

1. ELECTRICAL SPECIFICATIONS

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

Voltage (RCD, LOOP, Phase sequence)

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

Continuity test on protective and equalizing conductors

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 ÷ 1999	1	$\pm(10.0\% \text{ rdg} + 5\text{dgt})$

(*) calibrate the cables to null their resistance

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

Open-circuit voltage: $4\text{V} \leq V_0 \leq 12\text{V}$

Insulation resistance (DC voltage)

Test voltage[V]	Range [$\text{M}\Omega$]	Resolution [$\text{M}\Omega$]	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 $-0\% \pm 10\%$

Short circuit current: $< 6.0\text{mA}$ at 500V test voltage

Nominal test current: $> 1\text{mA}$ 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 $> 10\text{V}$

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

Range [Ω]	Resolution [Ω]	Accuracy
0.00 ÷ 199.9 $\text{m}\Omega$ (*)	0.1 $\text{m}\Omega$ (*)	$\pm(5.0\% \text{ rdg} + 1\text{m}\Omega)$ (*)
200 ÷ 1999 $\text{m}\Omega$ (*)	1 $\text{m}\Omega$ (*)	
0.01 ÷ 9.99 Ω	0.01 Ω	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
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 $\pm 5\%$

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/F (⌚), B/B+ (⌚) – General (G), Selective (S) and Delayed (⌚)
Rated tripping currents (I_{ΔN}): 6mA, 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	I _{ΔN}	Range I _{ΔN} [mA]	Resolution [mA]	Accuracy I _{ΔN}
AC, A/F, B/B+	6mA, 10mA	(0.2 ÷ 1.1) I _{ΔN}	≤ 0.1 I _{ΔN}	- 0%, +10% I _{ΔN}
AC, A/F, B/B+	30mA ≤ I _{ΔN} ≤ 300mA			- 0%, +5% I _{ΔN}
AC, A/F	500mA ≤ I _{ΔN} ≤ 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		G	S	
6mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	B/B+	999	999	999	999	999	999										310					
10mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	B/B+	999	999	999	999	999	999										310					
30mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	B/B+	999	999	999	999	999	999										310					
100mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	B/B+	999	999	999	999	999	999										310					
300mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	B/B+	999	999	999	999	999	999										310					
500mA 650mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	A/F	999	999	999	999	999	999	160	210								310					
	B/B+																					
1000mA	AC	999	999	999	999	999	999	160	210													
	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						AUTO+ 		
	\	G	S		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/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310			✓		
	B/B+	999	999			999	999										310			✓		
100mA 300mA	AC	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	A/F	999	999	999	999	999	999	160	210		50	150		✓	✓		310					
	B/B+	999	999			999	999										310					
500mA 650mA	AC	999	999	999	999	999	999	160	210		50	150		✓								
	A/F	999	999	999	999	999	999	160	210					✓								
	B/B+																					
1000mA	AC	999	999		999	999		160	210													
	A/F	999	999			999																
	B/B+																					

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

(*) Selection RCD type A/F and type B/B+ available only for Norway country



Test on RCD of type DD

Type of RCD:	Type DD (according to IEC62955 standard), General (G)
Trip-out current ($I_{\Delta N}$):	6mA
Voltage range F-PE, F-N:	100V ÷ 265V
Frequency:	50/60Hz ± 5%

RCD tripping current (DD type – only for RCD General)

RCD type	$I_{\Delta N}$	Range $I_{\Delta N}$ (mA)	Resolution (mA)	Accuracy $I_{\Delta N}$
DD	6mA	$(0.2 \div 1.1) I_{\Delta N}$	$\leq 0.1 I_{\Delta N}$	- 0%, +10% $I_{\Delta N}$

RCD trip-out time (DD type – only for RCD General)

RCD type	$I_{\Delta N}$	Range (ms)	Resolution (ms)	Accuracy $I_{\Delta N}$
DD	6mA	10000	1	$\pm(2\%rdg + 2dgt)$

