

1. ELECTRICAL SPECIFICATIONS – VERIFY TESTS

Accuracy is indicated as $\pm$ (% readings + no. of digits) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, con relative humidity $<60\%\text{UR}$.

Continuity test on protective and equalizing conductors

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷ 9.99	0.01	$\pm(2.0\%\text{rdg} + 2\text{dgt})$
10.0 ÷ 99.9	0.1	

(*) after cable calibration (which eliminates the cable resistance).

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

Resolution on current measurement: 1mA

Open-circuit voltage: $4\text{V} \leq V_0 \leq 24\text{V}$

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 ÷ 199.9	0.1	
	200 ÷ 249	1	$\pm(5.0\%\text{rdg} + 2\text{dgt})$
	250 ÷ 499	1	
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: $<1.3 \times$ nominal test voltage

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

nominal test current: $>2.2\text{mA}$ on $230\text{k}\Omega$ load (500V); $>1\text{mA}$ su $1\text{k}\Omega$ per V_{nom} (others)

Measurement limits fitted: 0.05, 0.10, 0.23, 0.25, 0.50, 1.00, $100\text{M}\Omega$

RCDs Tripping time

Range (ms)	Resolution (ms)	Accuracy
0.5I _{dn} , I _{dn}	1÷999	$\pm(2.0\%\text{rdg} + 2\text{dgt})$
2I _{dn}	1÷200 general 1÷250 selective	
5I _{dn}	1÷ 50 general 1÷160 selective	

Nominal trip-out currents: 10mA, 30mA, 100mA, 300mA, 500mA

RCDs type: AC, A, General and Selective

Phase-PE voltage: $100\text{V} \div 265\text{V}$

Frequency: $50\text{Hz} \pm 0.5\text{Hz}$

Tripping current of RCDs

RCD type	I _{ΔN}	Range I _{ΔN} (mA)	Resolution (mA)	Accuracy I _{ΔN}
AC	I _{ΔN} ≤ 10mA	(0.5 ÷ 1.4) I _{ΔN}	0.1 I _{ΔN}	-0%, +10%I _{ΔN}
A		(0.5 ÷ 2.4) I _{ΔN}		
AC	I _{ΔN} > 10mA	(0.5 ÷ 1.4) I _{ΔN}		
A		(0.5 ÷ 2.0) I _{ΔN}		

Contact voltage U_t

Range (V)	Resolution (V)	Accuracy
0 ÷ 2U _{tlim}	0.1	-0%, +(10.0% rdg + 3dgt)

U_{tlim} (UI): 25V , 50V

Line Impedance (Phase-Phase, Phase-Neutral)

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷ 9.99	0.01	±(5.0% rdg + 3dgt)
10.0 ÷ 199.9	0.1	

(*) 0.1 mΩ on range 0.0 ÷ 199.9 mΩ (with IMP57 optional accessory)

Maximum peak current: 3.65A (at 127V); 6.64A (at 230V); 11.5A (at 400V)

Test voltage: 100÷265V (Phase-Neutral) / 100÷460V (Phase-Phase); 50Hz ± 0.5Hz

Fault Loop Impedance (Phase-Ground)

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷ 19.99	0.01	±(5.0% rdg + 3dgt)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

(*) 0.1 mΩ on range 0.0 ÷ 199.9 mΩ (with IMP57 optional accessory)

Maximum peak current: 3.65A (at 127V); 6.64A (at 230V)

Test voltage: 100÷265V (Phase-Ground); 50Hz ± 0.5Hz

Fault Loop Resistance R_A without RCDs tripping

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

Test current: 0.5 I_{ΔN} set on U_t test
15mA on Ra15mA test

Earth Resistance with rods

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.01 ÷ 19.99	0.01	±(5.0% rdg + 3dgt)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

Test current: <10mA – 77.5Hz

Open-circuit voltage: < 20V rms

Earth resistivity

Range ρ (*)	Resolution	Accuracy (*)
0.06 ÷ 19.99 Ωm	0.01 Ωm	±(5.0% rdg + 3dgt)
20.0 ÷ 199.9 Ωm	0.1 Ωm	
200 ÷ 1999 Ωm	1 Ωm	
2.00 ÷ 99.99 kΩm	0.01 kΩm	
100.0 ÷ 125.5 kΩm	0.1 kΩm	

