

# Rigel 288+

Hand-held electrical safety analyzer.



Small and flexible electrical safety analyzer with battery powered earth/ground bond, insulation and leakage testing.

The **Rigel 288+** electrical safety analyzer offers an accurate and fast solution for meeting international and local safety standards.

Additional 50VDC and 100VDC insulation tests, to complement the 250VDC and 500VDC tests, make the **288+** conform to growing manufacturers' requirements for testing 24VDC and 48VDC operated devices such as operating tables, lights and mobile X-rays.

Combining automatic and manual test sequences, data storage and direct printing facilities, the **Rigel 288+** also provides an automatic warning of secondary earth/ground paths and makes users aware when invalid readings are made, ensuring correct and accurate test results first time, every time.



The **Rigel 288+ Downloader** app makes paperless and wireless transfer of electrical safety test data possible, using just your smartphone or tablet.

**288+ Downloader** generates a PDF of your test results to be saved, printed, attached to works order and emailed for storage on your central database or CMMS.

Available on Android devices only.

## Why buy the Rigel 288+?

- > **Built-in electronic data storage and automated testing** – internal memory holds up to 5,000 test results, reducing paperwork and saving you time
- > **Flexible user-definable test routines** to meet the needs of your organisation
- > **Battery powered testing** gives you complete freedom to move about
- > **High current, low energy earth/ground bond testing with automatic test verification**, giving you accurate test results first time, every time

To see the **Rigel 288+** for yourself, request your live online demonstration today at [rigelmedical.com/288plus](http://rigelmedical.com/288plus)



T: +44 (0) 191 587 8730 E: [sales@rigelmedical.com](mailto:sales@rigelmedical.com)

**TESTED, TRUSTED... WORLDWIDE.**

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## Key Features:

- > All-in-one compliance with international standards including IEC/EN 62353, AAMI/IEC/EN 60601-1, IEC 61010, NFPA-99, AS/NZ 3551
- > Built-in electronic data storage and automated testing
- > User-definable test routines
- > Direct printing via Bluetooth connectivity
- > Battery-powered leakage, insulation and earth/ground bond tests
- > 50/100/250/500VDC insulation testing allows testing on equipment running on 24VDC and 48VDC up to 253VAC
- > Automatic secondary verification
- > Accurate high current, low energy earth/ground bond testing
- > Available in a range of mains configurations

## Electrical Analysis/Functions

### Electrical Safety Tests performed:

- > Earth/ground bond, insulation

### Specific to IEC 60601-1:

- > Leakage, enclosure leakage, patient leakage, patient auxiliary, patient F-type

### Specific to IEC 61010:

- > Touch leakage

### Specific to IEC 62353:

- > Equipment leakage (direct, differential and alternative method)

### Applied part leakage (direct and alternative method) specific to AAMI & NFPA:

- > Patient leakage AP-GND, patient leakage AP-CASE, patient leakage AP-AP, patient leakage AP-ALL (AAMI/NFPA)

Custom tests can be created using variation or combination of the above.

## 288+ Applications:

- > Routine testing of medical electrical equipment
- > Service tool for performance testing
- > Asset management
- > Fast and efficient testing of IEC leads
- > Earth/ground bond testing on (medical) installations and non-medical equipment
- > Testing on fixed installations

## What's in the box?

- > Calibration certificate
- > Carrying case
- > Earth/ground bond test probe with clip and clip lead
- > Patient Applied part module
- > 10 Applied part adaptors
- > Detachable 2 meter mains cable
- > Quick start guide

## Optional Accessories:

- > Med-eBase test solution software (383A910)
- > Barcode scanner with embedded Bluetooth (339A923)
- > Bluetooth Test n Tag Elite 2 Printer (339A989)
- > Bluetooth results printer (339A930)

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From **SEAWARD**

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## Technical Specification:

### Continuity

Method 2 Wire Technique

Test Current

Max Test Voltage

Measuring Range (low range)

Measuring Range (mid range)

Measuring Range (high range)

Accuracy

Using 'zero' lead function

>+200mA -200mA DC into 2Ω

4-24V RMS o/c

0.001 - 0.999Ω @ 0.001Ω resolution

1.00 - 9.99Ω @ 0.01Ω resolution

10.0 - 19.9Ω @ 0.1Ω resolution

± 3% of reading + 0.01Ω

### Insulation Resistance

Measurement

Voltage

Range (low range) @ 50VDC

Range (low range) @ Above 50VDC

Accuracy (low range)

Range (high range) @ 250VDC

Range (high range) @ 500VDC

Accuracy (high range)

Resolution

EUT to earth/ground, EUT to AP,

AP to earth/ground

50/100/250 & 500VDC @ 1mA

0.01MΩ - 10MΩ

0.01MΩ - 20MΩ

± 5% of reading + 2 counts

20MΩ - 50MΩ

20MΩ - 100MΩ

± 10% + 2 counts

0.01MΩ

### Direct Leakage Measurement

Measuring Range

Accuracy

Mains on A.P. Voltage

Measuring Device

Measurement Type

4μA to 9999μA

± 5% or reading + 2 counts

F-type only @ 110% of mains

As per IEC 60601-1 requirements

Separate AC & DC for patient

(auxiliary) leakage to IEC 60601,

true RMS for all remaining

leakage tests

### Differential Leakage Measurement

Measuring Range

Accuracy

Measurement/ Display Resolution

Measurement Type

Measuring Device

75μA to 9999μA

± 5% of reading + 5 counts

1μA

True RMS

Frequency response characteristics  
to IEC 60601-1

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## Alternative Leakage Measurement

|                        |                                |
|------------------------|--------------------------------|
| Test Voltage           | 250V at mains frequency        |
| Test Current           | 3.5mA current limited          |
| Measurement Range      | 4 $\mu$ A to 9999 $\mu$ A      |
| Measurement Resolution | 1 $\mu$ A                      |
| Measurement Accuracy   | $\pm$ 5% of reading + 2 counts |
| Measurement Type       | True RMS                       |
| Measuring Device       | As per IEC 60601-1             |

## Power Measurement

|          |                      |
|----------|----------------------|
| Method   | VA rating            |
| Range    | 0.1kVA - 4kVA        |
| Accuracy | $\pm$ 10% + 2 counts |

## Mains Outlet Test

|                     |                                |
|---------------------|--------------------------------|
| Input Voltage Range | 0-300VAC                       |
| Max current         | 16A                            |
| Measures            | L-E,N-E                        |
| Accuracy            | $\pm$ 5% of reading + 2 counts |

## IEC Mains Lead Test

|               |   |
|---------------|---|
| Test Duration | 2s  |
| Test          | Continuity of all conductors, insulation & polarity |

## General Specification:

|                          |   |
|--------------------------|---|
| Mains Power              | 230VAC $\pm$ 10%, 50-60Hz +/- 1Hz<br>120VAC $\pm$ 10%, 60Hz +/- 1 Hz<br>(USA model) |
| Battery                  | 6 x 1.5V AA   |
| Weight                   | 1.6kg / 3.5lbs including batteries  |
| Size (L x W x D)         | 270 x 110 x 75mm/10.5 x 4 x 3"  |
| Operating Conditions     | 0°C - 40°C, 32°F - 104°F, 0-90%<br>RH - NC  |
| Storage Environment      | -15°C - +60°C / 5°F - 140°F   |
| Environmental Protection | IP 40   |

## Service and Warranty

288+ comes with a free upgraded 24 month warranty (subject to terms and conditions, available at [www.rigelmedical.com/register-product](http://www.rigelmedical.com/register-product))



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Rev 2.1

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