



1. ELECTRICAL SPECIFICATIONS

Accuracy is indicated as \pm (% readings + no. of digits*resolution) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, <80%HR

Continuity test on protective and equalizing conductors

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 19.99	0.01	$\pm(5.0\% \text{rdg} + 3\text{dgt})$
20.0 ÷ 99.9	0.1	

(*) calibrate the cables to null their resistance

Test current:

> 200mA DC for $R \leq 5\Omega$ (calibration included) ; Resolution for DC current :1mA

Open-circuit voltage:

 $4\text{V} \leq V_0 \leq 24\text{V}$

Insulation resistance (DC voltage)

Test voltage[V]	Range [$M\Omega$]	Resolution [$M\Omega$]	Accuracy
50	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
	10.0 ÷ 49.9	0.1	
	50.0 ÷ 99.9	0.1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$
100	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
	10.0 ÷ 99.9	0.1	
	100.0 ÷ 199.9	0.1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$
250	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
	10.0 ÷ 99.9	0.1	
	100 ÷ 499	1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$
500	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	
	200 ÷ 499	1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$
	500 ÷ 999	1	
1000	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	
	200 ÷ 999	1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$
	1000 ÷ 1999	1	

Open-circuit voltage:

nominal test voltage $-0\% +10\%$

Short circuit current:

<6.0mA at 500V test voltage

Nominal test current:

>1mA if load= $1\text{k}\Omega \cdot V_{\text{nom}}$ ($V_{\text{nom}}=50\text{V}, 100\text{V}, 250\text{V}, 500\text{V}, 1000\text{V}$)

Safety protection:

the display shows an error message for input voltage >10V

Ground resistance with 3-wire method

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 9.99	0.01	$\pm(5.0\% \text{rdg} + 3\text{dgt})$
10.0 ÷ 99.9	0.1	
100 ÷ 999	1	
1.00k ÷ 49.99k	0.01k	

Test current: <10mA – 77.5Hz, Open-circuit voltage: < 20Vrms

(*) Add 5% to the accuracy if the probe resistances (R_s or R_h) > 100 x R_{meas}

Soil resistivity with 4-wire Wenner method

Range [Ωm]	Resolution [Ωm]	Accuracy (*)
0.06 ÷ 9.99	0.01	$\pm(5.0\% \text{rdg} + 3\text{dgt})$
10.0 ÷ 99.9	0.1	
100 ÷ 999	1	
1.00k ÷ 9.99k	0.01k	
10.0k ÷ 99.9k	0.1k	
100k ÷ 999k	1k	
1.00M ÷ 3.14M	0.01M	

(*) with distance $d=10\text{m}$, Distance "d" range: 1 ÷ 10m

Test current: <10mA – 77.5Hz, Open-circuit voltage: < 20Vrms



Measurement of main parameters and harmonics (PQA)

AC TRMS Voltage

Range [V]	Resolution [V]	Accuracy
15.0 ÷ 459.9	0.1V	±(1.0%rdg + 1dgt)

Allowed crest factor ≤ 1,5 ; Frequency: 42.5 ÷ 69.0 Hz

Frequency

Range [Hz]	Resolution [Hz]	Accuracy
42.5 ÷ 69.0	0.01	±(2.0%rdg + 2dgt)

Allowed voltage: 15.0 ÷ 459.9V ; Allowed current: 5%FS clamp ÷ FS clamp

AC TRMS Current

FS clamp	Range [A]	Resolution [A]	Accuracy
≤ 10A	5% FS ÷ 9.99	0.01	1Ph: ±(1.0%rdg + 3 dgt) 3Ph: ±(2.0%rdg + 5 dgt)
10A ≤ FS ≤ 200	5% FS ÷ 199.9	0.1	
200A ≤ FS ≤ 3000	5% FS ÷ 2999	1	

Range: 5 ÷ 999.9 mV; Values under 5mV are zeroed

Allowed crest factor ≤ 3; Frequency: 42.5 ÷ 69.0 Hz

Active power (@ 230V in 1Ph systems, 400V in 3Ph systems, cosφ=1, f=50.0Hz)

