



MPI-530

Indeks: WMGBMPI530

Multifunction electrical installations meter

CAT IV

300V

CAT III

600V



BLUETOOTH

lux

CLASS A



IP 54

Description

MPI-530 meter is a multi-functional instrument for electric shock protection measurements including the option of various methods for measuring earthing and earthing resistance. Additionally the meter enables its user to analyse power supply parameters, records and displays them on its screen. The instrument automatically measures the insulation resistance in a socket and in 3 -, 4 - and 5-wire cables when used with AutoISO-1000C adapter. Measurement results may be continuously verified, depending on user's demand or according to binding regulations. Memory of the instrument may store tens of thousands of measurements allowing users to store them in a structure of a protocol and describe individual measurement points.

[Virtual instrument application of Sonel MPI-530](#)

Technical Specification

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 $R_{ZW}=10 \Omega$,
- measurement range: 95...440 V, frequency 45...65 Hz,
- measurement of short circuit loop impedance with resolution $0,01 \Omega$, in protected systems without tripping the RCD's with $I_{\Delta n} \geq 30 \text{ mA}$,
- 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, F, B 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 $t_{\Delta I}$ 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 GΩ,
- 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,
- 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 with and additional clamp,
- measurement with 2-clamp method.

Soil resistivity measurements.

Illuminance measurements.

Quick check of PE connection correctness.

Measurement and recording of voltage, frequency, AC, $\cos\phi$ and power (active, reactive 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.

Measurement of short circuit loop impedance Z_{L-PE} , Z_{L-N} , Z_{L-L}

Test current: 23/40 A; measuring range acc. to IEC 61557:

0,13...1999,9 Ω

(for 1.2 m test lead):

Display range	Resolution	Accuracy
0,000...19,999 Ω	0,001 Ω	±(5% m.v. + 0,03 Ω)
20,00...199,99 Ω	0,01 Ω	±(5% m.v. + 0,3 Ω)
200,0...1999,9 Ω	0,1 Ω	±(5% m.v. + 3 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: 15 mA, measuring range acc. to IEC 61557: 0,50...1999 Ω

Display range	Resolution	Accuracy
0,00...19,99 Ω	0,01 Ω	±(6% w.m. + 10 digits)
20,0...199,9 Ω	0,1 Ω	±(6% w.m. + 5 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 kΩ for test voltage 50 V
- 0,56 Ω...1,99 kΩ for test voltage 25 V

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	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$
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 $U_{n\max} = 100$ V
- maximum resistance of auxiliary earth electrodes 50 k Ω

Selective earth resistance measurement with clamp (3p + clamp)

Display 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

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

100...999 Ω	0,1 Ω	$\pm(20\% \text{ m.v.} + 4 \text{ digits})$
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- measurement with transmitting and receiving clamps
- interference current measuring range: up to 9,99 A

Soil resistivity measurement (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 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 UL-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	$0,5 \cdot I_{\Delta n}$	0...300 ms	

and short-time delay	$1 \cdot I_{\Delta n}$		1 ms	$\pm (2\% \text{ m.v.} + 2 \text{ digits})$ (for RCD with $I_{\Delta n} = 10 \text{ mA}$ and $0,5 \cdot I_{\Delta n}$ uncertainty: $\pm (2\% \text{ m.v.} + 3 \text{ digits})$)
	$2 \cdot I_{\Delta n}$	0...150 ms		
	$5 \cdot I_{\Delta n}$	0...40 ms		
Selective	$0,5 \cdot I_{\Delta n}$	0...500 ms		
	$1 \cdot I_{\Delta n}$			
	$2 \cdot I_{\Delta n}$	0...200 ms		
	$5 \cdot I_{\Delta n}$	0...150 ms		

accuracy of residual current application: for $0,5 \cdot I_{\Delta n}$: -8...0% for $1 \cdot I_{\Delta n}$, $2 \cdot I_{\Delta n}$, $5 \cdot I_{\Delta n}$: 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	$0,3 \times I_{\Delta}$.. $1,0 \times I_{\Delta}$	$\pm 5\% I_{\Delta n}$
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

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 x $I_{\Delta n}$..2,0 x $I_{\Delta n}$	$\pm 10\% I_{\Delta n}$
30 mA	10,5...42,0 mA			
100 mA	35,0...140 mA	1 mA	0,35 x $I_{\Delta n}$..1,4 x $I_{\Delta n}$	
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_A for direct residual current (type B)

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Rated current	Meas. range	Resolution	Test current	Accuracy
10 mA	2,0...20,0 mA	0,1 mA		
30 mA	6...60 mA			
100 mA	20...200 mA	1 mA		
300 mA	60...600 mA			
500 mA	100...1000 mA			
			0,4 x $I_{\Delta n}$..2,0 x $I_{\Delta n}$	$\pm 10\% I_{\Delta n}$

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: 1,000 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 MΩ	0,1 MΩ	
200...999 MΩ	1 MΩ	
1,00...9,99 MΩ	0,01 GΩ	±(4% m.v. + 6 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	±(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 $R < 2 \Omega$: min. 200 mA
- autocalibration of test leads
- measurements for both current polarities

Illuminance measurement

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 lx	
10,0...19,9 klx	0,1 lx	

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

ANALYSIS AND RECORDING OF SINGLE-PHASE SYSTEM

- Voltage measurement ULN: 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)

Clamps	Range	Resolution	Accuracy*
C-3, C-6	0,0...99,9 mA	0,1 mA	$\pm(5\%$ m.v. + 3 digits)
	100...999 mA	1 mA	
C-3,C-6 F-1, F-2, F-3	1,00...9,99 A	0,01 A	$\pm(5\%$ m.v. + 5 digits) (C-3, C-6) $\pm(0,1\%$ In + 2 digits) (F-1, F-2, F-3)
	10,0...99,9 A	0,1 A	
	100...999 A	1 A	
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	1	±(7% m.v. + 3 digits)
1,00...9,99 k	0,01 k	
10,0...99,9 k	0,1 k	±(7% m.v. + 5 digits)
100...999 k	1 k	
1,00...1,50 M	0,01 M	

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

Voltage harmonics measurement

Range	Resolution	Nr harm.	Accuracy
0,0...500 V	0,1 (1*) V	1,2,...15	±(5% m.v. + 3 digits)
		16,...40	±(5% m.v. + 10 digits)

- in addition display of h02...h40 values as percent of h01 (up to 999%)

*) from 300 V to 500 V

THD (in relation to the 1 st harmonics)

Resolution	Accuracy

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

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

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