

**1. ELECTRICAL SPECIFICATIONS**Accuracy is indicated as  $\pm$  (% readings + no. of digits\*resolution) at 23 °C  $\pm$  5 °C, <80%RH**Voltage (RCD, LOOP, Phase sequence)**

Range [V]	Resolution [V]	Accuracy
15 ÷ 460	1	$\pm(3.0\% \text{ rdg} + 2\text{dgt})$

**Frequency**

Range [Hz]	Resolution [Hz]	Accuracy
47.0 ÷ 63.6	0.1	$\pm(0.1\% \text{ rdg} + 1\text{dgt})$

**Continuity test on protective and equalizing conductors**

Range [ $\Omega$ ]	Resolution [ $\Omega$ ]	Accuracy (*)
0.01 ÷ 99.99	0.01	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$

(\*) calibrate the cables to null their resistance

Test current: > 200mA DC for  $R \leq 5\Omega$  (calibration included) ; Resolution for DC current : 1mAOpen-circuit voltage:  $4V \leq V_0 \leq 12V$ **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: &lt;6.0mA at 500V test voltage

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

Safety protection: the display shows an error message for input voltage &gt;10V

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

Range [ $\Omega$ ]	Resolution [ $\Omega$ ]	Accuracy
0.00 ÷ 199.9 m $\Omega$ (*)	0.1 m $\Omega$ (*)	$\pm(5.0\% \text{ rdg} + 1\text{m}\Omega) (*)$
200 ÷ 1999 m $\Omega$ (*)	1 m $\Omega$ (*)	
0.01 ÷ 9.99 $\Omega$	0.01 $\Omega$	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
10.0 ÷ 199.9 $\Omega$	0.1 $\Omega$	

(\*) 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  $\pm$  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	$\pm(5.0\% \text{ rdg} + 1\text{dgt})$
1 ÷ 999	1	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$

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 (I<sub>ΔN</sub>): 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	I <sub>ΔN</sub>	Range I <sub>ΔN</sub> [mA]	Resolution [mA]	Accuracy I <sub>ΔN</sub>
AC, A, B	6mA, 10mA	(0.2 ÷ 1.1) I <sub>ΔN</sub>	≤ 0.1 I <sub>ΔN</sub>	- 0%, +10% I <sub>ΔN</sub>
AC, A, B	30mA ≤ I <sub>ΔN</sub> ≤ 300mA			- 0%, +5% I <sub>ΔN</sub>
AC, A	500mA ≤ I <sub>ΔN</sub> ≤ 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													310					
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 (I <sub>ΔN</sub> )::	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	I <sub>ΔN</sub>	Range I <sub>ΔN</sub> [mA]	Resolution [mA]	Accuracy I <sub>ΔN</sub>
AC, A, B	300mA ≤ I <sub>ΔN</sub> ≤ 1A	(0.3 ÷ 1.1) I <sub>ΔN</sub>	≤ 0.1 I <sub>ΔN</sub>	- 0%, +5% I <sub>ΔN</sub>
AC, A	1.1A ≤ I <sub>ΔN</sub> ≤ 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	⌚
<b>0.3A</b> ÷ <b>1.0A</b>	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	
<b>1.1A</b> ÷ <b>3.0A</b>	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	
<b>3.1A</b> ÷ <b>6.5A</b>	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	
<b>6.6A</b> ÷ <b>10.0A</b>	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	⌚
<b>0.3A</b> ÷ <b>3.0A</b>	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A																		
	B																		
<b>3.1A</b> ÷ <b>6.5A</b>	AC	999	999	999	999	999	999	200	250		50	150		✓	✓		310		
	A																		
	B																		
<b>6.6A</b> ÷ <b>10.0A</b>	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<sub>ΔN</sub> < 30mA, test current = I<sub>ΔN</sub>/2 and N[Ω]=30/I<sub>ΔN</sub>; if I<sub>ΔN</sub> ≥ 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<sub>ΔN</sub> < 30mA, test current = I<sub>ΔN</sub>/2 and N[Ω]=(10x30)/I<sub>ΔN</sub> Ω; If I<sub>ΔN</sub> ≥ 30mA, test current I<sub>ΔN</sub>/2 and N[Ω]=(3x30)/I<sub>ΔN</sub>

**Contact voltage (RCD and NoTripTest)**

Range [V]	Resolution [V]	Accuracy
0 ÷ U <sub>lim</sub>	0.1	-0%, +(5.0% rdg + 3V)

**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 ( $\Delta V\%$ )**

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 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°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
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)**

**optec**  
energie ist messbar

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