1. ELECTRICAL SPECIFICATIONS – SAFETY SECTION

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)

Continuity test on protective and equalizing conductors with 200mA

Range [Ω]	Resolution [Ω]	Accuracy (*)
0.01 ÷ 19.99	0.01	±(5.0%rdg + 3dgt)
20.0 ÷ 99.9	0.1	

(*) 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
Safety protection: the display shows an error message for input voltage > approx. 10V

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 > approx.10V

Z Line (L-L, L-N, L-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) / 173÷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/F(∿⁺),B/B+(⎓⁺) – General (G), Selective (S) and Delayed (⏲)
Rated tripping currents (IΔN)::	10mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA
Line-PE, Line-N voltage:	100V ÷265V RCD type AC and A/F, 190V ÷265V RCD type B/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/F	IΔN = 10mA	(0.3 ÷ 1.1) $I_{\Delta N}$	≤ 0.1 $I_{\Delta N}$	- 0%, +10%$I_{\Delta N}$
	10mA <IΔN ≤650mA			- 0%, +5%$I_{\Delta N}$
B/B+	30mA ≤IΔN ≤100mA			

RCD Molded type tripping 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	⏲
10mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/B+																		
30mA 100mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/B+	999	999	999	999	999	999										310		
300mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/B+	999	999	999	999	999	999												
500mA 650mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F	999	999	999	999	999	999	200	250								310		
	B/B+																		
1000mA	AC	999	999	999	999	999	999	200	250										
	A/F	999	999	999	999	999	999												
	B/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			▟		
	\	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲	G	S	⏲
10mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F																		
	B/B+																		
30mA 100mA 300mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F																		
	B/B+																		
500mA 650mA	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F																		
	B/B+																		
1000mA	AC	999	999	999	999	999	999	200	250										
	A/F																		
	B/B+																		

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

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

RCD type: AC (∿),A/F(∿),B/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/F, 190V ÷265V RCD type B/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/F	300mA ≤IΔN ≤6.5A	(0.3 ÷ 1.1) $I_{\Delta N}$	≤ 0.1$I_{\Delta N}$	- 0%, +5%$I_{\Delta N}$
B/B+	300mA ≤IΔN ≤1A			

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/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/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/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/B+	999	999	999	999	999	999												
3.1A ÷ 6.5A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	B/B+	999	999	999	999	999	999												
6.6A ÷ 10.0A	AC	999	999	999	999	999	999	200	250										
	A/F	999	999	999	999	999	999												
	B/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/F																		
	B/B+																		
3.1A ÷ 6.5A	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A/F																		
	B/B+																		
6.6A ÷ 10.0A	AC	999	999	999	999	999	999	200	250										
	A/F																		
	B/B+																		

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

R_A – Non-trip earth loop impedance

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

R_A – Systems with Neutral wire

Range [Ω]	Resolution [Ω]	Accuracy
0.01 ÷ 9.99	0.01	-0%, +(5.0% rdg + 0.1Ω)
10.0 ÷ 199.9	0.1	-0%, +(5.0% rdg + 1Ω)
200 ÷ 1999	1	-0%, +(5.0% rdg + 3Ω)

Test current: ~10mA

R_A – Systems without Neutral wire

Range [Ω]	Resolution [Ω]	Accuracy
1 ÷ 1999	1	-0%, +(5.0% rdg + 3dgt)

Test current: < ½ IΔN set

Contact voltage (RCD and Ra test)

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)

Voltage range Phase-PE, Phase-Neutral: 100 ÷265V, Frequency: 50/60Hz ± 5%

Leakage current (by HT96U optional clamp transducer)

FS clamp AC (A)	Resolution	Accuracy
1	0.1mA	±(1.0%rdg + 20dgt)
1 < FS <10	0.01A	
10 ≤ FS <100	0.1A	
100 ≤ FS <1000	1A	

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

2. ELECTRICAL SPECIFICATIONS – PQA SECTION

AC TRMS Voltage (L-N)

Range [V]	Resolution [V]	Accuracy
15.0 ÷ 380.0	0.1V	±(1.0%rdg + 1dgt)

Allowed crest factor: ≤ 1,5 ; Frequency: 42 ÷ 69.0 Hz

AC TRMS Voltage (L-L)

Range [V]	Resolution [V]	Accuracy
15.0 ÷ 660.0	0.1V	±(1.0%rdg + 1dgt)

Allowed crest factor: ≤ 1,5 ; Frequency: 42 ÷ 69.0 Hz

Frequency

Range [Hz]	Resolution [Hz]	Accuracy
DC, 42 ÷ 69.0	0.01	±(2.0%rdg + 2dgt)

Allowed voltage: 15.0 ÷ 660V ; Allowed current: 5%FS clamp ÷ FS clamp

DC/ AC TRMS Current (STD clamp)

FS clamp	Range [A]	Resolution [A]	Accuracy
≤ 10A	5% FS ÷ 9.99	0.01	±(1.0%rdg + 3 dgt)
10A ≤ FS ≤ 300	5% FS ÷ 299.9	0.1	
300A ≤ FS ≤ 3000	5% FS ÷ 2999	1	

Range: 5 ÷ 999.9 mV; Values under 5mV are zeroed
Allowed crest factor: ≤ 3; Frequency: 42 ÷ 69.0 Hz

AC TRMS Current (FLEX clamp – 300A AC)

Range [mV]	Frequency [Hz]	Resolution	Accuracy	Overload protection
0.085 ÷ 85.0	42 ÷ 69.0	8.5µV	±(0.5%rdg+0.17%FS)	10V

Allowed crest factor ≤3, Values under 1A are zeroed

AC TRMS Current (FLEX clamp – 3000A AC)

