

Benefits and Advantages of Digital Electrical Safety Testers

There is no question that there are still many analog electrical safety testers being used in the field. However, the need for higher productivity, efficiency, and the focus on better safety assurances are placing new demands on electrical safety instrument owners. Advances in technology have met this challenge and the new generation of digital electrical safety testers offers many advantages and benefits over the analog variety. This note will specifically address these benefits, provide examples, and offer tips on how to introduce these products to analog users.

Better Resolution

Digital electrical safety testers offer easier to read displays, since they overcome the analog shortcoming of requiring the user to interpret pointers and analog metering. Digital displays leave no room for error as long as the tester is calibrated once per year. The setting and measurement resolution on a digital device is also a major advantage. For programming, no dial settings or pot tweaking are required, simply enter a digital value using a numerical keypad or an up/down arrow-key press. Viewing measurement data on a digital display eliminates the guesswork prevalent on analog devices.

Simple Menu-Driven Programming

Here again, no pots to tweak, no dials to turn, and no guesswork as to proper tester configuration. The digital testers provide numeric keypads and up/down arrows to select and edit parameters. Simple as well as advanced features can be entered and edited with the ease of keypads and clear displays. In addition, many advanced and specialty features are provided as a by-product of a digital device. Here is a list of such features: programmable rate of voltage rise, programmable time for PASS/FAIL indication, GPIB address, selectable DC voltage for insulation resistance, and the list goes on.

Keypad Lockout Security

When performing electrical safety tests, the issue of safety plays a major role. Everyone agrees that making the tests as safe and efficient as possible is very important. Digital devices offer many security features of which keypad lockout is only one. Keypad lockout permits the supervisor or test manager to program and store one or more tests in the tester's memory and then "lock out" the editable parameters. Once stored, a technician need only recall a test from memory and use the START and STOP keys to run tests. This eliminates the risk of unauthorized button pushing and improper or unsafe programming. A password is used to limit access to the tester's edit screens. Other safety features include programmable limits, a reset button, and safety interlocking.

Still More Advantages

Programmable Test Limits

Electrical safety tests include Hipot (with associated current sensing tests), Insulation Resistance, and Ground Continuity. Each of these tests permits the user to enter a series of limits that the tester compares measurement data with. The main advantage of digital over analog is in the sheer number of possible limit selections and the high resolution available. Analog devices have neither the amount of limit possibilities nor the precision technology demands.

The types of limit detection are all major advantages of digital testers. For example, an analog tester may offer a high current limit for a Hipot test where a digital device offers, not only a high current detect, but a low current detect (which verifies that cables and/or DUT are connected before running a test), and arc current detect. Resistance limits for Insulation Resistance test mode also benefit from the digital programming and sensing capabilities.

Arc Detect

Arc detect provides an extremely small window of time (1 to 10usec typically) during which an electrical safety tester senses changes in current and anticipates a breakdown much quicker than any known detect mode available. This would be virtually impossible on an analog instrument

Memory storage and Test Sequencing

Digital instruments really shine when it comes to programming test sequences and then storing these sequences for later recall. A test sequence is simply a series of electrical safety tests that run from one to the next automatically. For example: a hipot test, then an IR test, and finally another hipot test. Depending on the instrument in question, many tests can be programmed, stored, and recalled and on some units “groups” of these tests can also be stored. For example, the QuadTech Guardian 6000 allows up to 10 tests to be stored, recalled, and run back-to-back automatically. This test sequence is called a test group and up to 50 of these test groups can be stored for easy recall. Compare this to an analog device’s inability to store tests and it is plain to see the time saving, productivity, and organizational benefits of digital electrical safety testers.

Automation and Digital Interfaces

Digital interface capability, by definition, is a digital instrument’s claim to fame. Although you may find an interface of one sort or another on an analog instrument, there is simply no comparison when it comes to the capability of a digital instrument. IEEE-488.2, RS-232, and I/O type interfaces are available on selected instruments. The benefits are high productivity, speed, test and data archiving, statistical analysis, and the simplicity of automated testing.

Still More Advantages

✚ Simple Calibration

Calibrating a digital electrical safety tester couldn't be easier. Almost no external equipment is needed and simple key presses are all that is required. Analog instruments require tedious pot tweaking and external metering. In addition, analog circuits are subject to drift and are highly temperature and humidity sensitive. Digital instruments typically require one calibration per year where with analog equipment one is assured that calibrations will be another laborious part of the daily setup procedures.

✚ Ramp and Test Time Programming

In order to perform safe, accurate, and appropriate electrical safety tests on devices, programmable ramp and test time capability goes a long way in eliminating waste (due to improper potentials which can damage product) and complying with safety standards. Programmable ramp timing permits the user to apply potentials to a DUT at a fixed rate rather than hitting the DUT with the full potential all at once. With programmable test time capability the user can enter precisely the times required by safety standards such as UL and CSA.



Figure 1: Guardian 6000 Series Electrical Safety Analyzer

For complete product specifications on the 6000 Series Electrical Safety Analyzers or any of QuadTech's products, visit us at <http://www.quadtech.com/products>. Do you have an application specific testing need? Call us at 1-800-253-1230 or email applications at jkramer@quadtech.com and we'll work with you on a custom solution. Put QuadTech to the test because we're committed to solving your testing requirements.

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