

Exploring the Benefits of Advanced AC Power Source Technology

Introduction

Versatile test equipment proves to be one of the most valuable investments that electrical product manufacturers can make. A good test instrument can increase plant productivity by reducing setup time and complexity, and improve efficiency by reducing operator error. This is especially important for manufacturers that produce a wide assortment of products with varying specifications and power requirements.

The benefits of versatile test equipment are already apparent on the production line in the form of various types of all-in-one testing equipment. Over the past few years, new multi-function testers started to take the place of multiple pieces of equipment, and their automated interfaces made testing faster and easier than ever before. AC power source manufacturers are now following suit, releasing new products that address the shortcomings of older equipment. These more versatile instruments are smaller, lighter, and incorporate advanced features that not only improve testing, but also make it easier than ever to choose the right [AC power source](#) for the application.

Traditional AC Power Source Shortcomings

Efficiency

Traditional linear AC power sources are extremely inefficient (sometimes as low as 30% at full load), requiring much more power from the line than they can output to a DUT. Inefficient AC power sources increase utility bills which can unnecessarily inflate a firm's overhead.

Size and Weight

With both input and output transformers, older AC power sources are exceedingly heavy, making them difficult to operate and move around the test area. Large, heavy test equipment becomes especially troublesome if repair or calibration is needed, as shipping and repair costs can skyrocket. Increased shipping and repair time also means less time with the instrument functioning in the lab or on the production line.

Test Setup and Data Entry/Retrieval

Older AC power sources require test operators to manually change test parameters according to each DUT's specifications. Any data taken during testing must also be recorded manually and later entered into a database. Manual test setup and data retrieval increase test time and contribute to operator error.

Fixed Output Configuration

Most traditional AC power sources are not versatile enough to test both single phase and three phase DUT's. Manufacturers must therefore purchase multiple instruments if they have DUT's with different input configurations.

Fixed Power Output Rating

While some AC power source manufacturers have addressed the limitations of single- or three-phase-only models, their new designs still cannot accommodate customers' varying power requirements. A manufacturer with a traditional AC power source would have to purchase a larger instrument if the need to satisfy larger output requirements arises, making the current instrument obsolete. Output power limitations add unnecessary complexity to the purchasing decision, requiring electrical product manufacturers to purchase more expensive instruments in anticipation of future needs.

Recent AC Power Source Improvements

Efficiency

New AC power sources take advantage of switch-mode technology. This topology increases the efficiency of the instrument by more than 2x that of older models. Indeed, new AC power sources require for less energy to operate, often reaching close to 85% efficiency at full load.

Size and Weight

Most new AC power sources utilize a direct-coupled output. This output configuration replaces the bulky output transformer that older instruments used to reach full output voltage. Removing the output transformer makes AC power sources smaller and lighter. AC power source manufacturers are now utilizing PFC (power factor correction) modules to replace bulky input transformers as well. These circuits improve the input power factor of the instrument, making them more efficient, and further decreasing size and weight. High kVA AC power sources with direct coupled outputs and PFC circuits can be as much as 50% lighter than their traditional counterparts, making them far easier to operate, service and ship.

Test Setup and Data Entry/Retrieval

New AC power sources are capable of connecting to a PC through a multitude of interfaces (RS-232, GPIB, Ethernet, USB). This allows operators to fully automate their test procedures, making it easier to input test parameters and retrieve test data. The benefits of automation are far reaching, from reducing operator error and creating a safer work environment, to increasing efficiency and production throughput.

The Modular Revolution

Perhaps the most important feature that AC power source manufacturers have started to offer in new instruments is modular capability. A modular AC power source design makes the purchasing decision easier than ever. Older, non-modular instruments forced production line managers and test operators to choose from two less-than-ideal options:

- 1) Purchase a high kVA AC power source capable of outputting enough power to handle current testing requirements as well as cover any anticipated power increases due to future products.
- 2) Continually purchase additional instruments to handle products with high power input requirements.

Neither option is cost effective. Purchasing a high kVA AC power source is a substantial investment, and using an AC power source that is larger than necessary is not economical and requires additional space for the instrument. Larger instruments are also harder to move around the production area. AC power sources with dated technology force manufacturers to purchase more instruments when their application or power requirements change – a nice business model for power source manufacturers, but not an economical one for customers. With the purchase of every new AC power source, their previous instrument becomes obsolete.

Modular AC power sources provide companies with a simple solution for adapting to their changing power requirements. The Associated Power Technologies (APT) 300XAC family, for instance, not only comes in 1 kVA, 2 kVA (shown below), 4 kVA and 6 kVA models, but also can combine to form single phase systems up to 18 kVA.



This takes the guess work out of the purchase decision. Customers can choose the right output rating for their needs and not have to worry about replacing the instrument in the future – the company need only purchase another identical unit to double or triple their in-house instrument’s power output. Modular capability also makes AC power sources like the 300XAC perfect for 3 phase applications. Purchasing 3 smaller AC power sources such as the XAC 3020, allows the manufacturer to configure the output in either a 2 kVA-per-phase three phase instrument, or a 6 kVA single phase instrument. With the increased versatility of modular AC power sources, manufacturers can easily adapt to changing power requirements and output configurations.

Conclusion

New AC power sources incorporate a host of features that can make any production area more efficient, product testing easier, and test operators more productive. Modular instruments offer customers convenience and versatility, all while making the purchasing decision easier and more economical than ever. If you are still using AC



power sources with outdated technology, it may be time to take another look at current product offerings. The decision to upgrade your AC power source can pay big dividends now and in the future.