Range [mV]	Frequency [Hz]	Resolution	Accuracy	Overload protection
0.425 ÷ 255.0	42 ÷ 69.0	85µV	±(0.5%rdg+0.17%FS)	10V

Allowed crest factor ≤3, Values under 10A are zeroed

DC Power

FS clamp	Range [kW]	Resolution [kW]	Accuracy
≤ 10A	0.000 ÷ 9.999 10.00 ÷ 99.99	0.001 0.01	±(2.0%rdg + 7dgt)
10A ≤ FS ≤ 200	0.00 ÷ 99.99 100.0 ÷ 999.9	0.01 0.1	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9 1000 ÷ 9999	0.1 1	

Active power (@ 230V, I> 5%FS, cosφ ≥ 0.5, f=50.0Hz)

FS clamp	Range [kW]	Resolution [kW]	Accuracy
≤ 10A	0.000 ÷ 9.999 10.00 ÷ 99.99	0.001 0.01	±(2.0%rdg + 7dgt)
10A ≤ FS ≤ 200	0.00 ÷ 99.99 100.0 ÷ 999.9	0.01 0.1	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9 1000 ÷ 9999	0.1 1	
1000A ≤ FS ≤ 3000	0 ÷ 9999	1	

Reactive power (@ 230V, I >5%FS, cosφ<0.9, f=50.0Hz)

FS clamp	Range [kVAr]	Resolution [kVAr]	Accuracy
≤ 10A	0.000 ÷ 9.999 10.00 ÷ 99.99	0.001 0.01	±(2.0%rdg + 7dgt)
10A ≤ FS ≤ 200	0.00 ÷ 99.99 100.0 ÷ 999.9	0.01 0.1	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9 1000 ÷ 9999	0.1 1	
1000A ≤ FS ≤ 3000	0 ÷ 9999	1	

Power factor / cosφ (@ 230V, I >5%FS)

Range	Resolution	Accuracy
0.70c ÷ 1.00 ÷ 0.70i	0.01	±(2.0%rdg + 3dgt)

Voltage harmonics (@ 230V in 1Ph systems, 400V in 3Ph systems)

Range [%]	Resolution [%]	Order	Accuracy
0.1 ÷ 100.0	0.1	DC, 01 ÷ 49	±(5.0%rdg + 5dgt)

Frequency of fundamental: 42 ÷ 69.0 Hz
Harmonics are zeroed at the below conditions:

- DC : DC value <0.5% fundamental value or DC value < 1.0V
- 1° Harmonic: value of 1° Harmonic < 15V
- 2nd ÷ 49th Harmonics: harmonic value <0.5% fundamental value or if value < 1.0V

Current harmonics

Range [%]	Resolution [%]	Order	Accuracy
0.1 ÷ 100.0	0.1	DC, 01 ÷ 49	±(5.0%rdg + 5dgt)

Frequency of fundamental: 42 ÷ 69.0 Hz
Harmonics are zeroed at the below conditions:

- DC : DC value <0.5% fundamental value or DC value < 0.5%FS clamp
- 1° Harmonic: value of 1° Harmonic < 0.5%FS clamp
- 2nd ÷ 49th Harmonics: harmonic value <0.5% fundamental value or if value < 0.5%FS clamp

Voltage anomalies (L-N, L-PE)

Range [V]	Resolution [V]	Resolution [ms]	Accuracy [V]	Accuracy [ms]
15.0 ÷ 380	0.2	20ms	±(1.0%rdg + 2dgt)	± 1cycle

Voltage anomalies (L-L)

Range [V]	Resolution [V]	Resolution [ms]	Accuracy [V]	Accuracy [ms]
15.0 ÷ 660	0.2	20ms	±(1.0%rdg + 2dgt)	± 1cycle

3. GENERAL SPECIFICATIONS

DISPLAY AND MEMORY:	
Features:	TFT, touch screen, color graphic LCD, 320x240mm
Memory safety section:	999 locations, 3 marker levels
Memory PQA section:	8MB (not expanded)
Communication:	Optical-USB and built-in WiFi
Aggregation time (IP) PQA feature:	2s ÷ 30min selectable
Parameters saved PQA feature:	ca 600
POWER SUPPLY:	
Batteries:	6 x 1.2V(rechargeable) type AA or 6 x 1.5V type AA
Battery life:	> 500 test for each safety functions
Recording autonomy:	ca 43 days (IP=15min) ca 2 days (IP=1min) ca 2 hours (IP=2s)
Recharging time:	approx. 12 hours
External charger:	100-240VAC, 50/60Hz / 15VDC, CAT IV 300V
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
Mechanical protection:	IP40
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
Max height of use:	2000m
GENERAL REFERENCE STANDARDS:	
Safety of measuring instruments:	IEC/EN61010-1, IEC/EN61010-031, IEC/EN61010-2-032
Product type standard:	IEC/EN61557-1-2-3-4-5-6-7-10
EMC :	IEC/EN61326-1
Technical documentation :	IEC/EN61187
Insulation:	double insulation
Pollution degree:	2
Measurement category:	CAT IV 300V to ground, CAT III 350V to ground max 600V among inputs
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 (only Phase-Neutral-Ground systems)
Multifunction:	IEC/EN61557-10
Prospective short circuit current:	EN60909-0
Earth resistance on TN systems:	EN61936-1 + EN50522
Power quality:	EN50160

This instrument complies with the requirements of the European Low Voltage Directives 2014/35/EU (LVD), EMC Directive 2014/30/EU and RED 2014/53/EU Directive
This instrument complies with the requirements of the European 2011/65/EU (RoHS) and with the requirements of the European 2012/19/EU (WEEE)

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