FS clamp	Range [kW]	Resolution [kW]	Accuracy
≤ 10A	0.000 ÷ 9.999	0.001	1Ph: ±(2.0%rdg + 5 dgt) 3Ph: ±(2.5%rdg + 8 dgt)
10A ≤ FS ≤ 200	0.00 ÷ 999.99	0.01	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9	0.1	
1000A ≤ FS ≤ 3000	0 ÷ 9999	1	

Reactive power (@ 230V in 1Ph systems, 400V in 3Ph systems, cosφ=0, f=50.0Hz)

FS clamp	Range [kVAr]	Resolution [kVAr]	Accuracy
≤ 10A	0.000 ÷ 9.999	0.001	1Ph: ±(2.0%rdg + 7 dgt) 3Ph: ±(3.0%rdg + 8 dgt)
10A ≤ FS ≤ 200	0.00 ÷ 999.99	0.01	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9	0.1	
1000A ≤ FS ≤ 3000	0 ÷ 9999	1	

Power factor (@ 230V in 1Ph systems, 400V in 3Ph systems, f=50.0Hz)

Range	Resolution	Accuracy
0.70c ÷ 1.00 ÷ 0.70i	0.01	±(4.0%rdg + 10dgt) if I ≤ 10%FS ±(2.0%rdg + 3dgt) if I > 10%FS

cosφ (@ 230V in 1Ph systems, 400V in 3Ph systems, f=50.0Hz)

Range	Resolution	Accuracy
0.70c ÷ 1.00 ÷ 0.70i	0.01	±(4.0%rdg + 10dgt) if I ≤ 10%FS ±(1.0%rdg + 7dgt) if I > 10%FS

Voltage harmonics (@ 230V in 1Ph systems, 400V in 3Ph systems, f=50.0Hz)

Range [%]	Resolution [%]	Order	Accuracy
0.1 ÷ 100.0	0.1	01 ÷ 25	±(5.0%rdg + 5dgt)

Frequency of fundamental: 42.5 ÷ 69.0 Hz, DC accuracy not declared

Current harmonics (f=50Hz)

Range [%]	Resolution [%]	Order	Accuracy
0.1 ÷ 100.0	0.1	01 ÷ 9	±(5.0%rdg + 5dgt)
		10 ÷ 17	±(10.0%rdg + 5dgt)
		18 ÷ 25	±(15.0%rdg + 10dgt)



2. GENERAL SPECIFICATIONS

DISPLAY AND MEMORY:

Features:	Touch screen, color graphic LCD, 320x240mm
Memory:	999 locations, 3 marker levels
Communication:	Optical-USB and WiFi integrated

POWER SUPPLY:

Batteries:	6 x 1.2V(rechargeable) type AA or 6 x 1.5V type AA
Battery life:	> 500 test for each functions
Auto Power OFF:	after 5 min of idleness (disabled)

MECHANICAL FEATURES:

Dimensions (L x W x H):	225 x 165 x 75mm
Weight (included batteries):	1.2kg

WORKING ENVIRONMENTAL CONDITIONS:

Reference temperature:	23°C ± 5°C
Working temperature:	0° ÷ 40°C
Allowed relative humidity:	< 80% HR
Storage temperature:	-10 ÷ 60°C
Storage humidity:	< 80% HR

TEST VERIFIES REFERENCE STANDARDS:

Continuity test with 200mA:	IEC/EN61557-4
Insulation resistance:	IEC/EN61557-2
Earth resistance:	IEC/EN61557-5
Multifunction:	IEC/EN61557-10
Earth resistance on TN systems:	EN61936-1 + EN50522

GENERAL REFERENCE STANDARDS:

Safety of measuring instruments:	IEC/EN61010-1, IEC/EN61010-031, IEC/EN61010-2-032
Product type standard:	IEC/EN61557-1
Technical documentation :	IEC/EN61187
Insulation:	double insulation
Pollution degree:	2
Encapsulation :	IP40
Overvoltage category:	CAT III 240V~ (to ground), max 415V between inputs
Max height of use:	2000m

This instrument complies with the requirements of the European Low Voltage Directives 2006/95/EEC (LVD) and EMC 2004/108/EEC