



## 1. TECHNICAL SPECIFICATIONS

Accuracy is calculated as:  $\pm[\% \text{reading} + (\text{no. of digits}) * \text{resolution}]$  at 23°C, <80%RH

### AC TRMS VOLTAGE

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

### FREQUENCY

Range (Hz)	Resolution (Hz)	Accuracy
47.50 ÷ 52.50 / 57.00 ÷ 63.00	1	$\pm(0.1\% \text{ rdg} + 1\text{dgt})$

### CONTINUITY OF PROTECTION CONDUCTORS WITH 200mA

Range ( $\Omega$ )	Resolution ( $\Omega$ )	Accuracy
0.00 ÷ 9.99	0.01	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

Test current: >200mA DC up to 5 $\Omega$  (test leads included)  
 Test current generated: 1mA resolution, range 0 ÷ 250mA  
 Open-circuit voltage: 4 < V<sub>o</sub> < 24VDC  
 Safety protection: error message for input voltage >10V

### INSULATION RESISTANCE

DC 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		$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
100	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 99.9	0.1	
	100 ÷ 199	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 ÷ 249	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	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
1000	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	
	200 ÷ 999	1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$

Open-circuit voltage: rated test voltage -0% +10%  
 Rated measuring current: >1mA with 1k $\Omega$  x V<sub>nom</sub> (50V, 100V, 250V, 1000V), >2.2mA with 230k $\Omega$  @ 500V  
 Short-circuit current: <6.0mA for each test voltage  
 Safety protection: error message for input voltage >30V

### LINE/LOOP IMPEDANCE P-P, P-N, P-PE – TT/TN SYSTEMS

Range ( $\Omega$ )	Resolution ( $\Omega$ )	Accuracy
0.01 ÷ 19.99	0.01	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
20.0 ÷ 199.9	0.1	

Maximum test current: 3.31A (at 265V); 5.71A (at 457V)  
 P-N/P-P Test voltage: (100V  $\pm$  265V) / (100V  $\pm$  460V); 50/60Hz  $\pm$  5%  
 Protection types: MCB (B, C, D, K), Fuse (aM, gG, BS882-2, BS88-3, BS3036, BS1362)

## TEST ON RCD PROTECTION (MOLDED-CASE TYPE)

Differential protection type (RCD):	AC (⌚), A/F (⌚⌚), General (G), Selective (S)
<b>Single -phase systems (L-N-PE)</b>	
Voltage range L-PE, L-N:	100V ÷265V
Voltage range N-PE:	<10V
<b>Split-phase systems (phase delay VL1-PE, VL2-PE = 180° or phase delay VL1-PE, VL2-PE = 120°)</b>	
Voltage range L1-PE, L1-L2:	100V ÷265V
Voltage range L2-PE:	0V÷265V
Rated tripping currents (I <sub>ΔN</sub> ):	6mA, 10mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA
Frequency:	50/60Hz ± 5%

## RCD tripping current (for General RCDs only)

Type RCD	I <sub>ΔN</sub>	Range I <sub>ΔN</sub> (mA)	Resolution (mA)	Accuracy
A/F, AC	6mA, 10mA	(0.2 ÷ 1.1) I <sub>ΔN</sub>	0.1I <sub>ΔN</sub>	- 0%, +10%I <sub>ΔN</sub>
	30mA ≤ I <sub>ΔN</sub> ≤ 300mA			- 0%, +5%I <sub>ΔN</sub>
	500mA ≤ I <sub>ΔN</sub> ≤ 650mA			

## Measurement RCD tripping time – TT/TN systems

	x 1/2		x 1		x 5		AUTO				AUTO+ 	
	\	G	S	G	S	G	S	G	S	G	S	
<b>6mA</b>	AC	999	999	999	999	50	150	✓	✓	310		✓
	A/F	999	999	999	999	50	150	✓	✓	310		✓
<b>10mA</b>	AC	999	999	999	999	50	150	✓	✓	310		✓
	A/F	999	999	999	999	50	150	✓	✓	310		✓
<b>30mA</b>	AC	999	999	999	999	50	150	✓	✓	310		✓
	A/F	999	999	999	999	50	150	✓	✓	310		✓
<b>100mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>300mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>500mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>650mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999							
<b>1000mA</b>	AC	999	999	999								
	A/F	999	999	999								

Table with duration of tripping time measurement [ms] - Resolution: 1ms, Accuracy: ±(2.0%reading + 2digits)