(*) with distance d=10m

Distance range d: 1 ÷ 10m

Test current: <10mA – 77.5Hz

Open-circuit voltage: < 20V rms

**Continuity test with 10A according to EN60204-1**

Range (Ω)	Resolution (Ω)	Accuracy
0.001 ÷ 0.999	0.001	$\pm(1.0\% \text{ rdg} + 2\text{dgt})$

Test current: >10A AC for $R \leq 0.45\Omega$
Resolution test current: 0.1A
Open-circuit voltage: between 6 and 12V AC
Power supply voltage: 230V- 50Hz

Continuity test with 10A according to EN60204-1

Range (Ω)	Resolution (Ω)	Accuracy
0.01 ÷ 9.99	0.01	$\pm(1.0\% \text{ rdg} + 2\text{dgt})$

Test current: >10A AC for $R \leq 0.45\Omega$
Resolution test current: 0.1A
Open-circuit voltage: <12V AC
Power supply voltage: 230V- 50Hz

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	$\pm(0.1\% \text{ rdg} + 1\text{dgt})$

2. ELECTRICAL SPECIFICATIONS – ANALYZER AND AUX

Accuracy is indicated as $\pm$ (% readings + no. of digits) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, con relative humidity $<60\%\text{UR}$.

Voltage – Single phase / Three phase systems (Autorange)

Range (V)	Resolution (V)	Accuracy	Input Impedance
15 ÷ 310	0.2	$\pm(0.5\% \text{rdg} + 2\text{dgt})$	300 k Ω (Phase-Neutral)
310 ÷ 600	0.4		300 k Ω (Phase-Phase)

Voltage Anomalies – Single / Three phase systems (Manual range)

Range (V)	Resolution Voltage (V)	Resolution Time	Accuracy Voltage	Accuracy Time (ref. 50Hz)
15 ÷ 310	0.2	10ms	$\pm(1.0\% \text{rdg} + 2\text{dgt})$	$\pm 10\text{ms}$
30 ÷ 600	0.4			

Input Impedance: 300 k Ω (Phase-Neutral and Phase-Phase)

Current by external clamp transducer – FlexEXT / STD

Range (*)	Resolution (mV)	Accuracy	Input Impedance	Overload protection
0.005 ÷ 0.26V	0.1	$\pm(0.5\% \text{rdg} + 2\text{dgt})$	200k Ω	5V
0.26 ÷ 1V	0.4			

(*) Example: by using a clamp whose range is 1000A/1V, the instrument measures currents higher than 5A

Power factor (Cos ϕ) - Single / Three phase systems

Range (cos ϕ)	Resolution	Accuracy (°)
0.20 ÷ 0.50	0.01	1.0
0.50 ÷ 0.80		0.7
0.80 ÷ 1.00		0.6

Leakage curreny (by HT96U optional clamp transducer)

Range (mA)*	Resolution (mA)	Accuracy	Input Impedance	Overload protection
0.5 ÷ 999.9	0.1	$\pm(5.0\% \text{rdg} + 2\text{dgt})$	200k Ω	5V

(*) While recording the instrument stores only current values $> 5\text{mA}$ with 1mA resolution

