

Test Instrumentation: Can't Always Get What You Want?

In today's world of product testing, safety, throughput and high accuracy seem to drive manufacturers in choosing test instrumentation. National and international product safety standards define test specifications yet these constantly evolve as consumer safety concerns increase. As a manufacturer, the need is for test instrumentation that not only meets these standards but matches a particular product line as well. Put yourself in the manufacturer's shoes.

For example, you need test instrumentation. You've defined your test requirements and you're concerned not only about the bottom line but operator safety as well. What do you do? You visit several manufacturers websites to find, geez, there must be twenty different instruments with the same test parameters and a myriad of doodads. Yet no single manufacturer has the instrument that fits the bill. Nice menu but no sale. How are you going to get that simple instrument that specifically suits your test application?

After the requests of numerous customers for instrumentation that meets specific testing requirements, QuadTech a manufacturer of EST and LCR test instrumentation, developed its ASTS program. Application Specific Test Solutions (ASTS) are providing our customers with the means to test **their** products **their** way. Off-the shelf test boxes just aren't solving the problem since most test equipment manufacturers sell equally capable instrumentation only packaged in a different box. The test capabilities rarely differ from competitor's instrumentation as we are all building (and testing) to the same standards. What a customer wants, what a customer needs is instrumentation that specifically addresses his testing requirements. Don't need the extra bells and whistles, just a purely simple streamlined test. This achieves the desired result of putting the product through the production line at an accelerated, safe and decidedly accurate pace.

Read on for some examples of how one company is re-engineering its standard test instrumentation to provide the manufacturer with a specific test solution. No magic black box, just the tests the customer asks for.

EST Instrumentation



A manufacturer of wafer connectors for telecommunications equipment had a problem finding the right AC hipot tester. This company was looking to address employee safety on the assembly floor by purchasing test equipment in which the maximum output voltage was 1000V AC and the maximum output current was 1mA AC. The manufacturer's concern was grounded in the fact that some employees had pacemakers. Were they putting the employees with implanted medical devices at a risk by having them operate high voltage equipment? Also of concern was the high turnover rate of personnel on the assembly floor. The goal was to limit any 'dangerous' voltage levels to avoid possible electrical shock and also to keep stray EMF and RF signals to a minimum. Did QuadTech have an instrument that could do this and could the front panel programming be locked out to further enhance operator safety?

QuadTech took the Sentry 10 AC Hipot Tester (capable of producing AC Output Voltage up to 5000VAC) and reconfigured the instrument's software so that its maximum output voltage was 1000V AC and maximum output current was 1mA AC. The Test Engineer can program 10 2-step tests and then store them in instrument memory. The Test Step # can then be recalled from memory and the front panel programming function locked out with a password. Effectively, the customer's requirement of reducing the High Output Voltage and locking out the front panel was accomplished with one instrument. The manufacturer now provides a safer work environment for his employees and increased throughput in his production line.



An international manufacturer of temperature sensing devices was using multiple QuadTech Sentry 10 AC hipot testers on its thermistor production line. The supervisor of test engineering called QuadTech saying he thought the Sentry 10 was a capable and durable production tester with easy intuitive programming. He also liked the instrument's ability to store 10 test setups with 2 steps per measurement. So what was the dilemma? This particular product line was required to run through **seventy** AC voltage tests. The operators were spending precious test time inputting the test voltages instead of running the product through the line. Could QuadTech help them?

QuadTech reconfigured the existing Sentry 10 software to give this manufacturer the ability to store and recall **80** single step tests (or 40 2-step tests). The manufacturer excitedly expressed that this solution resulted in a dynamic production line. Not only was it cost effective, it decreased test time and increased product throughput.



Figure 1: Sentry Series Hipot Tester

EST & LCR Instrumentation

✓ A large manufacturer of commutators was testing for ‘shorts’ between the flat heads of a commutator rotating at very high speed. They were looking specifically for an instrument that could perform an AC hipot test at 960Hz. QuadTech modified the 2520 AC/DC Hipot Tester to provide this manufacturer the ability to perform this test at 960Hz with a fast measurement cycle. This fast data acquisition cycle (“FastAC”) processes data every 2.083milliseconds during the test phase. The instrument display is left static during the test phase and updated at the ended of the test with the highest current measured during the test. This current is the Total AC current (rms value). In addition to the “FastAC” measurement function, the output voltage was decreased to 3000V AC/DC and the output current was increased to 30mA AC and 15mA DC.



Figure 2: Guardian 2500 Series Hipot Tester

✓ A large manufacturer of tantalum capacitors called QuadTech looking for an LCR meter that would accurately characterize the electrical properties of the tantalum powder to ensure consistent results in capacitor production. Tantalum powder is highly resistant to corrosion and that makes it an excellent choice for high frequency applications. This manufacturer wanted the instrument to accurately measure the capacitance over a frequency (use) range up to 100kHz. Precise measurement accuracy and high resolution were fundamental in monitoring slight changes in the tantalum powder’s capacitance value that could cause greater changes in the final product. Did QuadTech have an instrument that could solve their R&D needs?

QuadTech offered its 7400 Precision LCR meter as a solution due to the multiple high frequency application. The frequency selection capability, range, high resolution display and averaging function provided this manufacturer with the capability to monitor those slight changes in the tantalum powder. The manufacturer then chose to interface via the IEEE-488 port to a PC that controlled measurements to as high as 100kHz. The PC also controls the scanning of twenty plug-in capacitors installed in a custom designed Kelvin fixture.



Figure 3: 7000 Series Precision LCR Meter

Still More LCR Instrumentation



Another capacitor manufacturer was using two QuadTech 1689 Digibridges and a rotary fixture with two sets of mechanical contact 'arms' as part of its capacitor test line. The manufacturer was concerned with maintenance and service on the mechanical arms as well as that of the digibridges. They were considering a competitors new instrument that used single bridge technology. Did QuadTech have anything new to offer?

QuadTech chose the 7600 Precision LCR meter to replace the two 1689 Digibridges. This eliminated one set of the mechanical contact 'arms' saving the manufacturer part maintenance cost and test time. QuadTech also stripped down specialized features of the 7600 instrument to improve test time. The current capability and bias capability were eliminated. Voltage was limited helping the manufacturer to gain greater low impedance accuracy. Handler and binning options were also removed to further speed up test time. The manufacturer was now capable of running 2 full tests in 65 milliseconds. This solution worked well for this particular manufacturer in not only decreasing production test time but also in lessening mechanical maintenance of the test fixturing and reducing the amount of fixtures needed to perform the test in the first place.

Summary

The growing trend in customizing instrumentation for specialized testing not only adds value to the final product, it can enhance operator safety, decrease product test times and increase device throughput. Having your test instrumentation designed specifically for your product can only improve your production time, quality and operation. Fundamental to manufacturing and shipping good product is the streamlined test. Testing production lots solely per the specified requirements and discarding the extraneous features that eat up precious test time can only serve to better the test. So, look around at all the instrumentation available and get the facts. If you ask, you just might get what you need. Quality of the test augments quality of the product.

For complete product specifications on any of QuadTech's EST and LCR instrumentation, visit us at <http://www.quadtech.com/resources/dataindex.html>. If you have an application specific testing need, please 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.

The information presented here is subject to change and is intended for general information only

©QuadTech, Incorporated

Telephone: 1- 800-253-1230, Website: <http://www.quadtech.com>

Printed in U.S.A.

P/N 035096

November, 2000