1. ELECTRICAL SPECIFICATIONS

Accuracy is indicated as ± (% readings + no. of digits*resolution) at 23°C ± 5°C, <80%RH

Voltage (RCD, LOOP, Phase sequence)

Range [V]	Resolution [V]	Accuracy
15 ÷ 460	1	±(3.0% rdg + 2dgt)

Frequency

Range [Hz]	Resolution [Hz]	Accuracy
47.0 ÷ 63.6	0.1	±(0.1% rdg + 1dgt)

Continuity test on protective and equalizing conductors

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 99.99	0.01	±(5.0%rdg + 3dgt)

(*) calibrate the cables to null their resistance
Test current: > 200mA DC for R≤5Ω (calibration included) ; Resolution for DC current :1mA
Open-circuit voltage: 4V ≤ V_0 ≤ 12V

Insulation resistance (DC voltage)

Test voltage[V]	Range [MΩ]	Resolution [MΩ]	Accuracy
50	0.01 ÷ 9.99	0.01	±(2.0%rdg + 2dgt)
	10.0 ÷ 49.9	0.1	
	50.0 ÷ 99.9	0.1	±(5.0%rdg + 2dgt)
100	0.01 ÷ 9.99	0.01	±(2.0%rdg + 2dgt)
	10.0 ÷ 99.9	0.1	
	100.0 ÷ 199.9	0.1	±(5.0%rdg + 2dgt)
250	0.01 ÷ 9.99	0.01	±(2.0%rdg + 2dgt)
	10.0 ÷ 99.9	0.1	
	100 ÷ 499	1	±(5.0%rdg + 2dgt)
500	0.01 ÷ 9.99	0.01	±(2.0%rdg + 2dgt)
	10.0 ÷ 199.9	0.1	
	200 ÷ 499	1	
	500 ÷ 999	1	±(5.0%rdg + 2dgt)
1000	0.01 ÷ 9.99	0.01	±(2.0%rdg + 2dgt)
	10.0 ÷ 199.9	0.1	
	200 ÷ 999	1	
	1000 ÷ 1999	1	±(5.0%rdg + 2dgt)

Open-circuit voltage: nominal test voltage –0% +10%
Short circuit current: <6.0mA at 500V test voltage
Nominal test current: >1mA if load= 1kΩ*Vnom (Vnom=50V, 100V, 250V, 500V, 1000V)
Safety protection: the display shows an error message for input voltage >10V

Z Line (Line-Line, Line-Neutral, Line-PE)

Range [Ω]	Resolution [Ω]	Accuracy
0.00 ÷ 199.9 mΩ (*)	0.1 mΩ (*)	±(5.0% rdg + 1mΩ) (*)
200 ÷ 1999 mΩ (*)	1 mΩ (*)	
0.01 ÷ 9.99 Ω	0.01 Ω	±(5.0% rdg + 3dgt)
10.0 ÷ 199.9 Ω	0.1 Ω	

(*) By means of IMP57 optional accessory
Maximum test current: 5.81A (at 265V); 10.10A (at 457V)
Test voltage ranges: 100÷265V (Line-Neutral) / 100÷460V (Line-Line); 50/60Hz ± 5%
Protection type: MCB (B, C, D, K), Fuse (gG, aM)
Insulation materials: PVC, Rubber butyl, EPR, XLPE

First fault current (IT systems)

Range (mA)	Resolution (mA)	Accuracy
0.1 ÷ 0.9	0.1	±(5.0% rdg + 1dgt)
1 ÷ 999	1	±(5.0% rdg + 3dgt)

Limit contact voltage (ULIM) : 25V, 50V

RCD test (Molded case type)

RCD type:	AC (∿), A (⌒), B(⎓) – General (G), Selective (S) and Delayed (⏲)
Rated tripping currents (IΔN)::	6mA, 10mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA
Line-PE, Line-N voltage:	100V ÷265V RCD type AC and A, 190V ÷265V RCD type B
Frequency:	50/60Hz ± 5%

RCD tripping current (Molded case type – RCD General)