Maximum stored value is the peak value calculated with response time of 1ms

Power – Single / Three phase systems

Measures type	Range	Resolution	Accuracy
ACTIVE POWER	100.0 ÷ 999.9W	0.1W	±(1.0% rdg + 2dgt)
	1.000 ÷ 9.999kW	0.001kW	
	10.00 ÷ 99.99kW	0.01kW	
	100.0 ÷ 999.9kW	0.1kW	
	1.000 ÷ 9.999MW	0.001MW	
	10.00 ÷ 99.99MW	0.01MW	
	100.0 ÷ 999.9MW	0.1MW	
REACTIVE POWER	100.0 ÷ 999.9VAR	0.1VAR	
	1.000 ÷ 9.999kVAR	0.001kVAR	
	10.00 ÷ 99.99kVAR	0.01kVAR	
	100.0 ÷ 999.9kVAR	0.1kVAR	
	1.000 ÷ 9.999MVAR	0.001MVAR	
	10.00 ÷ 99.99MVAR	0.01MVAR	
APPARENT POWER	100.0 ÷ 999.9VA	0.1VA	
	1.000 ÷ 9.999kVA	0.001kVA	
	10.00 ÷ 99.99kVA	0.01kVA	
	100.0 ÷ 999.9kVA	0.1kVA	
	1.000 ÷ 9.999MVA	0.001MVA	
	10.00 ÷ 99.99MVA	0.01MVA	
ACTIVE ENERGY (Class 2 EN61036)	100.0 ÷ 999.9Wh	0.1Wh	
	1.000 ÷ 9.999kWh	0.001kWh	
	10.00 ÷ 99.99kWh	0.01kWh	
	100.0 ÷ 999.9kWh	0.1kWh	
	1.000 ÷ 9.999MWh	0.001MWh	
	10.00 ÷ 99.99MWh	0.01MWh	
REACTIVE ENERGY (Class 3 IEC1268)	100.0 ÷ 999.9VARh	0.1VARh	
	1.000 ÷ 9.999kVARh	0.001kVARh	
	10.00 ÷ 99.99kVARh	0.01kVARh	
	100.0 ÷ 999.9kVARh	0.1kVARh	
	1.000 ÷ 9.999MVARh	0.001MVARh	
	10.00 ÷ 99.99MVARh	0.01MVARh	
REACTIVE ENERGY (Class 3 IEC1268)	100.0 ÷ 999.9MVARh	0.1MVARh	
	100.0 ÷ 999.9MVARh	0.1MVARh	
	100.0 ÷ 999.9MVARh	0.1MVARh	
	100.0 ÷ 999.9MVARh	0.1MVARh	
	100.0 ÷ 999.9MVARh	0.1MVARh	
	100.0 ÷ 999.9MVARh	0.1MVARh	

Harmonics - Single / Three phase systems

Range	Maximum resolution	Base accuracy
DC ÷ 25 ^a	0.1V / 0.1 A	±(5.0% rdg + 2dgt)
26 ^a ÷ 33 ^a		±(10% rdg + 2dgt)
34 ^a ÷ 49 ^a		±(15% 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 luxmeter probe is according to Class AA

3. GENERAL SPECIFICATIONS

SINGLE/THREE PHASE RECORDING:

STORED PARAMETERS:

- Phase and delta voltages, Phase currents, neutral current, Phase and total three phase Active, Reactive, Apparent power, Active energy (Class 2 EN61036), Reactive energy (Class 3 IEC1268), Phase and total three phase Power factor $\cos\phi$, Voltages, currents harmonics (DC,1,2,...49), Voltage anomalies (sags, swells, breaks), Predefined recordings (EN50160, Voltage anomalies, Harmonics, Start up, Power & Energy), Max selectable parameters: 63 or 3 AUX (Environmental and/or leakage)
- Integrated period: $5 \div 3600$ sec
- Recording autonomy: > 30 days with integrated period of 15 minutes
- Memory capacity: 2Mbyte

DISPLAY AND MEMORY:

Features:	Dot matrix with backlight
Resolution:	128x128 dots
Memory:	999 measures

POWER SUPPLY:

Batteries:	6 batteries 1.5V type LR6-AA-AM3-MN 1500
External power supply adapter:	Code A0050 (AUX e ANALYZER functions only)
Mains power supply:	230V- 50Hz (LOW Ω 10A function only)

MECHANICAL FEATURES:

Dimensions:	225 (W)x165(L)x105(D) mm
Weight (included batteries):	about 2.0 kg

WORKING ENVIRONMENTAL CONDITIONS:

Reference temperature:	23°C $\pm$ 5°C
Working temperature:	0° $\div$ 40°C
Allowed relative humidity:	< 80% HR
Storage temperature:	-10 $\div$ 60°C
Storage humidity:	< 80% HR

TEST VERIFIES REFERENCE STANDARDS:

Continuity test with 200mA:	IEC 61557-4
Insulation resistance:	IEC 61557-2
Earth resistance:	IEC 61557-5
Fault Loop Impedance:	IEC 61557-3
RCDs test:	IEC 61557-6
Phase sequence:	IEC 61557-7
Continuity test with 10A:	EN60439-1, EN60204-1

POWER/ENERGY MEASUREMENTS REFERENCE STANDARDS:

Active energy static counters for AC current	EN61036 (Class 2)
Reactive energy static counters for AC current	IEC1268 (Class 3)

GENERAL REFERENCE STANDARDS:

Safety of measuring instruments:	EN61010-1 + A2(1997)
Product type standard:	IEC61557-1, 2, 3, 4, 5, 6
Insulation:	double insulation
Pollution degree:	2
Overvoltage category:	CAT II 600V~ / 350V~ (to ground) CAT III 600V~ / 300V~ (to ground)
Max altitude of use:	2000m

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