

**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 (Ω) | Resolution (Ω) | 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 Ω (test leads included)
 Test current generated: 1mA resolution, range 0 ÷ 250mA
 Open-circuit voltage: 4 < V₀ < 24VDC
 Safety protection: error message for input voltage >10V

INSULATION RESISTANCE

| DC test voltage (V) | Range (M Ω) | Resolution (M Ω) | Accuracy |
|---------------------|---------------------|--------------------------|--|
| 50 | 0.01 ÷ 9.99 | 0.01 | $\pm(2.0\% \text{ rdg} + 2\text{dgt})$ |
| | 10.0 ÷ 49.9 | 0.1 | $\pm(5.0\% \text{ rdg} + 2\text{dgt})$ |
| | 50.0 ÷ 99.9 | | |
| 100 | 0.01 ÷ 9.99 | 0.01 | $\pm(2.0\% \text{ rdg} + 2\text{dgt})$ |
| | 10.0 ÷ 99.9 | 0.1 | $\pm(5.0\% \text{ rdg} + 2\text{dgt})$ |
| | 100 ÷ 199 | 1 | |
| 250 | 0.01 ÷ 9.99 | 0.01 | $\pm(2.0\% \text{ rdg} + 2\text{dgt})$ |
| | 10.0 ÷ 99.9 | 0.1 | |
| | 100 ÷ 249 | 1 | $\pm(5.0\% \text{ rdg} + 2\text{dgt})$ |
| | 250 ÷ 499 | | |
| 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 | | |
| 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 | | |

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

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

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

(*) 0.1m Ω in range 0.1 ÷ 199.9 m Ω (by using the optional accessory IMP57)

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 (⌚), General (G), Selective (S) and B (⌚) |
| Voltage range P-PE, P-N: | 100V ÷ 265V RCD type A, A and B ($I_{\Delta N} \leq 100\text{mA}$), 190V ÷ 265V RCD type B ($I_{\Delta N} = 300\text{mA}$) |
| Voltage range N-PE: | <10V |
| Rated tripping currents ($I_{\Delta N}$): | 6mA, 10mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA |
| Frequency: | 50/60Hz ± 5% |

RCD tripping current (for General RCDs only)

| Type RCD | $I_{\Delta N}$ | Range $I_{\Delta N}$ (mA) | Resolution (mA) | Accuracy |
|----------|--|-------------------------------|--------------------|---------------------------|
| A, AC, B | 6mA, 10mA | $(0.2 \div 1.1) I_{\Delta N}$ | $0.1 I_{\Delta N}$ | - 0%, +10% $I_{\Delta N}$ |
| A, AC, B | $30\text{mA} \leq I_{\Delta N} \leq 300\text{mA}$ | | | - 0%, +5% $I_{\Delta N}$ |
| AC, A | $500\text{mA} \leq I_{\Delta N} \leq 650\text{mA}$ | | | |

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 |
| 6mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 10mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 30mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 100mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 300mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 500mA 650mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | A | 999 | 999 | 999 | 999 | | | | | 310 | |
| | B | | | | | | | | | | |
| 1000mA | AC | 999 | 999 | 999 | | | | | | | |
| | A | 999 | 999 | | | | | | | | |
| | B | | | | | | | | | | |

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 |
| 6mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| 10mA | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | ✓ |
| 30mA | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 100mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| 300mA | A | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | ✓ | 310 | |
| | B | 999 | 999 | 999 | 999 | | | | | 310 | |
| 500mA | AC | 999 | 999 | 999 | 999 | 50 | 150 | ✓ | | 310 | |
| 650mA | A | 999 | 999 | 999 | 999 | | | ✓ | | 310 | |
| | B | | | | | | | | | | |
| 1000mA | AC | 999 | 999 | 999 | 999 | | | | | | |
| | A | 999 | 999 | | | | | | | | |
| | B | | | | | | | | | | |

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 |
|------------------|---|

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 2014/35/EU

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