

## Diagnostic insulation tests for condition assessment of electrical assets have been redesigned to eliminate the shortcomings of older test equipment



### Introduction

High-voltage insulation test sets are essential tools for condition assessment of almost all major items of electrical power plant, including transformers, bushings, circuit breakers, cables and rotating machines. Many of the insulation test sets currently in use have significant shortcomings, which means not only that they are less convenient to use than they should be, but also that the results obtained are less comprehensive and less reliable. A new generation of instruments is now available which addresses these shortcomings.

To see what these versatile products have to offer, let's take a look at one of the latest 12 kV insulation diagnostic systems. The first thing users are likely to notice is that it is much more portable than its older counterparts – its two-piece design weighs a total of 36 kg, making it probably the industry's lightest power factor test set. Another useful benefit is provision for fully automatic tan delta/power factor and tip-up testing, which is a big time saver. Facilities are also available for manual testing – including the option to increase the test voltage during the test – to allow special testing requirements to be accommodated. The ability of the test set to generate its own test voltage, which can be varied in frequency over the range 1 to 500 Hz not only increases its versatility, but also ensures that dependable and repeatable results are obtained even when the instrument is fed from a poor quality supply.

Another benefit is automatic voltage dependence detection. If the instrument detects, for example, that the dissipation factor of the test object varies with the applied voltage, which suggests there is a problem that requires further investigation, it instantly provides a user alarm. The inability to correct accurately for temperature differences when calculating results is a weakness of many insulation test sets

currently in use. The new generation instrument overcomes this by using a novel method to apply individual and accurate temperature compensation for the actual test object. This is based on carrying out an additional DFR measurement and mathematically converting data at different frequencies to data at different temperatures.

Results analysis is a key aspect of insulation testing and, in the new instrument, analysis is facilitated by allowing immediate comparisons to be made between the current results and stored data sets. Comparisons of results of obtained at different voltages and frequencies can also easily be made.

The instrument is supplied complete with powerful industry-standard acceptance and maintenance test data software, which not only offers extended test automation options, but also provides comprehensive facilities for archiving, analysing and reporting results.

The instrument described in this short item is Megger's DELTA4000 series 12 kV insulation diagnosis system, which is supplied with the powerful yet easy to use PowerDB software package. Developed after careful analysis of user requirements in relation to high voltage insulation testing, this innovative new test set is a significant step forward in high-voltage insulation testing technology.

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**ABSTRACT:** Portable high voltage diagnostic insulation testers feature automatic voltage dependence detection and are much lighter and easier to use than previously. They also provide comprehensive facilities for archiving, analysing and reporting results.