

## 1. ELECTRICAL SPECIFICATIONS – VERIFY TESTS

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

### Continuity test on protective and equalizing conductors

Range ( $\Omega$ )	Resolution ( $\Omega$ )	Accuracy (*)
0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
10.0 $\div$ 99.9	0.1	

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

Test current: > 200mA DC for  $R \leq 5\Omega$  (included calibration)  
Resolution on current measurement: 1mA

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

### Insulation Resistance (DC voltage)

Test voltage(V)	Range (M $\Omega$ )	Resolution (M $\Omega$ )	Accuracy
50	0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
	10.0 $\div$ 49.9	0.1	
	50.0 $\div$ 99.9	0.1	$\pm(5.0\%rdg + 2dgt)$
100	0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
	10.0 $\div$ 99.9	0.1	
	100.0 $\div$ 199.9	0.1	$\pm(5.0\%rdg + 2dgt)$
250	0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
	10.0 $\div$ 199.9	0.1	
	200 $\div$ 249	1	$\pm(5.0\%rdg + 2dgt)$
	250 $\div$ 499	1	
500	0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
	10.0 $\div$ 199.9	0.1	
	200 $\div$ 499	1	$\pm(5.0\%rdg + 2dgt)$
	500 $\div$ 999	1	
1000	0.01 $\div$ 9.99	0.01	$\pm(2.0\%rdg + 2dgt)$
	10.0 $\div$ 199.9	0.1	
	200 $\div$ 999	1	$\pm(5.0\%rdg + 2dgt)$
	1000 $\div$ 1999	1	

Open-circuit voltage: <1.3 x nominal test voltage

Short circuit current: <6.0mA at 500V test voltage

nominal test current: >2.2mA on 230k $\Omega$  load (500V); >1mA su 1k $\Omega$  per Vnom (others)

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

### RCDs Tripping time

Range (ms)	Resolution (ms)	Accuracy
$\frac{1}{2} I_{\Delta N}$ , $I_{\Delta N}$ 2 $I_{\Delta N}$ 5 $I_{\Delta N}$ RCD	1 $\div$ 999 1 $\div$ 200 general 1 $\div$ 250 selective 1 $\div$ 50 general 1 $\div$ 160 selective	$\pm(2.0\%rdg + 2dgt)$

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

RCDs type: AC, A, General and Selective

Phase-PE voltage: 100V  $\div$  255V

Frequency: 50Hz  $\pm$  0.5Hz

## Tripping current of RCDs

RCD type	I <sub>ΔN</sub>	Range I <sub>ΔN</sub> (mA)	Resolution (mA)	Accuracy I <sub>ΔN</sub>
AC	I <sub>ΔN</sub> ≤ 10mA	(0.5 ÷ 1.4) I <sub>ΔN</sub>	0.1 I <sub>ΔN</sub>	-0%, +(5.0% I <sub>ΔN</sub> )
A		(0.5 ÷ 2.4) I <sub>ΔN</sub>		
AC	I <sub>ΔN</sub> > 10mA	(0.5 ÷ 1.4) I <sub>ΔN</sub>	0.1 I <sub>ΔN</sub>	-0%, +(5.0% I <sub>ΔN</sub> )
A		(0.5 ÷ 2.0) I <sub>ΔN</sub>		

## Contact voltage U<sub>t</sub>

Range (V)	Resolution (V)	Accuracy
0 ÷ 2U <sub>tlim</sub>	0.1	-0%, +(5.0% rdg + 3dgt)

U<sub>tlim</sub> (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<sub>A</sub> without RCDs tripping

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

Test current: 0.5 I<sub>ΔN</sub> set on U<sub>t</sub> 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 ( $\Omega$ )	Resolution ( $\Omega$ )	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 ( $\Omega$ )	Resolution ( $\Omega$ )	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°C  $\pm$  5°C, con relative humidity <60%UR.

### Voltage – Single phase / Three phase systems (Autorange)

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

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

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

Input Impedance: 300 k $\Omega$  (Phase-Neutral and Phase-Phase)

### Current by external clamp transducer – FlexEXT / STD

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

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

### Power factor (Cos $\phi$ ) - Single / Three phase systems

Range (cos $\phi$ )	Resolution	Accuracy (°)
0.20 $\div$ 0.50	0.01	1.0
0.50 $\div$ 0.80		0.7
0.80 $\div$ 1.00		0.6

### Leakage curreny (by optional clamp transducer)

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

(\*) While recording the instrument stores only current values > 5mA 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	
100.0 ÷ 999.9MVAR	0.1MVAR		
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	
100.0 ÷ 999.9MVA	0.1MVA		
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	
100.0 ÷ 999.9MWh	0.1MWh		
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	
100.0 ÷ 999.9MVARh	0.1MVARh		

## Harmonics - Single / Three phase systems

Range	Maximum resolution	Base accuracy
DC ÷ 25 <sup>a</sup>	0.1V / 0.1 A	±(5.0% rdg + 2dgt)
26 <sup>a</sup> ÷ 33 <sup>a</sup>		±(10% rdg + 2dgt)
34 <sup>a</sup> ÷ 49 <sup>a</sup>		±(15% rdg + 2dgt)

## Environmental parameters (AUX function)

Range	Resolution	Accuracy
-20°C ÷ 80°C	0.1 °C	±(2.0% rdg + 2 dgt)
0 ÷ 100% UR	0.1% UR	
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 ÷ 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
Visible area:	73x73 mm
Memory:	999 measures

#### POWER SUPPLY:

Batteries:	6 batteries 1.5V type LR6-AA-AM3-MN 1500
External power supply adapter:	Code <b>A0050</b> (AUX e ANALYZER functions only)
Mains power supply:	230V- 50Hz (LOW $\Omega$ 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° ÷ 40°C
Allowed relative humidity:	< 80% HR
Storage temperature:	-10 ÷ 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:

Features of voltage supplied by public utilities:	EN50160
Active energy static counters for AC current	EN61036 (Class 2)
Reactive energy static counters for AC current	IEC1268 (Class 3)

#### NOISE MEASUREMENTS REFERENCE STANDARDS:

Sound measurements (with HT55 probe):	EN60651:1994/A1 type 1 EN60804:1994/A2 type 1
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**GENERAL REFERENCE STANDARDS:**

Safety of measuring instruments:	EN61010-1 + A2(1997)
Product type standard:	IEC61557-1, 2, 3, 4, 5, 6
Insulation:	class 2 (double insulation)
Pollution degree:	2
Overvoltage category:	CAT II 600V~ / 350V~ (to ground) CAT III 600V~ / 300V~ (to ground)
Use:	internal use; max altitude: 2000m
EMC:	EN61326-1 (1998) + A1 (1999)

**This instrument complies with the requirements of the European Low Voltage Directives 72/23/CEE (LVD) and EMC 89/336/CEE, amended with 93/68/CEE**