

## Advice on the right time to buy a protective relay test set



### Introduction

With the challenges of testing the smart grid just around the corner, and IEC 61850 networking starting to transform the way substations operate, is now really a good time to be thinking about buying a protective relay testset? Surprisingly perhaps, the answer is yes – provided that it's a smart test set that has been designed with future developments in mind.

The reasons for investing now rather than waiting are simple: there's a new generation of test sets that makes testing easier, faster and more convenient. And, in today's high-pressure world where time – and downtime – are everything, which protection engineer doesn't need these benefits now rather than later?

Let's take a look at what makes these revolutionary new test sets so attractive. First of all, they're light and small. To put this in perspective, it's not so very long ago that a complete three-phase test set with modest output power weighed in at around 150 kg, and even today, most of the instruments on sale tip the scale at around 25 kg. The new test sets halve this to 12 kg and they are also smaller than their predecessors, making them much easier and more convenient to transport and handle. Size isn't everything, however, although it's undeniably important! Protection engineers also need versatility. For testing three-phase schemes, three current outputs plus three voltage outputs are the minimum requirement, but if numerical current differential relays are to be tested, six current channels are needed. The most convenient and economical way to provide these is to arrange for the three "voltage" channels to be convertible, so that they can be used either for current or voltage, as required.

With their requirements for size and versatility addressed, protection engineers will undoubtedly turn their thoughts to power. For convenient testing, current amplifiers with a

constant power output are highly desirable, and it needs to be a high constant power to allow the testing of protection schemes that use electromechanical relays – we may be looking to the future, but legacy equipment is still going to be with us for a very long time.

Fortunately, despite their small size and weight, the new generation test sets have no problems in the power department. They can offer a full 200 VA up to 30 A, with a compliance voltage of 50 V at up to 4 A. They even make provision for current outputs to be series connected to double the compliance voltage to 100 V and provide a constant 400 VA output power.

Of course, power is also important for the voltage outputs and the designers of the new generation test sets have taken this into account. From 30 V to 150 V, the voltage amplifiers can deliver a constant 150 VA, thereby providing high current at "difficult" low test voltages.

Continuous power rating is one thing, but protective relay test sets also need generous short time ratings. The bench-mark of performance for an amplifier with a 30 A continuous rating is a short-time rating of 60 A, plus the ability to supply up to 180 A at high power for instantaneous overcurrent test applications.

So much for the brawn, but what about the brain? After all, as every protection engineer knows, power is nothing without control. Let's start with the user interface, as this is what makes the difference between a test set that's a pleasure to use, and one that's viewed with dread and foreboding. The gold standard in this area is set by the latest touch-screen interfaces that provide a simple way of testing even the most complex relays. They allow users to perform manual, steady-state and dynamic tests quickly and easily, and they have built-in pre-set test routines for popular relays. Naturally, the new generation test sets also make provision for automatic testing, using powerful yet intuitive

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software running on a PC. It's clear that the new generation relay test sets will handle all of today's demands with ease and convenience, but what of the future? Relay test sets are no trivial investment, and users rightly expect them to retain their value and usefulness for many years.

The best of the new test sets fully address this requirement. Their logic systems feature high-power processors to take care of future requirements, and their functionality can be readily enhanced to meet changing requirements by means of firmware upgrades.

But what of IEC 61850? As might be expected, new generation test sets are IEC 61850 ready. That is, they can be supplied now without integrated IEC 61850 functionality, to eliminate the need for users to pay for features they don't currently require, but they can be upgraded easily and economically to provide full IEC 61850 support as soon as the user has a need for it.

Hopefully, by now these new protection relay test sets are starting to sound like a very attractive investment, but how can you get hold of one? The answer is simple – contact Megger. All of the characteristics and benefits discussed in this article are embodied in the new SMRT 36 test sets and, if you would like one, they're ready for delivery right now!

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**ABSTRACT:** The new generation of IEC 61850-ready test sets are designed to meet the needs of protection testing on the smart grid. The latest products are smaller, lighter and more powerful than previous generations and have been designed with increased productivity in mind.