RCD type	IΔN	Range IΔN [mA]	Resolution [mA]	Accuracy IΔN
AC, A, B	6mA,10mA	(0.2 ÷ 1.1) $I_{\Delta N}$	≤ 0.1 $I_{\Delta N}$	- 0%, +10%$I_{\Delta N}$
AC, A, B	30mA ≤IΔN ≤300mA			- 0%, +5%$I_{\Delta N}$
AC, A	500mA ≤IΔN ≤650mA			

RCD Molded type tripping time range [ms] (TT/TN system)

		x 1/2			x 1			x 2		x 5		AUTO			AUTO+		
	\	G	S	⏲	G	S	⏲	G	S	G	S	G	S	⏲	G	S	⏲
6mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	A	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	B	999	999	999	999	999	999							310			
10mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	A	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	B	999	999	999	999	999	999							310			
30mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	A	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	B	999	999	999	999	999	999							310			
100mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	A	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	B	999	999	999	999	999	999							310			
300mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	A	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	B	999	999	999	999	999	999							310			
500mA 650mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	A	999	999	999	999	999	999	160	210					310			
	B																
1000mA	AC	999	999	999	999	999	999	160	210								
	A	999	999	999	999	999	999										
	B																

Resolution: 1ms, Accuracy: ±(2.0%rdg + 2dgt)

RCD Molded type tripping time range [ms] (IT system)

		x 1/2			x 1			x 2		x 5		AUTO			AUTO+		
	\	G	S	⏲	G	S	⏲	G	S	G	S	G	S	⏲	G	S	⏲
6mA 10mA 30mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310	✓		
	A																
	B																
100mA 300mA 500mA 650mA	AC	999	999	999	999	999	999	160	210	50	150	✓	✓	310			
	A																
	B																
1000mA	AC	999	999	999	999	999	999	160	210								
	A																
	B																

Resolution: 1ms, Accuracy: ±(2.0%rdg + 2dgt)

Test on earth leakage delay tester RCDs (with RCDX10 optional accessory)

RCD type: AC (∿), A (⌒), B(⎓) – General (G), Selective (S) and Delayed (⏲)
Rated tripping currents (IΔN):: 0.3A ÷ 10A
Line-PE, Line-N voltage: 100V ÷265V RCD type AC and A, 190V ÷265V RCD type B
Frequency: 50/60Hz ± 5%

Earth leakage delay tester RCDs tripping current (RCD General)

RCD type	IΔN	Range IΔN [mA]	Resolution [mA]	Accuracy IΔN
AC, A, B	300mA ≤IΔN ≤1A	(0.3 ÷ 1.1) $I_{\Delta N}$	≤ 0.1$I_{\Delta N}$	- 0%, +5%$I_{\Delta N}$
AC, A	1.1A ≤IΔN ≤10A			

Earth leakage delay tester RCDs trip out time range [ms] (TT/TN system)

		x 1/2			x 1			x 2			x 5			AUTO			▟		
	\	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲
0.3A ÷ 1.0A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B	999	999	999	999	999	999										310		
1.1A ÷ 3.0A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B	999	999	999	999	999	999												
3.1A ÷ 6.5A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B	999	999	999	999	999	999												
6.6A ÷ 10.0A	AC	999	999	999	999	999	999	200	250										
	A	999	999	999	999	999	999												
	B																		

Resolution: 1ms, Accuracy: ±(2.0%rdg + 2dgt)

Earth leakage delay tester RCDs trip out time range [ms] (IT system)

		x 1/2			x 1			x 2			x 5			AUTO			▟		
	\	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲
0.3A ÷ 3.0A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A																		
	B																		
3.1A ÷ 6.5A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A																		
	B																		
6.6A ÷ 10.0A	AC	999	999	999	999	999	999	200	250										
	A																		
	B																		

Resolution: 1ms, Accuracy: ±(2.0%rdg + 2dgt)

NoTripTest – Non-trip earth loop impedance

Test voltage: 100÷265V (Line-PE), 50/60Hz ± 5%

NoTripTest – Systems with Neutral wire

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 9.99	0.01	±(5% reading + N/10)
10.0 ÷ 199.9	0.1	±(5% reading + N)
200 ÷ 1999	1	±(5% reading + 3N)

(*) If $I\Delta_N$ <30mA, test current = $I\Delta_N$/2 and N[Ω]=30/$I\Delta_N$; if $I\Delta_N$ ≥ 30mA, test current <15mA and N=1Ω

