket adapter AGT-16C
- Triple phase socket adapter AGT-32C
- Adapter for industrial sockets AGT-16T
- Adapter for industrial sockets AGT-32T
- Light meter probe LP1 with WS-06 plug
- Box for batteries
- Mini bluetooth keyboard with casing
- RCD breaker testing adapter TWR-1
- Earth contact test probe (rod); 0,80m
- Software for creation of documentation from electrical measurements "Sonel Reports"
- Software „SONEL Schematic“
- Hardware Adapter for Sonel PE program

WAADAWS04
WAADAAIS010C
WAPRZ050YEBBSZ
WAPRZ025BUBBSZ
WAPRZ005REBB
WAPRZ010REBB
WAPRZ020REBB
WACEGC30KR
WACEGC60KR
WACEGN1BB
WACEGF10KR
WACEGF20KR
WACEGF30KR
WAADAAGT16P
WAADAAGT32P
WAADAAGT63P
WAADAAGT16C
WAADAAGT32C
WAADAAGT16T
WAADAAGT32T
WAADALP1KPL
WAPOJ1
WAADAMKZ
WAADATWR1
WASONG80
WAPROSONPROT
WAPROSCHEM2
WAADAKEY1

Multifunction electrical installations meter

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	$\pm(6\% \text{ m.v.} + 5 \text{ digits})$
200...1999 Ω	1 Ω	

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

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	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$
100...999 Ω	1 Ω	
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: 1 Ω ...1,99 k Ω

Range	Resolution	Accuracy
0,00...9,99 Ω	0,01 Ω	$\pm(8\% \text{ m.v.} + 4 \text{ digits})$
10,0...99,9 Ω	0,1 Ω	
100...999 Ω	1 Ω	
1,00...1,99 k Ω	0,01 k Ω	

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

Selective earth measurement with two clamps

Range	Resolution	Accuracy
0,00...9,99 Ω	0,01 Ω	$\pm(10\% \text{ m.v.} + 4 \text{ digits})$
10,0...19,9 Ω	0,1 Ω	
20,0...99,9 Ω	1 Ω	$\pm(20\% \text{ m.v.} + 4 \text{ digits})$

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

Soil resistivity measurement (ρ)

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 k Ωm	0,01 k Ωm	
10,0...99,9 k Ωm	0,1 k Ωm	

- 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_{L-L} : 100...440 V (45...65 Hz)
- 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	$0,5 * I_{\Delta n}$	0...300 ms	1 ms	$\pm(2\% \text{ m.v.} + 2 \text{ digits})$ (for RCD with $I_{\Delta n}=10$ mA and $0,5xI_{\Delta n}$ uncertainty: $\pm(2\% \text{ m.v.} + 3 \text{ digits})$)
	$1 * I_{\Delta n}$			
	$2 * I_{\Delta n}$	0...150 ms		
Selective	$5 * I_{\Delta n}$	0...40 ms		
	$0,5 * I_{\Delta n}$	0...500 ms		
	$1 * I_{\Delta n}$			
	$2 * I_{\Delta n}$	0...200 ms		
	$5 * I_{\Delta n}$	0...150 ms		

- accuracy of residual current application: for $0,5 * I_{\Delta n}$: -8...0.0% for $1 * I_{\Delta n}$, $2 * I_{\Delta n}$, $5 * I_{\Delta n}$: 0...8%
- measurement of RCD tripping current I_A for sinusoidal residual current (AC type)

Rated current	Meas. range	Resolution	Test current	Accuracy
10 mA	3,3...10,0 mA	0,1 mA	$0,3 * I_{\Delta n}$... $1,0 * I_{\Delta n}$	$\pm 5\% I_{\Delta n}$
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	Resolution	Test current	Accuracy
10 mA	3,5...20,0 mA	0,1 mA	$0,35 * I_{\Delta n}$... $2,0 * I_{\Delta n}$	$\pm 10\% I_{\Delta n}$
30 mA	10,5...42,0 mA			
100 mA	35...140 mA	1 mA		
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_A for direct residual current (type B)

Rated current	Meas. range	Resolution	Test current	Accuracy
10 mA	2,0...20,0 mA	0,1 mA	$0,2 * I_{\Delta n}$... $2,0 * I_{\Delta n}$	$\pm 10\% I_{\Delta n}$
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 $I_{\Delta n}$ - rated residual current

Insulation resistance measurements

Measuring range acc. to IEC 61557-2:

- for $U_n = 50$ V: 50 k Ω ...250 M Ω
- for $U_n = 100$ V: 100 k Ω ...500 M Ω
- for $U_n = 250$ V: 250 k Ω ...999 M Ω
- for $U_n = 500$ V: 500 k Ω ...2 G Ω
- for $U_n = 1000$ V: 1 M Ω ...9,99 G Ω

Display range*)	Resolution	Accuracy
0...1999 k Ω	1 k Ω	$\pm(3\% \text{ m.v.} + 8 \text{ digits})$
2,00...19,99 M Ω	0,01 M Ω	
20,0...199,9 M Ω	0,1 M Ω	
200...999 M Ω	1 M Ω	
1,00...9,99 G Ω	0,01 G Ω	$\pm(4\% \text{ m.v.} + 6 \text{ digits})$

*) 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

Range	Resolution	Accuracy
0,00...19,99 Ω	0,01 Ω	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$
20,0...199,9 Ω	0,1 Ω	
200...400 Ω	1 Ω	

