

# Resolving Power Quality Problems with Electronic Medical Equipment

## Managing Power Quality in Hospitals & Clinics Increases Patient Safety, Lowers Operations Costs & Extends Life of Electronic Medical Equipment

Healthcare administrators must deal with increasing operational costs as their budgets shrink. Hospitals and clinics rely on the reliable and available operation of electronic medical equipment just as they rely on reliable and available power.

Every minute and second counts when diagnosing, treating and performing surgical procedures. Medical staffs do not have time to deal with malfunctioning and failing equipment. Nor do they have time to find a reliable and available source of power with good power quality. Equipment issues caused by poor PQ are part of the costs administrators must manage. Dealing with

these problems on a reactive basis further increases costs and decreases patient safety in the healthcare environment.

Equipment and biomedical resources are limited. Unmanaged PQ in a healthcare environment adds to equipment downtime and repair as well as service contract costs.

Proactively managing PQ will increase safety, lower costs and extend equipment life. Securing Electrotek PQ engineering experts combined with the implementation of Dranetz PQ monitors allows administrators to reap untapped cost savings. Moreover, reactive PQ management will improve the

outcome of JCAHO (Joint Commission Accreditation of Healthcare Organizations) visit.

Electrotek's broad and detailed 30 years of experience with healthcare and medical equipment PQ combined with Dranetz PQ monitoring allows us to understand, identify, solve and prevent PQ problems. Our expert PQ engineers are knowledgeable regarding medical equipment PQ immunity as well as the PQ performance of healthcare facility electrical systems and how to identify the causes of PQ problems.

Our experience includes addressing with utility-generated PQ disturbances through working with 100's

of US and international utilities as well as manufacturers of medical equipment and power quality mitigation devices and equipment.

Investing in proactive PQ and addressing potential PQ problems before they mushroom into a potential catastrophe is key to operating a top-notch



Failure on medical-grade power supply caused by voltage transient occurring in an Intensive Care Unit (ICU)

## Managing Healthcare Power Quality Impacts Medical Device Errors & Safety

Patient safety and medical device errors have become a greater concern to administrators and medical staff. Unmanaged facility PQ increases the risk for device errors. Many potential errors caused by poor PQ go undetected. While electronic medical equipment use medical grade power supplies and

undergo IEC 60601-1-2 testing for EMC and PQ immunity, errors (including malfunctions and failures) caused by common every day PQ disturbances exacerbated still occur. This is especially true if unknown wiring and grounding problems and deficiencies are present in the facility's electrical system.

Upgrading facility equipment by adding variable frequency drives, etc. to increase energy savings also adds significant risk to unmanaged PQ as energy-efficient equipment are non-linear loads which generate disturbances.

Understanding the PQ ef-

fects of adding energy-efficient equipment to an electrical system will help ensure reliable and safe operation of medical equipment. Monitoring for PQ in a facility is critical to ensuring the electrical supply to equipment is known, so that proper mitigation helps ensure PQ is managed.

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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 Characterizing Power Quality for Medical Imaging Systems

Electrotek's PQ monitoring and investigation approach, customized for resolving PQ problems in hospitals and clinics with electronic medical equipment, has improved the technical and economical performance of 100's of departments in hospitals and clinics. This offers financial and technical benefits including:

- Minimize medical equipment downtime to avoid delayed medical tests and treatments.
- Minimize use of service calls and spare parts from Service Contract, making it available for service when PQ is not the problem.
- Maintain reliable operation of medical equipment caused by PQ disturbances and wiring and grounding problems—increase patient safety and eliminate repeat repairs.
- Maximize life of critical medical equipment components by ensuring acceptable PQ is delivered to all hospital departments and clinics.
- Allow expert Electrotek PQ engineers to identify needed maintenance of essential and non-essential hospital electrical systems for powering medical equipment.
- Ensure good scoring on Joint Commission on Accreditation of Healthcare Organizations.
- Reduce equipment repair and re-calibrations in the Biomedical Equipment Department.

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## 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 to participants on IEEE and IEC standards boards regarding PQ standards and to designers of end-use electronic equipment. Our engineers are armed to address any PQ problem at any level. The future of reliable and 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.

