RIGEL MEDICAL
GMC-INSTRUMENTS GROUP

Can I carry out safety tests on an isolated (IT) supply or non-TN system?

Incorrect readings could occur when testing on either an IT, Missing, Centre Tab or Split Rail Supply. When considering the test environment according to IEC 60601-1-1, the test setup is based on a TN (Terre-neutral) supply, because it ensures the highest possible leakage. Non-TN systems have a lower potential to ground and safety testing carried out on these systems could potentially pass faulty units (See Figure 1).

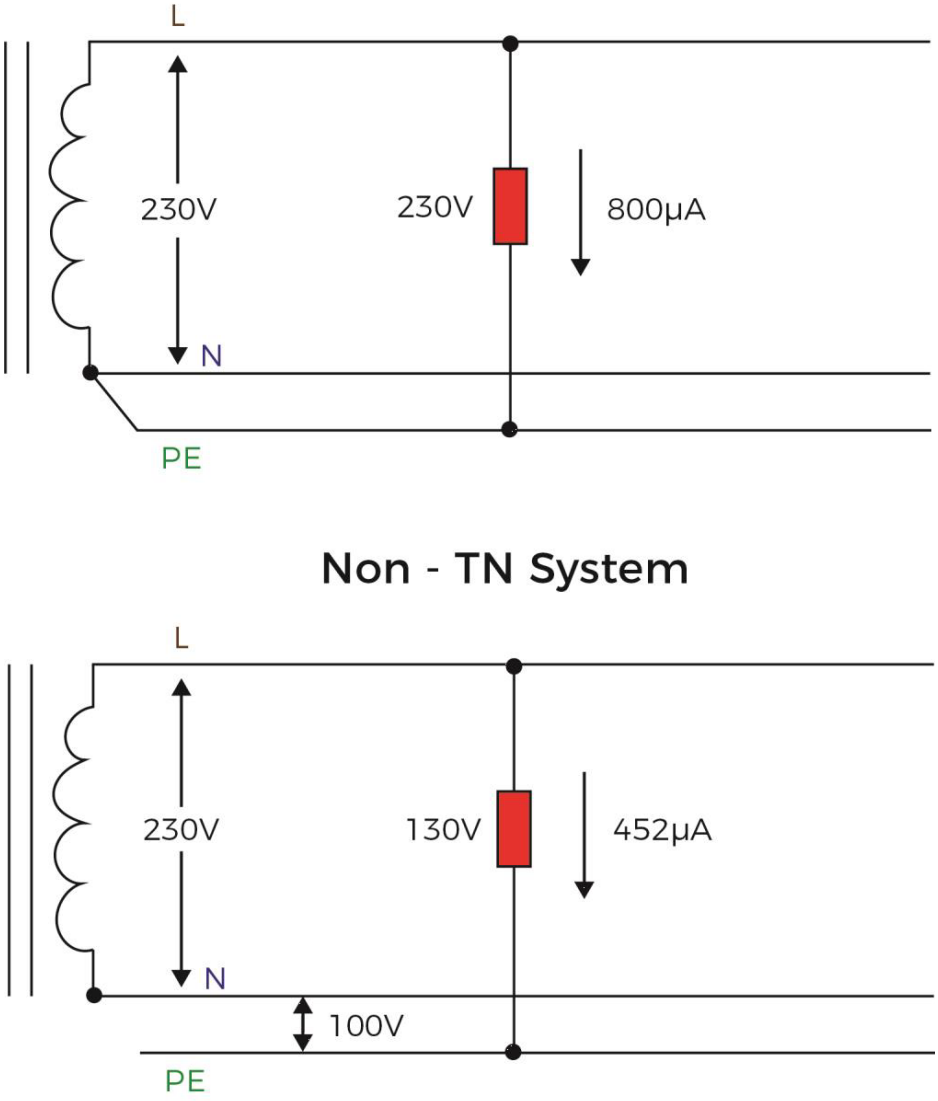

Figure 1: Potential difference and leakage currents on TN and Non-TN systems

Due to the portability of most electrical safety analyser, the products are not supplied with internal isolation transformers. For instance, the Rigel 288+ is rated to power-up and measure on instruments up to 4KVA. Incorporating a 4KVA rated Isolation transformer into our products would add approximately 15 – 25 Kilo's to the unit's weight. For obvious reasons, we would no longer class such size and weight as portable hence defeating our objective to produce Portable and Innovative Test Equipment.

In case measurements are done on an IT system we would recommend using a sufficiently rated External Isolation Transformer or using an extension cable powered from a TN supply, to ensure the safety analyser is

able to measure the maximum leakage. If this is not possible, the measurements done on an IT system will be considerably lower and considerations must be given to the test results.

The leakage current measurements in the IEC 60601-1 are described and referred to, using the full mains potential between L and E. Any voltage between N and E would result in a difference between the full mains potential (L-N) and the L – E potential thus resulting in incorrect readings. All Rigel electrical safety analysers do however; provide a warning to the user in case of a missing Earth or when the voltage between Neutral and Earth exceeds 4 Volts, as shown in Figure 2. The latter would indicate that t e L-N voltage.

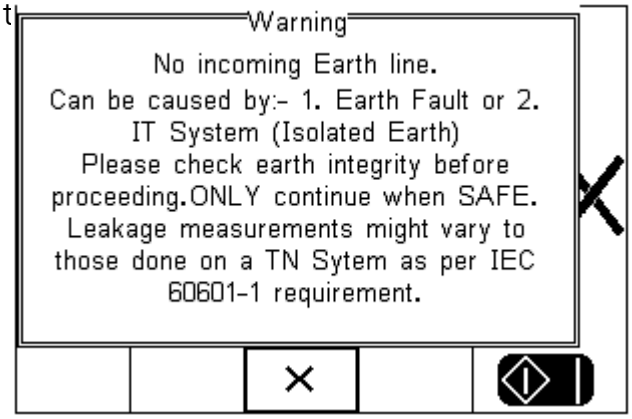

Figure 2. Warning message for potential non-TN system

If it is imperative leakage measurements are taken with the tester powered from an IT mains system, the equipment under test will only be valid for that condition. When medical equipment is then moved outside an IT system, further testing should be provided to determine the true leakage at a TN system.

For traceability while testing on an IT supply, automatic test sequences using the Rigel 288+ and 62353+ provide a comment that is automatically added into the SAVE TEST RESULTS screen. This comment states “IT Supply – Confirm Correct Measurements”. This comment may be deleted if required.

If you require more help, please contact us at https://www.seaward.com/gb/enquiry/

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