

Electrotek's Real-World Power Quality Disturbance Testing Program

What's in a Field PQ Disturbance? A Mixture of PQ Phenomena

Product standards are written to provide designers a starting point with a target to ensure performance meets a level matched to the threats occurring in an electrical environment. IEEE and IEC standards provide test levels based on environment severity. They also provide an option for conducting immunity tests us-

ing specific test levels, and conditions more closely matched to customer environments.

Most manufacturers do not take advantage of the option to specify their own testing requirements. Electrotek's unique digital collection of complex PQ disturbances provides the waveforms and conditions to fully utilize the

optional testing level in these standards.

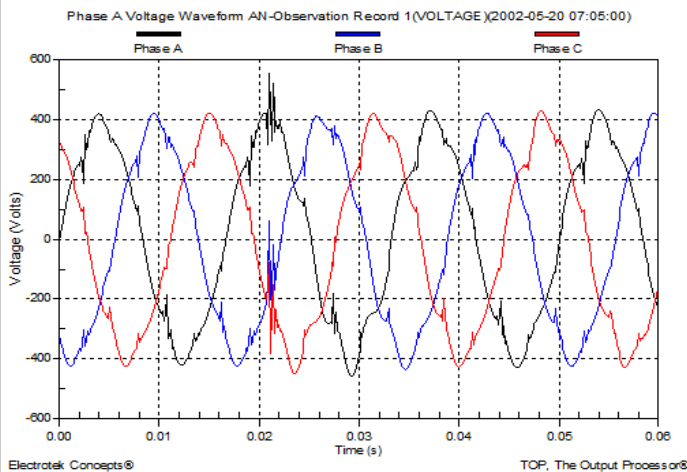
The disturbance shown below is one example of a three-phase complex disturbance containing voltage notching, voltage swells, oscillatory transients, impulsive transients, and voltage distortion.

Textbook, IEEE, and IEC standards do not specify complex disturbances. They specify simple definition-type disturbances. Clean sags, swells, and distorted disturbances do not occur in the field. Disturbances that occur in the field are complex, as they contain multiple disturbance types superimposed on each other.

Clean disturbances specific in standards provide a starting point for identifying PQ issues with electronic cir-

cuits. Designers work to resolve these issues, improving the PQ immunity. However, when a product completes a battery of tests either IEEE or IEC listed in these standards, 30% to 40% of hidden underlying weak links in the product's PQ immunity still remain. Given enough time, real facility disturbances will boil these up to the surface. At this point, unbeknown to the designer has commissioned the customer's site as a testing ground.

Having Electrotek design a specific battery of PQ immunity tests representative of the customer's environment (commercial, industrial or outdoor) will help ensure acceptable performance.



Using Electrotek's Remote PQ Monitoring Service

Providing the customer with a monitor to collect voltage and current data is the right thing to do, especially if they've already had driver failures. Driver and fixture manufacturers that implement remote PQ monitoring to reduce risks and control costs, should supply a monitor to customers who operate

typically PQ-problematic facilities.

Advanced, yet simple to hook up, monitors with network connectivity should be used to ensure the proper data representative of the environment is collected. Electrotek uses the Dranetz monitors. Co-designed by Elec-

trotek and Dranetz. These monitors record the data required to characterize all PQ-related aspects of voltage and current, as well as, include network connectivity.

If network connectivity cannot be provided, Electrotek supplies a cellular-based

data modem, which allows Electrotek to download data as often as needed. Remote monitoring also provides for on-the-spot modification of monitoring thresholds when trigger levels must be revised. Customers are not asked to intervene in the monitoring process. Monitoring periods typically range from two to four weeks.

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Electrotek's Power Quality Engineering Services Center is a world-renowned center for power systems and power quality engineering. Our Center includes an Advanced Power Quality Testing & Research Laboratory.

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Benefits of Remote Power Quality Monitoring at Customer Sites

Electrotek was the first to develop and implement remote PQ monitoring (RPQM) for its customers. RPQM offers financial and technical benefits including:

- Lowers risk of costly re-works in the event of failure within the warrant period, whether the failure is caused by a design defect, unmanaged customer PQ, or change in utility PQ conditions.
- Avoid sending an engineer or technician to the site just to install a monitor. (An Electrotek engineer may need to visit the site to conduct a detailed PQ investigation in some situations.)
- The remote monitor can be moved from point to point on the customer's electrical system by facility electrician (if available) as data analysis and investigative efforts progress, especially in reactive situations.
- Allows customer to understand how they can create their own internal PQ problems, and the importance of engaging in monitoring to manage their own PQ environment.
- Electrotek manages all monitoring functions including, starting/stopping, threshold adjustment, data downloading, data analysis, and setting up email notifications to customer engineers or driver manufacturers in the event of severe disturbances occurring at the facility.

About Electrotek

Founded in 1984, Electrotek Concepts, Inc. is world renowned for its research, developmental, applications and problem-solving work in understanding, identifying, analyzing and preventing power quality (PQ) problems. Our expertise extends from the utility generators to inside the electrical/electronic load inside a customers' facility. The experience of Electrotek's team of PQ engineers extends from experts in utility power systems, participants on IEEE and IEC standards boards regarding PQ standards, and designers of end-use electronic equipment. Our engineers are armed to address any PQ problem at any level. The future of reliable, available power, and customer equipment in today's modern technological society depends on compatibility between utility power, the customer's facility electrical system and the end-use equipment customers depend on to carry out their day-to-day business activities.