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

Multifunction electrical installations meter

ANALYSIS AND RECORDING OF SINGLE-PHASE SYSTEM

- Voltage measurement U_{eff} : 0...500 V
- Frequency range of measured voltages: 45,0...65,0 Hz
- Frequency measurement range for 50...500 V voltages: 45,0...65,0 Hz (basic uncertainty max. $\pm 0,1\%$ m.v. + 1 digit)
- $\cos\phi$ measurement: 0,00...1,00 (resolution 0,01)
- Measurement and recording in single-phase system

Current measurement (True RMS)

Claps	Range	Resolution	Accuracy*
C-3, C-6	0,0...99,9 mA	0,1 mA	$\pm(5\%$ w.m. + 3 cyfry)
	100...999 mA	1 mA	
C-3, C-6 F-1, F-2, F-3	1,00...9,99 A	0,01 A	$\pm(5\%$ w.m. + 5 cyfr) (C-3, C-6)
	10,0...99,9 A	0,1 A	
	100...999 A	1 A	$\pm(0,1\%$ I_n + 2 cyfry) (F-1, F-2, F-3)
F-1, F-2, F-3	1,00...3,00 kA	0,01 kA	

* the accuracy of current clamps must also be taken into account

Measurement of active power P, reactive power Q, apparent power S and $\cos\phi$

Range [W], [VA], [var]	Resolution [W], [VA], [var]	Accuracy*
0...999	1k	$\pm(7\%$ m.v. + 3 digits)
1,00...9,99k	0,01k	
10,0...99,9k	0,1k	
100...999k	1k	$\pm(7\%$ m.v. + 5 digits)
1,00...1,50M	0,01M	

- voltage range: 0...500V
- current range: 0...1000A (3000A)
- mains rated frequency f_n : 50Hz, 60Hz

Voltage harmonics measurement

Range	Resolution	Harm. no.	Accuracy
0,0...500V	0,1 (1*)V	1,2,...15	$\pm(5\%$ m.v. + 3 digits)
		16,...40	$\pm(5\%$ m.v. + 10 digits)

- in addition display of h02...h40 values as percent of h01 (up to 999%)
- *) from 300V to 500V

Current harmonics measurement

Range	Resolution	Harm. no.	Accuracy
0,0...1000A*	results from the I measurement ranges	1,2,...15	$\pm(5\%$ m.v. + 3 digits)
		16,...40	$\pm(5\%$ m.v. + 10 digits)

- in addition display of h02...h40 as percent of h01 (do 999%)
- *) for C-3 clamp, for C-6 - 10A, for F clamp up to 3000A

THD (in relation to the 1st harmonics)

		Resolution	Accuracy
THD-F voltage (h = 2...40)	0,0...999,9% for $U_{\text{RMS}} \geq 1\% U_{\text{nom}}$	0,1%	$\pm 5\%$
THD-F current (h = 2...40)	0,0...999,9% for $I_{\text{RMS}} \geq 1\% I_{\text{nom}}$	0,1%	$\pm 5\%$

The instruments conforms to:

- EN 61010-1 (general safety requirements)
- EN 61010-031 (detailed safety requirements)
- EN 61326 (electromagnetic compatibility)
- EN 61557-10 (requirements for combined instruments)
- IEC 60364-6-61 / HD 60364-6 (measurements - verification)
- IEC 60364-4-41 / HD 60364-4-41 (measurements - protection against electric shock)
- EN 04700 (measurements - acceptance tests)
- EN 12464 (lighting of work places)
- DIN VDE 0100
- DIN VDE 0413
- BS 7671

NOTE: "m.v." means "measured value"

Illuminance measurement

Range	Resolution	Accuracy
0,1...99,9lx	0,1lx	$\pm(5\%$ m.v. + 2 digits)
100...999lx	1lx	
1,00...9,99klx	0,01lx	
10,0...19,9klx	0,1lx	

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



Photo. Illuminance measurement.

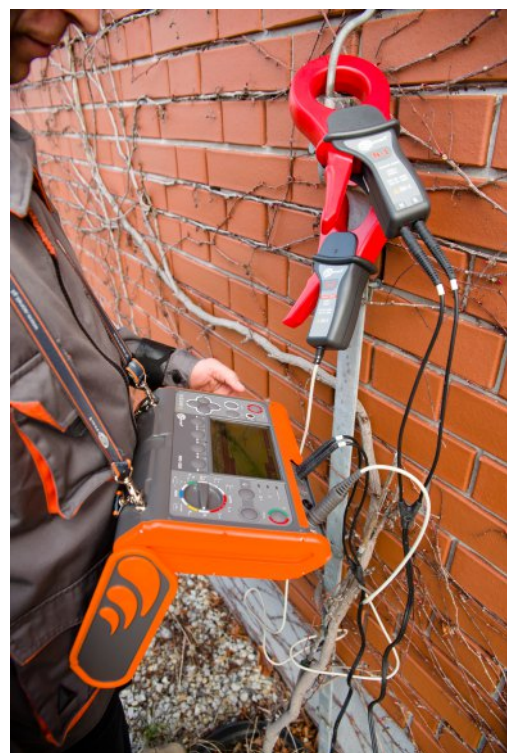


Photo. Earth measurement - two-clamp method.