Why Making the Move from a Variable Transformer to a VariPLUS is the Right Decision

Introduction

No matter what the industry, advances in technology continue to improve the way that companies do business. Manufacturers of electrical products should expect no different. In the past 10 years, electrical safety testing equipment with microprocessor-based controls helped to increase productivity and made complying with safety agency standards easier than ever. With the benefits of more advanced testing equipment self evident, why are electrical product manufacturers still using inefficient and ineffective ways to power products during production line testing? For some it could be a lack of education, for others, confusing and ambiguous safety agency standards. Yet one thing is certain; manufacturers that continue to rely on less-than-ideal methods for powering their products during testing do so at their own risk. With **AC power sources** available at increasingly competitive price points, the benefits of switching to an AC source far outweigh the shortcomings and costs associated with using traditional methods.

Electrical Safety and Production Line Testing

In order for electrical product manufacturers to be competitive in today's international markets, they must comply with safety agency standards. Agencies such as UL or TUV, along with the EU's CE listing process require manufacturers to conduct rigorous design and production line tests to confirm electrical products are safe for consumer use. With so many specifications and standards available it can be confusing to determine the appropriate test procedures for a product. Yet no matter what the product or standard, test operators must use some variation of an AC power source in order to perform accurate functional and leakage tests on the production line. Until recently, most manufacturers used utility power, an inexpensive variable transformer, or an autotransformer to perform the required tests. Their reasoning was clear: why pay thousands of dollars for an AC power source when a wall outlet or a variable transformer does the job for far less money?

As we will see in the following sections, no alternative measures up to an AC power source when it comes to international safety agency compliance, operator safety and efficiency.

Utility Power: An Unreasonable Alternative

While the standard wall outlet may seem like a quick and easy solution for AC power on the production line, utility power is not a valid alternative to an AC power source for many reasons. First, utility power is not acceptable for complying with international specifications for selling products abroad. Failure to power the DUT at its normal operating voltage (usually 230 VAC in the EU) during functional and leakage current testing, can lead to noncompliance with CE listing requirements, and litigation if the product leads to customer injury. Second, using utility power requires additional monitoring equipment to comply with agency standards. During functional testing, the test operator must use a voltmeter, ammeter and/or power meter during testing to confirm the DUT is operating correctly. This additional equipment is costly, cumbersome and time consuming to setup, all but negating the cost advantages of "free" power. Third, utility power does not produce stable output voltages. Leakage testing requirements, which often specify a 110% input voltage condition to the DUT, also cannot be met by using utility power. Fourth, utility power does not provide any isolation to the DUT. Failure to isolate the DUT from ground during leakage current testing could cause false failures and lead to increased R&D time and decreased throughput. Fifth, utility power provides limited protection to the test operator when a malfunction occurs. Although most building power incorporates fuses or circuit breakers, these devices may not be fast enough to prevent lethal electric shocks. Finally, utility power does nothing to help test operators understand the nature of a DUT failure. If a problem occurs, the test operator will have no information about the issue which can decrease production efficiency if troubleshooting is required. Relying on utility power during production line testing may seem like an affordable alternative to purchasing an AC power source, but the decision to

do so will at the very least decrease throughput and require additional setup time and equipment. At most the use of utility power could cause injury or damage, violate international safety standards and lead to possible litigation.

The Variable Transformer: A Technological Dinosaur

Most technicians use a variable transformer or autotransformer for testing products designated for sale abroad because they are cheap and easy to replace. Unfortunately, the economic benefit of purchasing a transformer-in-a-box does not compensate for the many limitations of this inferior technology. First, a variable transformer may not comply with international safety standards for performing functional and leakage tests on products sold abroad because the output frequency is fixed at 50 Hz. Manufacturers that fail to test their products at operating voltage and frequency can face possible litigation if a product they sell injures a customer. Second, variable transformers have limited metering capabilities and questionable accuracy. With the simple and often un-calibrated meters available on most variable transformers, test operators can't be sure of how much voltage or current is being applied to the DUT and thus need extra equipment such a voltmeter, ammeter, or power analyzer to comply with international safety agency specifications. Third, a variable transformer provides no isolation to the DUT. Just as with utility power, using a variable transformer for sensitive leakage current measurements could produce false failures and lower production efficiency. Fourth, a variable transformer provides no additional protection to the test operator in case of a malfunction. The built-in slow acting fuse is mostly for fire prevention, and cannot protect the test operator from lethal shock in case of a malfunction. Finally, a variable transformer provides no trouble shooting assistance to the test operator in cause of a DUT failure. While the decision to use a variable transformer on the production line may seem to make economic sense, the shortcomings of these outdated devices make them obsolete for use in production line testing

Feature	Benefit	Standard Wall Outlet	Variable Transformer	VariPLUS
Provides 110% Output Voltage	Compliance		X	X
Reduces Operator Error	Efficiency			X
Regulates Output Current	Accuracy			X
Accurate Metering of Voltage and Current	Compliance			X
Multiple Output Frequencies	Compliance			X
One Box Solution	Economic			X
Prevents Damage to DUT	Efficiency			X
Increases Operator Safety	Safety			X
Isolated from Utility Power	Efficiency			X

Figure 1: Power Source Technology Benefit Matrix

Introducing the VariPLUS

The **APT VariPLUS** (shown below) is a one-box solution for production line managers and test operators that wish to addresses all the shortcomings of traditional test methods. This feature-packed, reasonably priced instrument can satisfy the demands of the modern production line environment, providing enough current to power most household and office-related products, while giving manufacturers the versatility to test their products up to 300VAC at both 50 and 60 hertz. The output is isolated so leakage current test measurements will be accurate and false failures will no longer affect production efficiency. Accurate voltage, current, and power meters allow the VariPLUS to take the

place of multiple instruments, reducing production line expenditures, decreasing setup time, and improving efficiency.

Figure 2: APT 105 Series AC Power Source

Transitioning from traditional test instruments to the VariPLUS is easy. The VariPLUS utilizes simple push-button technology and big LED displays so test operators can quickly change test parameters from one product line to another, while the rotary knob functions exactly like that of a traditional variable transformer. Technicians no longer need to spend hours troubleshooting test setups because the VariPLUS takes the guess work out of product failures and blown fuses. High speed shutdown circuits and current hi-limit and low-limit monitoring circuits are just a few of the advanced built-in safety features to protect the operator and DUT from harm. Further, the VariPlus's reduced weight and size makes it easy to move from one production line to another as needed.

Conclusion

Times are changing and businesses must change with them. Providing your production line managers and test operators with the latest technology will allow your business to

make the most of its manufacturing process, increasing productivity, improving efficiency, and encouraging a safe work environment. It's true that not all power sources are created equal. If you've been hesitant to make the transition from a variable transformer to an AC power source, now is the time to take a look at the VariPLUS.