

## Encore Series UPS Monitoring

### WHERE EVERY MILLISECOND COUNTS!

The digital economy has redefined business operations and is setting new standards for electric power reliability and quality. Downtime - undesirable for any business - is catastrophic for Data Centers and other high reliability facilities where even the smallest power quality issue can cause equipment failure, data corruption, and data loss. Costs can range from thousands to millions of dollars per incident! Businesses that rely on 24/7 operation have responded to their power reliability and quality needs by installing redundant capabilities that typically include uninterruptible power supply (UPS) systems and backup generators. To ensure the proper operation of these systems and provide ongoing monitoring of power conditions, many companies employ comprehensive power monitoring systems.

### THE LIMITS OF UPS SYSTEMS

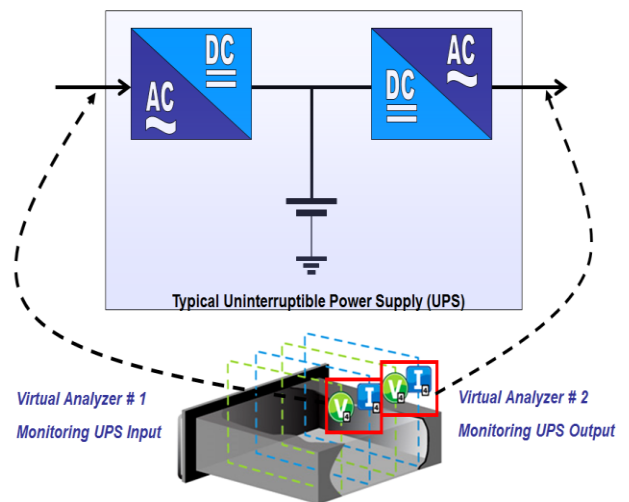
UPS systems are critical components of a cohesive power reliability program. But just because a UPS is running does not mean that it is fully operational or that it can fully protect your system. UPS systems have technical limitations in resolving potential power quality issues. They are complex electro-mechanical devices that are themselves subject to failure. Although your UPS system may have alarming capabilities, such features are typically based upon course indicators without the ability to evaluate the quality of the electrical supply to your critical loads. The very system installed to protect your facility could actually be the source of problems without you even knowing about it. Simultaneous monitoring of both UPS input and output allows you to keep tabs on the utility supply, UPS response to input power problems, and your critical loads in order to verify that your investment is working optimally and mitigating supply side problems.

### CRITICAL SYSTEMS MONITORING

Monitoring the utility supply, UPS, and other critical areas of your power system puts you in the driver's seat, providing the necessary tools to be proactive and determine the overall health of the power systems and loads within your facility. Just because the system is functioning doesn't mean it's working optimally and that problems aren't looming. Power

monitoring systems have the unique ability to provide advance warning of potential failure by continually evaluating the quality of supply and sending you notifications if problems occur. In addition, should a worst case outage or critical failure occur, the data provided by the power monitoring system can be invaluable in troubleshooting the problem and getting back online as soon as possible, reducing the cost of downtime and providing needed information to permanently correct or mitigate the problem.

### Encore Series Model 61000 Monitors Both UPS Input & Output In One Instrument



### ENCORE SERIES IS A COST EFFECTIVE MONITORING SOLUTION

Available in both standard and switchgear mount enclosures, the 61000 family of DataNodes are perfect for high reliability monitoring. The 61000's unique, modular design provides high resolution monitoring (512 samples per cycle) of voltage and current for two three-phase circuits in one instrument. This popular 61000 configuration has four modules: (2) voltage modules and (2) current modules. Each voltage and current module has four channels for complete monitoring of all three phases, plus Neutral. As shown in the diagram above, when configuring the system, voltage and current modules are paired together in instrument firmware to form Virtual Analyzers. One voltage and one

current module are paired together to monitor the UPS input (Virtual Analyzer #1) and the others are paired together to monitor the UPS output (Virtual Analyzer #2). Each Virtual Analyzer functions like a complete and independent Power Quality, Demand, & Energy instrument. Encore Series Software, which is the systems' web enabled software, sees each Virtual Analyzer as a separate, configurable instrument.

