

Rigel 288+

The smallest and most flexible electrical safety analyzer on the market 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.

Enjoy complete freedom to move around, without the need for mains voltage, thanks to the new battery powered test capability. Using standard AA batteries, tests can be carried out for insulation, earth/ground bond testing, and touch or point-to-point leakage current testing.

Additional 50V DC and 100V DC insulation tests, to complement the 250V DC and 500V DC tests, make the 288+ conform to growing manufacturer's requirements for testing 24V DC and 48V DC 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+ remains the most compact safety analyzer of its kind. An automatic warning of secondary earth/ground paths makes users aware when invalid readings are made, ensuring correct and accurate test results first time, every time.

To further improve the portability and flexibility of the 288+, a range of accessories, including Bluetooth printers and barcode scanners, are available.

The Rigel 288+ is available in a wide range of power configurations, to suit local requirements, and conforms to several international standards, including IEC 62353, 60601-1, NFPA-99 and many other local variants.

The comprehensive database software, Med-eBase, ensures fast and easy download of test results, creation of test sequences and the ability to produce professional test certificates.

Schuko and other mains configurations available

Key Benefits

- 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 reduce paperwork and saves time
- Flexible user-definable test routines to meet the needs of your organisation
- Small and compact with direct printing via Bluetooth connectivity
- Battery-powered leakage, insulation and earth/ground bond tests enable faster and more convenient testing
- 50 / 100 / 250 / 500V DC insulation testing allows testing on equipment running on 24V DC and 48V DC up to 253V AC
- Automatic secondary verification ensures the correct result first time
- Accurate high current, low energy earth/ground bond testing
- Available in a range of mains configurations to meet local requirements across the globe

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 a 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

Download your **FREE** guide to electrical safety testing at www.rigelmedical.com/guides



► Compliance with international standards

Have peace of mind when it comes to having to comply with a variety of international and local standards and recommendations including, but not limited to, IEC / EN 62353, AAMI / IEC / EN 60601-1, IEC 61010, NFPA-99, AS / NZ 3551.



◀ Built-in electronic data storage and automated testing

Leave the laptop in the office and rest assured that the 288+ has an internal memory to store 5,000 test results, eliminating the risk of manual data capture error and the hassle of paperwork.

Automated test sequences ensure test procedures are performed in a consistent manner, whilst saving time and money through speeding up the test process.

► Flexible user-definable test routines

Have complete flexibility over test routines by setting the Rigel 288+ to incorporate user-defined protocols, including specific test instructions or a space to record visual inspections.

It's easy to update the customisable routines using the Bluetooth communication port, to ensure that test procedures are always up-to-date with the latest requirements.

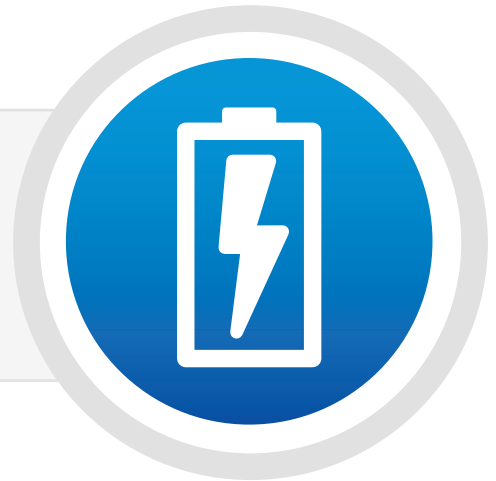




◀ **Small and compact with wireless printing**

Reduce the burden of carrying multiple instruments from site to site by using the most compact electrical safety analyzer on the market.

When printed test results are required on the spot, simply connect to one of our battery powered Bluetooth printers, and print your test results wherever and whenever you want, without the need for mains power.



▶ **Battery-powered testing**

The 288+ runs on standard AA batteries, and is capable of performing point-to-point leakage, earth/ground bond and insulation resistance tests on battery power alone.



◀ **Low voltage insulation testing**

Meet the ever growing need to meet manufacturer's test requirements for increasingly popular equipment running on 24V DC and 48V DC, such as operating tables, lights and mobile X-rays.

▶ Automatic test verification

Get the correct results first time and avoid time consuming re-tests with Rigel's unique and automated verification of incoming mains configuration and secondary paths, which result in false positives.