NoTripTest – Systems without Neutral wire

Range [Ω]	Resolution [Ω]	Accuracy (*)
1 ÷ 1999	1	-0%, +(5.0% lettura +N)

(*) if $I\Delta_N$ <30mA, test current = $I\Delta_N$/2 and N[Ω]=(10x30)/$I\Delta_N$ Ω; If $I\Delta_N$ ≥ 30mA, test current $I\Delta_N$/2 and N[Ω]=(3x30)/$I\Delta_N$

Contact voltage (RCD and NoTripTest)

Range [V]	Resolution [V]	Accuracy
0 ÷ Utlim	0.1	-0%, +(5.0% rdg + 3V)

Contact voltage (EARTH test – TT system)

Range [V]	Resolution [V]	Accuracy
0 ÷ 99.9	0.1	-0%, +(5.0% rdg + 3V)

Contact voltage (EARTH test – TN system)

Range [V]	Resolution [V]	Accuracy
0 ÷ 99.9	0.1	-0%, +(5.0% rdg + 3V)
100 ÷ 999	1	

Ground resistance with 3-wire method

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 9.99	0.01	±(5.0% rdg + 3dgt)
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 (Rs or Rh) > 100 x Rmeas

Soil resistivity with 4-wire Wenner method

Range [Ωm]	Resolution [Ωm]	Accuracy (*)
0.06 ÷ 9.99	0.01	±(5.0% rdg + 3dgt)
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=10m, Distance “d” range: 1 ÷ 10m
Test current: <10mA – 77.5Hz, Open-circuit voltage: < 20Vrms

Phase sequence rotation with 1-wire method

Voltage range P-N, P-PE[V]	Frequency range
100 ÷ 265	50Hz/60Hz ± 5%

Measurement is only carried out by direct contact with metal live parts **(not on insulation sheath)**

Voltage drop on main power lines (ΔV%)

Range (%)	Resolution (%)	Accuracy
0 ÷ 100	0.1	±(10.0% rdg + 4dgt)

Leakage current (by HT96U optional clamp transducer)

Range [mA]	Resolution [mA]	Accuracy
0.5 ÷ 999.9	0.1	±(5.0% rdg + 2dgt)

Environmental parameters (AUX function)

Parameter	Range	Resolution	Accuracy
Temperature [°C]	-20°C ÷ 80°C	0.1 °C	±(2.0%rdg+2dgt)
Temperature [°F]	-4°F ÷ 176°F	0.1 °F	
Relative humidity [%HR]	0 ÷ 100%HR	0.1% UR	
DC output voltage	0.1mV ÷ 1.0V	0.1mV	
Illuminance [Lux]	0.001Lux ÷ 20.00 Lux (*)	0.001 ÷ 0.02 Lux	
	0.1 Lux ÷ 2000 Lux (*)	0.1 ÷ 2 Lux	
	1 Lux ÷ 20 kLux (*)	1 ÷ 20 Lux	

(*) Accuracy of HT53 lux probe is according to Class AA

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 built-in WiFi
POWER SUPPLY:	
Batteries:	6 x 1.2V(rechargeable) type AA or 6 x 1.5V type AA
Battery life:	> 500 test for each funtions
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°C ÷ 40°C
Allowed relative humidity:	<80%RH
Storage temperature:	-10°C ÷ 60°C
Storage humidity:	<80%RH
TEST VERIFIES REFERENCE STANDARDS:	
Continuity test with 200mA:	IEC/EN61557-4
Insulation resistance:	IEC/EN61557-2
Earth resistance:	IEC/EN61557-5
Fault loop impedance:	IEC/EN61557-3
RCD test:	IEC/EN61557-6
Phase sequence:	IEC/EN61557-7
Multifunction:	IEC/EN61557-10
Prospective short circuit current:	EN60909-0
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 IV 300V~ (to ground), max 415V between inputs
Max height of use:	2000m

This instrument satisfies the requirements of Low Voltage Directive 2014/35/EU (LVD) and of EMC Directive 2014/35/EU
This instrument satisfies the requirements of European Directive 2011/65/EU (RoHS) and 2012/19/EU (WEEE)