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 ($I_{\Delta N}$):	0.3A ÷ 10A (type AC, A/F) ; 0.3A ÷ 3.0A (type B/B+)
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	$I_{\Delta N}$	Range $I_{\Delta N}$ [mA]	Resolution [mA]	Accuracy $I_{\Delta N}$
AC, A/F, B/B+	$300mA \leq I_{\Delta N} \leq 1A$	$(0.3 \div 1.1) I_{\Delta N}$	$\leq 0.1 I_{\Delta N}$	- 0%, +5% $I_{\Delta N}$
AC, A/F	$1.1A \leq I_{\Delta N} \leq 10A$			

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/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+																		
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: $\pm(2.0\%rdg + 2dgt)$

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

Resolution: 1ms, Accuracy: $\pm(2.0\%rdg + 2dgt)$

(*) Selection RCD type A/F and type B/B+ available only for Norway country



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 $I_{\Delta N} < 30\text{mA}$, test current = $I_{\Delta N}/2$ and $N[\Omega] = 30/I_{\Delta N}$; if $I_{\Delta N} \geq 30\text{mA}$, test current $< 15\text{mA}$ and $N=1\Omega$

NoTripTest – Systems without Neutral wire

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

(*) if $I_{\Delta N} < 30\text{mA}$, test current = $I_{\Delta N}/2$ and $N[\Omega] = (10 \times 30)/I_{\Delta N}$ Ω; If $I_{\Delta N} \geq 30\text{mA}$, test current $I_{\Delta N}/2$ and $N[\Omega] = (3 \times 30)/I_{\Delta N}$

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: $< 10\text{mA} - 77.5\text{Hz}$, Open-circuit voltage: $< 20\text{Vrms}$

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

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 $d=10\text{m}$, Distance "d" range: 1 ÷ 10m

Test current: $< 10\text{mA} - 77.5\text{Hz}$, Open-circuit voltage: $< 20\text{Vrms}$

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	$\pm(10.0\% \text{ rdg} + 4\text{dgt})$

Leakage current (by HT96U optional clamp transducer)

Range [mA]	Resolution [mA]	Accuracy
0.5 ÷ 999.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$

Environmental parameters (AUX function)

Parameter	Range	Resolution	Accuracy
Temperature [°C]	-20°C ÷ 80°C	0.1 °C	$\pm(2.0\% \text{rdg} + 2\text{dgt})$
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	$\pm(1.0\% \text{rdg} + 1\text{dgt})$

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

Frequency

Range [Hz]	Resolution [Hz]	Accuracy
42.5 ÷ 69.0	0.01	$\pm(2.0\% \text{rdg} + 2\text{dgt})$

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: $\pm(1.0\% \text{rdg} + 3 \text{dgt})$ 3Ph: $\pm(2.0\% \text{rdg} + 5 \text{dgt})$
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, $\cos\phi=1$, f=50.0Hz)

FS clamp	Range [kW]	Resolution [kW]	Accuracy
≤ 10A	0.000 ÷ 9.999	0.001	1Ph: $\pm(2.0\% \text{rdg} + 5 \text{dgt})$ 3Ph: $\pm(2.5\% \text{rdg} + 8 \text{dgt})$
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, $\cos\phi=0$, f=50.0Hz)

FS clamp	Range [kVAr]	Resolution [kVAr]	Accuracy
≤ 10A	0.000 ÷ 9.999	0.001	1Ph: $\pm(2.0\% \text{rdg} + 7 \text{dgt})$ 3Ph: $\pm(3.0\% \text{rdg} + 8 \text{dgt})$
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
Earth resistance:	IEC/EN61557-5
Fault loop impedance:	IEC/EN61557-3
RCD test:	IEC/EN61557-6
RCD-DD :	IEC62955
Multifunction:	IEC/EN61557-10
Prospective short circuit current:	EN60909-0
Earth resistance on TN systems:	EN61936-1 + EN50522
Test on EVSE devices:	IEC/EN61851-1, IEC/EN60364-7-722 (with EV-TEST100)

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)
of EMC Directive 2014/35/EU and Directive RED 2014/53/EU
This instrument satisfies the requirements of European Directive 2011/65/EU (RoHS) and 2012/19/EU
(WEEE)**