◀ Accurate high current, low energy earth/ground bond testing

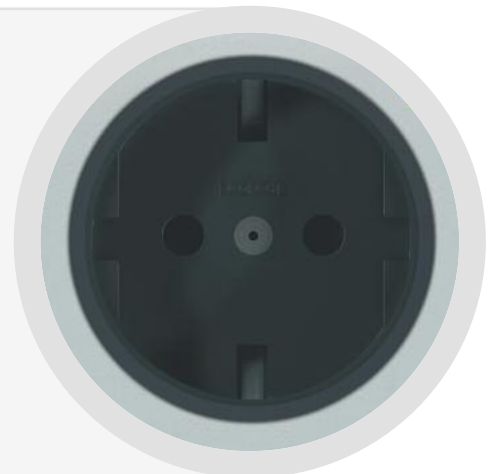
Rigel's unique earth/ground bond technology, gives accurate and precise readings, saving time and unnecessary replacement of good mains cables. Measurements are still conducted at 200mA to ensure mechanical wear is being identified.

▶ Available in international mains configurations

The Rigel 288+ is a truly global product, available in the widest possible range of mains configurations to meet local requirements across the globe. Please contact us at support@rigelmedical.com to enquire about the available mains configuration for your area.

- USA, 120V
- Schuko Germany, 230V
- UK, 230V
- Schuko France/Poland, 230V
- China, 220V
- India/South Africa, 220V
- Japan, 100V
- Australia/New Zealand, 10A/230V

More versions available. Please contact us on support@rigelmedical.com



Technical Specifications

Continuity

Method	2 wire technique using 'zero' lead function
Test Current	>+200mA -200mA DC into 2 ohms
Max Test Voltage	4-24V RMS o/c
Measuring Range (low range)	0.001 – 0.999 ohms @ 0.001 ohms resolution
Measuring Range (mid range)	1.00 – 9.99 ohms /@ 0.01 ohms resolution
Measuring Range (high range)	10.0 – 19.9 ohms @ 0.1 ohms resolution
Accuracy	± 3% of reading + 0.01 ohms

Insulation Resistance

Measurement	EUT to earth/ground, EUT to AP, AP to earth/ground
Voltage	50 / 100 / 250 & 500V DC @ 1mA.
Range (low range) @ 50V DC	0.01Mohms - 10Mohms
Range (low range) @ Above 50V DC	0.01Mohms - 20Mohms
Accuracy (low range)	± 5% of reading + 2 counts
Range (high range) @ 250V DC	20Mohms – 50Mohms
Range (high range) @ 500V DC	20Mohms – 100Mohms
Accuracy (high range)	±10% +2 counts
Resolution	0.01Mohms

Direct Leakage Measurement

Measuring Range	4µA to 9999µA
Accuracy	± 5% or reading +2 counts
Mains on A.P. voltage	F-type only @ 110% of mains
Measuring Device	As per IEC 60601-1 requirements
Measurement Type	Separate AC & DC for Patient (Auxiliary) Leakage to IEC 60601, True RMS for all remaining Leakage tests

Differential Leakage Measurement

Measuring Range	75µA to 9999µA
Accuracy	±5% of reading + 5 counts
Measurement / display resolution	1µA
Measurement Type	True RMS
Measuring Device	Frequency response characteristics to IEC 60601-1

Alternative Leakage Measurements

Test Voltage	250V at mains frequency
Test Current	3.5 mA current limited
Measurement Range	4µA to 9999µA
Measurement Resolution	1µA
Measurement Accuracy	±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	±10% + 2 counts

Mains Outlet Test

Input voltage range	0-300V AC
Max current	16A
Measures	L-E, N-E
Accuracy	± 5% of reading + 2 counts

IEC Mains Lead Test

Test Duration	2s
Test	Continuity of all conductors, Insulation & Polarity

General Specifications

Mains power	230V AC ±10%, 50-60Hz +/- 1Hz 120V AC ±10%, 60Hz +/- 1Hz (USA model)
Battery	6 x 1.5V AA
Weight	1.6 kg / 3.5 lbs including batteries
Size (L x W x D)	270 x 110 x 75 mm / 10.5 x 4 x 3"
Operating conditions	0°C - 40°C, 32°F - 104°F, 0-90% RH - NC
Storage environment	-15°C - +60°C / 5°F - 140°F
Environmental Protection	IP 40

Service & Warranty

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

Standard Accessories (supplied with 288+)

- Calibration certificate
- Carrying case
- Earth/ground bond test probe with clip
- Earth/ground bond clip lead
- Patient Applied part module
- 10 Applied part adaptors
- Detachable 2 meter mains cable
- Bluetooth USB dongle
- Electronic instruction manual
- Quick start guide
- Application software

Optional Accessories

- Med-eBase test solution software
- Barcode scanner with embedded Bluetooth
- Bluetooth Test 'n' Tag System
- Bluetooth results printer
- Bluetooth to USB adaptor
- Pelican case

Rev 1