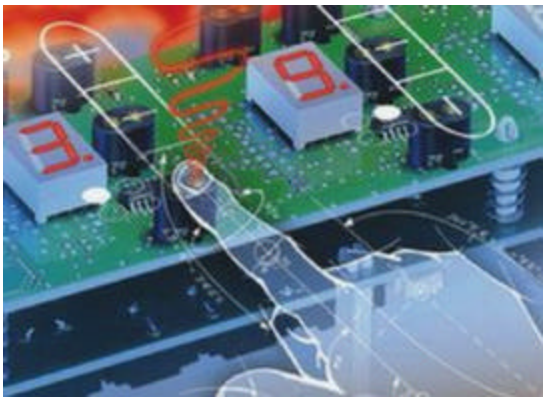

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Supplier Solutions: Testing Equipment

AC Power Converters Ensure Consistent Testing

By Ron Storm, Behlman Electronics, Inc.

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Although the AC power in your manufacturing plant or design facility may be totally reliable in terms of consistent availability, just how reliable is it when it comes to the power quality necessary for accurate, consistent product test measurements?

In the design of electrical and electronic appliances, even an occasional or intermittent power quality problem can disrupt your operation. All it takes is sufficient deviation from norms in the power supplied from your factory's AC main during a product test, to cause obvious operational problems in the equipment being tested. While the symptoms of poor power quality caused by surges and spikes (overpowering), transients, blackouts, noise and sags (underpowering) are often readily apparent, leading to such problems as equipment failures, safety hazards, process interruptions and shutdowns, often there are more subtle fluctuations in voltage that do not result in such obvious problems. Nevertheless, these can wreak havoc on product performance and efficiency test measurements.

AC-main voltage fluctuations in a typical production facility often result from the wide variety of heavy-duty machinery and equipment in use throughout the facility at different times of the day. Such varying power usage can cause large swings in voltage at a factory's individual circuit locations, rendering them unable to provide the AC-power necessary for accurate and consistent test measurements.

In short, don't trust the power coming out of the wall!

Designs of AC motors, solenoids, levers and actuators must have predictable performance characteristics that engineers can rely

September 2006: U.S. Appliance Industry Shipment Statistics - Factory Unit Shipments Statistics for the month of June 2006
September 2006: Appliance Industry - Majors and Comfort Conditioning Index for June 2006

on to achieve design goals. The inability to accurately measure incremental differences in the performance of each design change of a product, or to verify stated product specifications and efficiency, can result in a number of problems for manufacturers. In addition to the potentially huge costs associated with additional engineering and testing (and the resulting delays in getting a product to market), final product performance and reliability may be compromised or unpredictable, the need for repairs may increase, the product may not meet its published specs, efficiency ratings (such as Energy Star) may be reduced, and ultimately, customer satisfaction will be negatively impacted. In a worst-case scenario, a good product design can be unnecessarily scrapped.

Behlman BL1350 with the (MT) Motor Test option has high peak current capability and fold-back feature used to soft-start motors.

Recently, both a major electric hand tool manufacturer and a major appliance manufacturer were able to overcome persistent power quality problems at their respective production and test facilities, by employing AC to AC power supplies designed to eliminate the voltage fluctuations of their facilities' AC-main power.

The power to leave nothing to chance.

In the first example, the electric hand tool manufacturer was unable to accurately and consistently gauge the performance effects of product design changes. It was critically important for the manufacturer to be able to measure the performance of a specific tool across a number of design changes, but they were not even able to obtain consistent performance from a single design revision. Time after time, the same design performed differently. As a result, comparative design testing was impossible.

Behlman BLP7000 is a higher-power version of the P1352 with same power measurement capability along with Ethernet interface for remote control. Used to test higher-power appliances such as microwave ovens.

The manufacturer consulted power supply manufacturer Behlman Electronics, which subsequently tested one of the manufacturer's prototype products in Behlman's own engineering lab. Using the regulated AC power of the lab, it was discovered that the peak currents of the tested product were actually 4- to 5- times higher than the manufacturer had measured in-house with their own instruments.