### SAMPLE BILL OF MATERIALS

As indicated in the diagram above, the most economical Encore Series monitoring solutions take advantage of the modularity of the 61000 - Two virtual analyzers simultaneously monitoring the UPS input and output in one instrument. Below is just one common 61000 configuration:

- Instrument:
  - Qty (1) 61STD, standard 61000
- Voltage measurements:
  - Qty (2) 61MZP, 61000 POD modules
  - Qty (2) 5536VPOD, 600V voltage POD's
- Current measurements:
  - Qty (2) 61MZP, 61000 POD modules
  - Qty (2) 5537APOD, 5A current POD's

Several other configurations are available, such as using the 61SG or 61SGD (with LCD display) switchgear panel mount 61000 instruments, along with various other module and POD combinations to meet other measuring and mounting requirements.

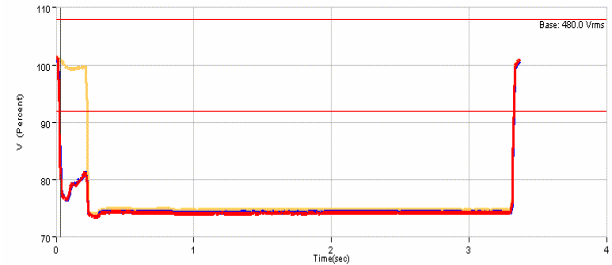
### CASE STUDY: BANKING CENTER UPS FAILURE

Encore Series System is monitoring a Data Center for a major international bank located in New York City. This facility has three UPS modules, one rotary system, and two identical online static systems from the same major UPS manufacturer. The input and output of each UPS module is monitored.

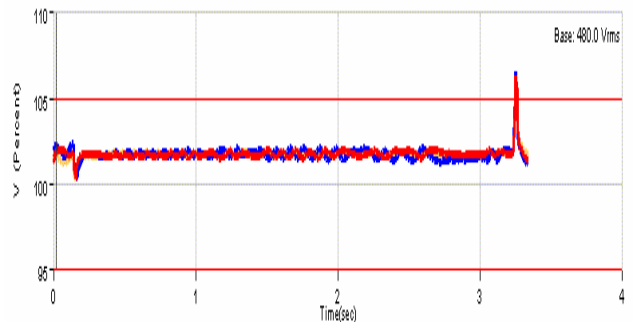
Shortly after midnight on February 19<sup>th</sup> a 3.3 second upstream sag occurred that originated from the utility. The depth of the sag was about 75% of the nominal 480VAC. The sag resulted in damaged elevator controls in the high rise building, but there were no indications of critical systems being affected. However, further investigation proved otherwise...

A UPS Performance Verification Answer Module® is available in Encore Series Software which is a pass/fail reporting module. This answer module works on the simple principle that, although

undesirable, PQ events may occur on the UPS input, which is typically the utility supply, but should never occur on the output. When events are detected on the UPS input, the answer Module searches the monitoring database for corresponding events on the UPS output. If present, a UPS failure is reported, since it didn't properly mitigate the input side power anomaly.



Utility Supply



UPS Output

In the case of this power event, neither the UPS or critical systems reported any alarms, but the Encore Series UPS Performance Verification Report indicated that one of two static UPS's experienced a swell, or over voltage condition coincident with the return to normal of the utility sag. The peak voltage reached about 107% of nominal or almost 520V! Over voltage conditions are undesirable since they can stress and even damage computer and other power supplies and result in critical system failures.

By being proactive, this potentially serious problem was identified before any system failures or downtime occurred. The UPS service team was called and they identified a control board problem with the UPS, which was quickly corrected. If the problem was not proactively identified by the Encore Series System, the UPS system could have potentially experienced a catastrophic failure that resulted in downtime and significant financial loss to the bank.