



## **Improving Production Line Efficiency: How Automating Your Electrical Safety Testing Routine Can Pay Big Dividends**

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### **Introduction**

It seems that only recently a new wave of electrical safety testing equipment came to market promising to make production line testing safer, faster and more efficient. Although skeptical of these new and unfamiliar microprocessor controlled testers, electrical product manufacturers slowly began replacing their transformer-in-a-box equipment and immediately saw big benefits. Microprocessor-based hipot, ground bond, insulation resistance, and line leakage testers entered the market with advanced features like high and low trip current limits, multiple memory locations, and ground fault circuit interrupters. These testers helped reduce setup time, all but eliminate operator error, and make electrical safety testing a more streamlined and manageable process for manufacturers of electrically powered products.

To meet the productivity demands of a continually evolving manufacturing industry, electrical safety testers are now taking advantage of automation. As automation technology has advanced and become more affordable, electrical safety testing equipment has advanced with it, now incorporating features that allow test operators to connect their instruments to a PC and fully automate their test sequences. In the following article, we will explore the many benefits of automating your electrical safety testing routine.

### **Electrical Safety Testing Background**

Electrical safety tests are usually performed in research and development labs and on the production line in order to ensure that electrical products will not harm the end-user during routine operation. The four most common [types of tests](#) are: hipot or dielectric



voltage withstand test, ground bond/ground continuity test, insulation resistance test, and line leakage test. Manufacturers must implement a strict electrical safety testing routine in order to comply with international safety agencies such as UL and TUV, or receive a CE listing. Most safety agency specifications call for electrical safety tests to be performed on 100% of all manufactured units leaving the factory. The required tests depend on the standard, the agency listing being applied for, and the type of product.

### **Production Line Efficiency Limitations**

On the production line, efficiency matters. Quality assurance managers want their firms' products to be tested accurately and the data recorded systematically, while production line managers want their products to be tested quickly and their technicians to adapt to fluctuations in production schedules. Until recently, test operators could only test as fast as they could make connections to the units coming down the line. Their throughput was not only a matter of their familiarity with the DUT and the testing equipment, but also the speed with which they could make the connections and run the required tests. Safety concerns also limited the speed with which they could test. The more connections that a test operator had to make, the greater the chance of error or injury due to contact with high voltage leads or exposed live parts.

Safety agency standards are more stringent now than ever. More tests are required, and more time must be spent performing safety tests. Test instrument manufacturers such as SCI alleviated this problem by releasing all-in-one testers like their model [4320](#) (see below) and model [6330](#). These instruments are capable of performing all of the required electrical safety tests quickly and accurately, increasing test operators' throughput and safety. But perhaps the most important benefit of these testers is that they incorporate a Serial RS-232 Port which allows the test operator to automate any test procedure and control the instrument with a PC.

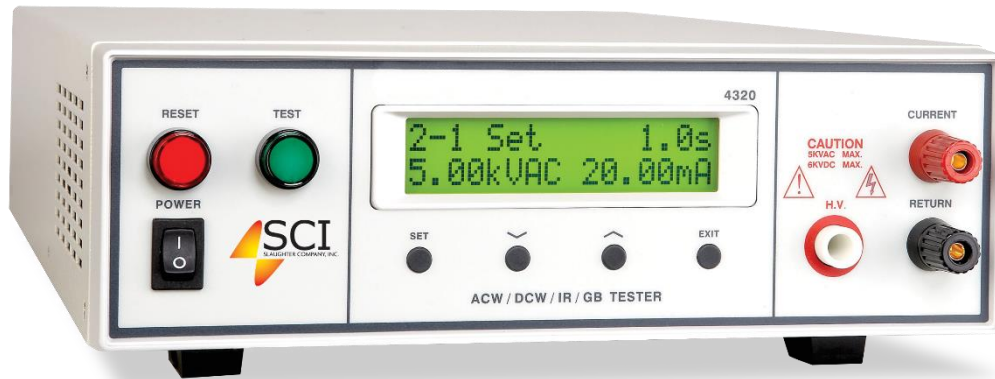
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**Figure 1: SCI Model 4320**

### **Better Technology, Better Testing**

An automated test sequence provides a multitude of benefits to electrical product manufacturers. First, automation makes test operators more productive. Instead of reconfiguring the test instrument and changing connections for each DUT by hand, test operators can incorporate their tester into an automatic testing system and test different products with the push of a button. Second, using a PC to control a safety tester drastically reduces setup time and increases productivity. Most manufacturers don't limit themselves to one model or product, and each model has different safety testing requirements and parameters. Using an automated tester allows technicians to quickly load test setups for different products and test them using unique parameters. Automation can also increase the versatility of a test station by allowing test operators to quickly respond to demand fluctuations and product line changes. Third, automation improves the overall safety of the testing area. As a test operator upgrades to an instrument with automation, he or she need not be exposed to high voltage test leads or live parts. Testing can be done in a designated and enclosed area, with a dedicated cable harness providing a

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simple and safe way of making all necessary connections to the DUT.

### **Feature Rich Instruments**

Although automation was traditionally offered as an advanced feature on big ticket items, new models now include this technology at lower price points. The latest SCI [290](#) series of hipot and insulation resistance testers (see below) has an optional Serial RS-232 Port available on all models, allowing test operators to benefit from the improved efficiency of automation at a reasonable price. Further, a production line manager that wishes to automate his test routine doesn't need the assistance of a dedicated software programmer to take advantage of the safety and efficiency benefits of automation.

Instruments like the 290 series come with all of the necessary instructions and commands to start automating test procedures, and can easily be controlled through Hyper Terminal (software that's included standard on every PC). They are also capable of working with custom-built automation software packages.

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**Figure 2: SCI Model 295**

## Conclusion

With electrical safety testers incorporating more advanced features at lower prices, now is the time to make the most of automated production line testing. Safety testing equipment with a Serial RS-232 Port helps manufacturers improve efficiency, productivity and safety which will translate to lower operating costs and increased throughput. Incorporating this technology into your test routine can be much easier than you think.

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