Electrotek CONCEPTS

Identifying and Solving Wiring & Grounding Errors in Customer Facilities

Electrotek's Power Quality Investigation System & Data Analysis Technique Locates Wiring & Grounding System Errors in Customer Facilities

Power quality (PQ) research conducted by Electrotek Concepts, and recognized by other PQ researchers in the industry, showed that 75% to 85% of all PQ problems with electrical and electronic equipment were caused by wiring and ground errors in customers' facilities. Many errors are undetectable with the bare human eye, and require sophisticated measurement and detection methods to locate.

Electrotek's PQ investigation system combined with our advanced PQ data analysis software uses advanced algorithms combined with voltage and current characteristics to determine the location of common and uncommon errors in a facility wiring, and grounding system. Advanced PQ monitoring instruments manufactured by Dranetz Technologies, Inc. compute a special set of PQ parameters that are used by Electrotek software to detect PQ characteristics of wiring and grounding errors.

Our system and approach can be connected to a facilities electrical system, and applied without interrupting the power or load, to a facility. System data is downloaded from the problem facility to Electrotek's PQ Monitoring Centers in Knoxville, Tennessee and Beverly, Massachusetts. Our system can analyze the data within a few hours, providing the results to Electrotek's expert PQ monitoring engineers for further review and analysis. Our system also collects PQ data numerics and statistics, which are used to pin-point wiring and grounding errors, as well as determine the location of errors and equipment causing PQ disturbances.

Our system and approach can locate problems with grounding issues associated with switchgear equipment and loads, main facility grounding systems, equipment grounding systems, lightning grounding systems, deteriorating connections, overloaded circuits, faulty circuit breakers, malfunctioning safety-related equipment, loads with problematic voltages, and currents indicative of potential faulty loads. This includes loads operating in environments contributing to system and load behaviors. Additionally, our system can locate non-linear loads characteristics of short tern power supply failures.

The final analysis provided by our engineers is a list of locations where wiring and ground errors are located to within +/- a few feet. Detailed information regarding the customers' electrical system are required as well as detailed information about the non-linear loads larger than 100 watts. Further analysis is then used to determine the extent of the errors found.

Frequency Makes a Difference: Harmonics & Conducted Emissions as a Tool

One type of data Electrotek used in evaluating wiring and grounding issues in a facility electrical system is, the harmonic voltage and current data measured by Dranetz PQ monitors, as well as, conducted emissions data from selected measurement points on the system to provide critical data regarding wiring and grounding errors.

Information regarding the electrical system is entered in our software and used to simulate the customer's electrical system. Our software generates specific characteristics of a normal electrical system without wiring and grounding errors. PQ measurement data is then utilized by our software to determine the wiring and grounding issues present in the facility, and their approximate location in the system.

Each individual electrical system will respond differently to currents flowing through it, thus generating a specific response. Our software generates specific algorithms used to characterize specific electrical quantities critical to identifying wiring, grounding issues, problematic loads, and loads likely to fail under certain PQ condition.

Power Systems and Power Quality Engineering Services Center

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.

Learn about our Center by visiting: www.pqengineering.com

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Benefits of Using Electrotek to Identify Wiring & Grounding Errors

The cost of using traditional techniques to identify wiring and grounding errors is typically preventative. Moreover, most errors go undetected, and only the "surface" errors are detectable. Many benefits of using Electrotek's approach and equipment now make this service cost effective and informative for finding electrical problems with both electrical systems and their loads.

- Electrotek's approach characterizes the facility's electrical system while it also characterizes the power quality in that system.
- No removal of power or disconnection of loads is required during the measurement process.
- System data is transmitted via cellular data modem to Electrotek's PQ Monitoring Center for on-line analysis. Facility engineers don't have to oversee the system or transfer data.
- Our approach can also identify potential problems with filters, surge protective devices and other power electronic systems in the front-end circuitry of end-use electronic equipment such as variable frequency drives (VFDs) and other equipment utilizing electronic power supplies.
- The more frequently an electrical system (i.e., exercising of loads) is used during Electrotek's measurement process, the better the integrity and usefulness of the data is.
- After wiring and grounding issues are identified and fixed, Electrotek's system remains installed to log the normal operation of the electrical system and its loads for future investigations.

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 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, to 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.

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