Veris Industries, located in Portland Oregon, is a leading provider of energy and environmental sensors for commercial and industrial buildings. Their product portfolio includes a wide array of control system peripherals including air quality sensors, humidity sensors, leak detection systems, lighting control devices, network integration systems, power and energy monitors, pressure sensors, relays, temperature sensors, and more.

Veris products integrate with a facility's main automation system, providing valuable feedback on energy consumption and helping building managers regulate and decrease a facility's energy usage. The new Veris E3x family of Panelboard Monitoring Systems monitors power at the branch circuit level, making it particularly useful for facilities that use large amounts of power, such as data centers and strip malls. These facilities are often occupied by multiple tenants, and the E30 keeps track of exactly how much power is consumed by each.

Every E30 monitoring system is calibrated to a variety of ANSI and IEC standards, a task that requires extremely accurate electrical power standards. The E30 handles up to 120 amps and needs to be tested under signals that simulate real loads and a number of special waveforms that are specified by various building codes. Calibration requires a signal source that provides high accuracy phantom power (separate voltage and current) as well as degradations (frequency variation, harmonic distortion, interharmonics, fluctuating harmonics, flicker, and dips and swells). The high capacity of the E30 means that it requires higher levels of calibration current than any device previously built by the company.

Build or buy?

It took Veris engineers about 14 months to design, build and qualify the production tester used to calibrate the E30. The cost of the project, which included nine months of development with one person full time and five months with one and a half people, was about $100,000. The vast majority of the project consisted of designing and building the electrical power standard. Yet the in-house standard had some significant limitations. The test is completely automated yet has a 25 minute cycle time to completely test the unit, including stabilization time. The standard was calibrated against a high-end digital multimeter, but Veris prefers to use a third-party rather than internal calibration.

“Our original experience with power sources came with one of Fluke’s competitors,” said Martin Cook, Lead Design Engineer for Veris. “We were never completely satisfied with those devices. They had a tendency to break down at inconvenient times on the shop floor. They are limited to 50 amps which is not enough for our E30 product and cannot be run in parallel. This is why we originally designed our own electrical power source for our E30 production tester.”
The only way to cover the full required dynamic range in the past was to jury-rig the power source with shunts, which was very complicated,” Cook said. “We are great at power meters, but we are not experts at electrical sources.” Then Fluke came out with their 6100A electrical power standard which, with an optional add-on, generates up to 80 amps and provides the ability to run two units in parallel to generate up to 160 amps.

Veris is currently using a three-phase 6130A system with the 80 Amp option to generate the 150A needed to fully test the E30. Cook said that “If the company had gone with the Fluke electrical power standard from the beginning of the project, it would have saved 11 months and perhaps $70,000 of the time and money required to develop the production tester.” The Fluke standard also reduces the time required to test each unit from 25 minutes to 15 minutes.

“We also like the fact that the Fluke certifies its electrical power standards,” Cook said. “This provides much more credibility than our previous internal certification methods.” Veris sends its instruments to Fluke for a certificate of traceable calibration with data. This document certifies that a specific instrument, identified by model and serial number, was tested using Fluke’s applicable procedures in accordance with Fluke’s quality standards. The calibration is done with calibrating standards traceable to national and international standards. Specific testing dates and specific testing instrumentation details are provided. Details of the individual tests are also provided with a variety of supporting information.

Fluke 6100A electrical power standards are also much easier to use and maintain than the in-house sources. “Our factory has a considerable amount of dust in the air and cardboard fibers on the floor,” Mike Johnson, Meters Test Engineer said. “Yet the only maintenance that the Fluke standards require is to clean the air filters. We clean them once per month but that is probably more than is really necessary.”

Many applications for one tool

Veris uses many of the complex measurement capabilities of the Fluke 6100A standard in testing the E30 power meter. The 6100A generates all of the flicker calibration signals that are defined in IEC standard IEC-61000-4-15 and displays the resulting Pst with an accuracy of 0.25%, 20 times better than required by IEC-61000-4-15. The 6100A standard also adds accurate harmonic distortion independently on the voltage and current outputs. The 6100A harmonic accuracy comfortably exceeds the requirements of IEC-61000-4-7 and 61000-4-13.

Soon, Veris will switch to the new Fluke 6105A source in the E30 production tester because of its greater dynamic range, from milliamps to 21, 50 or 80 amps, depending on the options that are purchased. Veris is planning to use three 50 amp sources in parallel to provide 150 amps maximum. Veris will use the 8 mm terminals on the standard to cover the entire range. The 6015A also provides an accuracy of 0.007 % or 66 parts per million one year energy accuracy for sinusoidal...
waveforms and meets all requirements of power quality testing to the IEC 61000-4 series of standards.

Another application involves using the 6100A Electrical Power Standard for testing power metering products that have 0-6A inputs. The company uses four three-phase standards to test 50,000 products per year. The source is used to calibrate the meters and verify that they meet specifications. Several different input stimuli are used ranging from 50 mA, 720 V ac to 6 A, 90 V ac. The test is automated using GPIB communications and takes under 13 minutes. Veris has used both Fluke and competitive instruments on this application and found the Fluke sources to be considerably more reliable. “Since we established our current maintenance schedule we have not seen a single failure,” Cook said.

Veris also uses the 6100A to test its voltage mode metering devices. These devices are power meters but they have 1 V current transformer inputs instead of 5 A current transformer inputs. “When using the Fluke 6100 in voltage mode we can calibrate as well as verify these products,” Johnson said. “We run the 6100 current outputs in voltage mode down to 1 mV ac and up to about 1.2 V ac in a typical configuration.”

Veris makes extensive use of the soft start feature offered on the 6100A as a firmware upgrade and is standard on the new 6105A and 6100B. The new products provide a variable soft start that can ramp up the output over a period of up to 10 seconds. “Many of our products are powered by the voltage they are sensing,” Johnson said. “The soft start function allows us to power these units and still meet compliance limits, allowing much more flexibility and configuration possibilities.”

Cook added that two features of the 6105A standard are going to be very important to the company moving forward. “We have to generate 1000 amps to test one product,” he said. “The Fluke standard generates 20 amps and a coil steps up the current by a factor of 50. There are two challenges in this application. The first is that the standard must have a relatively high compliance voltage in order to overcome the resistance in the coil. Second, the accuracy of the standard is critical because any errors are multiplied by a factor of 50. We have found that the Fluke 6105A offers a substantially higher compliance voltage and better accuracy than any of its competitors. So it is perfect for this application.”

“Our customers rely upon our meters for a number of critical applications such as billing energy to subtenants,” Cook concluded. “So the accuracy of our products needs to be impeccable. Fluke standards help us make it happen. In our various applications we have utilized nearly every feature of this product such as flicker functions, total harmonic distortion functions, full frequency spectrum as well as numerous others. Fluke does standards well – that’s why we buy Fluke.”

Fluke Calibration. Precision, performance, confidence.

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