## Measurement RCD tripping time – IT systems

	x 1/2		x 1		x 5		AUTO				AUTO+ 	
	\	G	S	G	S	G	S	G	S	G	S	
<b>6mA</b>	AC	999	999	999	999	50	150	✓	✓	310		✓
	A/F	999	999	999	999	50	150	✓	✓	310		✓
<b>10mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>30mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>100mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>300mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>500mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>650mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		
<b>1000mA</b>	AC	999	999	999	999	50	150	✓	✓	310		
	A/F	999	999	999	999	50	150	✓	✓	310		

Table with duration of tripping time measurement [ms] - Resolution: 1ms, Accuracy: ±(2.0%reading + 2digits)



## 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

## OVERALL EARTH RESISTANCE WITHOUT RCD TRIPPING

Voltage range P-PE, P-N:	100V ÷ 265V
Voltage range N-PE:	<10V
Frequency:	50/60Hz ± 5%

## Overall earth resistance in systems with Neutral (3-wire) – (30mA or higher RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 8dgt)
10.0 ÷ 199.9	0.1	

## Overall earth resistance in systems with Neutral (3-wire) – (6mA and 10mA RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 30dgt)
10.0 ÷ 199.9	0.1	

## Overall earth resistance in systems without Neutral (2-wire) – (30mA or higher RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 8dgt)
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

## Overall earth resistance in systems without Neutral (2-wire) – (6mA and 10mA RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 30dgt)
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

## Contact voltage

Range [V]	Resolution [V]	Accuracy
0 ÷ Ut LIM	0.1	-0%, +(5.0%rdg + 3V)

## PHASE ROTATION WITH 1 TEST LEAD

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**)



## 2. GENERAL SPECIFICATIONS

### MECHANICAL CHARACTERISTICS

Dimensions (L x W x H):	225 x 165 x 75mm (9 x 6 x 3in)
Weight (batteries included):	1.2kg (42 ounces)
Mechanical protection:	IP40

### MEMORY AND PC CONNECTIONS

Memory:	999 locations, 3 mark levels
PC connection:	optical/USB port

### DISPLAY

Characteristics:	COG Black/white graphic LCD, 320x240pxl
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### POWER SUPPLY

Battery type:	6x1.5V alkaline batteries type AA IEC LR06 or 6 x1.2V rechargeable NiMH type AA
Battery life:	> 500 tests for each function
Auto Power OFF:	after 5 minutes' idling (if activated)

### ENVIRONMENTAL CONDITIONS FOR USE

Reference temperature:	23°C ± 5°C (73°F ± 41°F)
Operating temperature:	0°C ÷ 40°C (32°F ÷ 104°F)
Allowable relative humidity:	<80%RH
Storage temperature:	-10°C ÷ 60°C (14°F ÷ 140°F)
Storage humidity:	<80%RH
Max. operating altitude:	2000m (6562ft)

### REFERENCE GUIDELINES

Safety:	IEC/EN61010-1, IEC/EN61010-2-030, IEC/EN61010-2-033 IEC/EN61010-2-034, IEC/EN61557-1
EMC :	IEC/EN61326-1
Technical documentation:	IEC/EN61187
Safety of accessories:	IEC/EN61010-031
Insulation:	double insulation
Pollution level:	2
Measurement category:	CAT IV 300V to earth, maximum 415V between inputs
RPE:	IEC/EN61557-4, BS7671 17th ed., AS/NZS3000/3017
MΩ:	IEC/EN61557-2, BS7671 17th ed., AS/NZS3000/3017
RCD:	IEC/EN61557-6 (only on Phase-Neutral-Earth systems)
LOOP P-P, P-N, P-PE:	IEC/EN61557-3, BS7671 17th ed., AS/NZS3000/3017
Multifunction:	IEC/EN61557-10, BS7671 17th ed., AS/NZS3000/3017
Short-circuit current:	EN60909-0

**This instrument satisfies the requirements of Low Voltage Directive 2014/35/EU (LVD) and of EMC Directive 2014/30/EU**

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

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## KWS®

KWS® is een uniek servicesysteem voor uw meetinstrumenten met periodiek onderhoud en kalibratie tegen vaste, lage kosten. Via een gratis webportal ([mijnkws.be](http://mijnkws.be)) heeft u altijd en overal beschikking over uw kalibratiecertificaten.

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