It was clear that in addition to needing a solution that would provide a consistent and known AC-power baseline, the tool manufacturer needed a solution that would also provide the power needed to meet the required peak currents of the products being tested, no matter what else was being powered in their factory at the time.

Behlman provided a BL1350-MT 1350VA AC power supply/frequency converter, (Figure 1), with a unique "motor test" option circuit (Figure 2). The high-efficiency, compact power supply featured low-output impedance for improved load regulation, and a modified power stage to meet the tool manufacturer's unique requirements.

Significant cost savings were made possible by the power supply's motor test option, which eliminated the need to purchase a much larger power supply of the type typically required for high peak current output testing. Starting a motor

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can require between 6- and 10-times the running current of the motor – and power supplies have previously needed to be "sized" to the larger starting current, at a much greater cost. Behlman's power supply was able to be sized to the smaller running current, as its motor test option enables the power supply to fold back the voltage on startup, and bring the motor up slowly (a "soft start"). Specifically, the power supply provided was rated at 14 Amps (50 percent duty cycle), and able to start motors which would normally require up to 140 Amps of starting current.

A power supply with a motor test option is ideal for production requirements, as the soft start enables the tested product's motor to start without the "jump" that typically accompanies motor startup – which often requires the product being tested to be well-secured. By not having to secure and release the test product, the entire production process becomes faster, easier, and less expensive. For higher power units or for testing multiple units simultaneously, a Behlman model BLP7000 was used. (Figure 3)

Keep your Energy Star glowing brightly.

Behlman P Series AC Power Supply/Frequency Converters are small, light weight and portable. They are easily moved to the test site. P1352 has a microprocessor controller with capability to do power measurements to verify "Star" rating.

In the case of the major appliance manufacturer, large voltage fluctuations at electrical outlets throughout the plant were caused by heavy-duty production machinery being used at various times during the day. To "home-test" the products on their five production lines, and to measure Energy Star ratings, appliances were routinely "plugged" into factory mains. It was discovered that such tests were preventing the manufacturer from achieving the best possible Energy Star ratings for its refrigerators and other appliances.

Because it is imperative that a manufacturer be able to accurately measure input power required versus output power used, in order to prove efficiency, Behlman recommended and installed individual, low-cost P1352 AC power supplies/frequency converters (Figure 4) on each of the manufacturer's five production lines. Regardless of the factory's power fluctuations, the power supplies provided clean, regulated AC power to the appliances being tested, whether tests were performed by the manufacturer, or by government inspectors responsible for certifying the coveted Energy Star rating.

As a result, the manufacturer could be confident that the energy rating observed in their own tests would be replicated by Energy Star inspectors, who can select a product for testing from on or off the production line, anywhere in the plant. To support testing of products at such remote locations as the packing and shipping area, for example, a duplicate power supply was mounted on a cart. Such portability allowed the manufacturer to quickly and easily bring the relatively small power supply wherever it is needed, instead of moving a large appliance or disrupting the production line.

Selecting the right power supply can make a difference for any appliance manufacturer experiencing AC-related problems. A power supply for a production test facility must be robust and rugged enough to handle the demands of a factory environment, while being able to deliver clean, regulated AC output regardless of input fluctuations. Variable voltage and frequency capabilities should be included to enable testing at high and low limits. A motor-test option with fold back/soft start capabilities can deliver significant time and cost benefits (as described above), and remote-control or computer-control features for automated testing can be invaluable in a large production test facility.

The bottom line is that the right AC power supply can ensure absolutely predictable and consistent AC power for appliance testing, which can save a tremendous amount of time and money, as well the quality reputation of the appliance manufacturer.

About the Author

Ron Storm is Vice President of Sales and Marketing at Behlman Electronics, Inc, a subsidiary of Orbit International Corp. (NASDAQ:ORBT). Behlman manufactures and sells standard, modified standard, custom and COTS power solutions, including AC-AC power supplies, frequency converters, inverters, DC-DC, AC-DC, DC-AC, and uninterruptible power supplies. The Behlman Custom Division designs, manufactures and sells power units and electronic products for military and high-end industrial usage. Mr. Storm can be e-mailed at rstorm@behlman.com
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Suppliers mentioned in this article:

- Behlman Electronics Inc.