Extending the Life of Electronics

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It’s time for a wake-up call regarding power and its role in electronics protection.

Why am I calling for this? Let’s start with a little history. The original two-prong electrical plug and socket were invented by Harvey Hubbell and patented in 1904. Driven by a convenience factor, Hubbell invented the plug to eliminate the possibility of making an error when wiring a connection so that electrical power could be utilized by people without electrical skill.

The next advancement came in 1928 when a third ground prong was added in order to reduce electrical shock. Nearly a century later, after decades of electronics innovation, we still use the same century-old grid to power the electronics in our hospitals, medical centers, businesses, and homes. There’s something wrong with this picture.

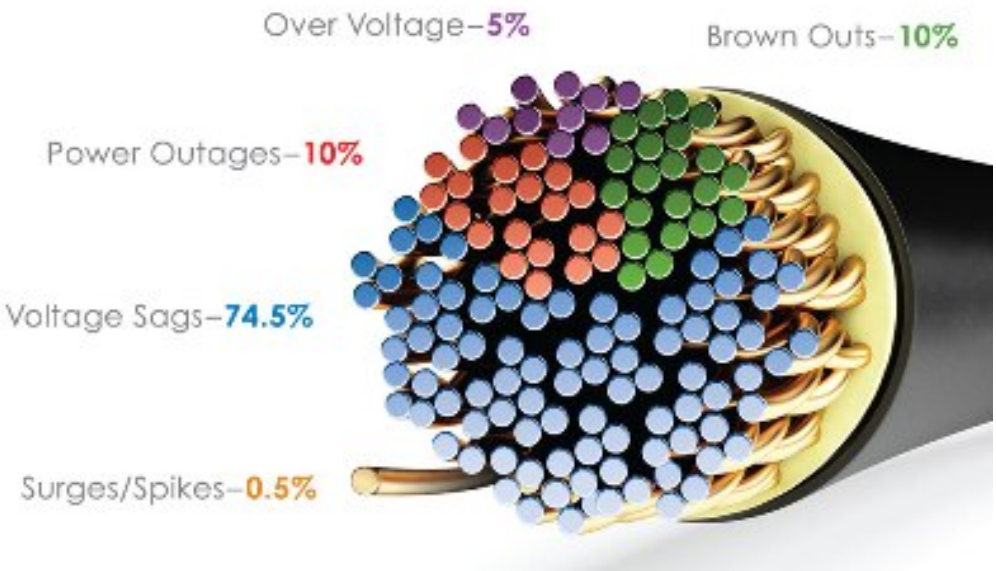
The fact is, electronics have grown increasingly sophisticated and the grid powering them is seriously antiquated. With that said, since the inception of the plug and socket, power protection devices have been invented to protect electronics—beginning with the surge protector and then uninterruptable power supply (UPS) technology.

Similar to the plug and socket, these devices have advanced minimally from a power protection standpoint and are limited in their ability to meet the protection requirements demanded by today’s increasingly digital world. More than ever, electronics are increasingly complex. New enhanced features and gadgets require more processors. But before we dive into the technology, the first question should be: why should we even care?

Two facts pertain to all electronics: they require power to operate and are significantly impacted by complex power disturbances. An inconsistent power grid places the reliability and efficiency of expensive medical electronics in constant jeopardy. Factors such as physician productivity and patient care are at risk when electronics aren’t protected. However, many healthcare providers are unaware of these effects until it is too late; therefore, having an effective system in place to protect pricey assets and avoid damages and costly service calls is imperative. I like

to think this would be simple, but the awareness of the damaging effects and how costly these are is lacking.

Vulnerabilities
Of power related events that damage electronic equipment, approximately 0.5% are caused by voltage surges and spikes, and a small percentage of failures actually results from power outages themselves. These daily disturbances include a complex array of voltage sags, brown outs, over voltages, power outages and voltage surges and spikes. No two disturbances are the same, and the increased complexity of these disturbances has proven to be catastrophic to the lifespan and reliability of medical equipment.



According to the Electric Power Research Institute (ERPI) [1], these daily loss-generating disturbances are costing hundreds of billions of dollars annually to businesses in the U.S. alone. It’s time for a solution.

The Electronics Protection Landscape to Date
Today’s electronics protection choices have been limited. Traditionally, UPS technology is effective from a technical standpoint. The technology protects against disturbances on the higher end by isolating electronics from the grid and powering them by battery. However, UPSs are expensive for most applications and too large to integrate into electronics, so users either use nothing, or turn to inexpensive surge protection that shields electronics from less than 1% of damaging power disturbances, according to reports from I-Grid [2].

Taking these limitations and underserved markets into consideration, most electronics exist in one of the following states:

- Protected at too great of cost
- Under protected
- Not protected at all

The Future of Electronics Protection
The current protection landscape of medical equipment points to a void in the electronics protection market. Experts are realizing current technologies are limited and grid events are more complex and frequent, elevating the need to develop an intelligent solution that is effective and affordable for the world's electronics suppliers and consumers.

To bridge the gap, new and advanced technologies have been developed that provide intelligent electronics protection at a price point and form-factor that is accessible to nearly all users.

Compared to inexpensive surge protection and filtering technologies, this new protection is cost-effective and a proven long-term safeguard for electronic devices. Similar to UPS systems, the technology provides immunity from disturbances, and with a greater success rate, more usable form-factor.

Such technologies that are changing the marketplace include Innovolt's patented technology, which resides between the public power grid and the equipment that is being protected. Using a series of patented algorithms and protocols to recognize potential power issues, the technology can quickly remediate issues before damaging effects occur. This platform has three components:

- Measurement and Signature Creation—Monitors and measures details of incoming power to create signatures, which can be profiled in real-time against known disturbances.
- Predictive Processing—Compares real-time power signatures to profiles that are known to cause damage to electronics. With millions of potential combinations of profile and signatures, a central microprocessor system then determines the most effective steps for remediation and activates a Core Protection Circuitry.
- Core Protection Circuitry—Provides a buffer between a damaging power event, its effects, and the protected electronics.

This new technology is not only data driven, it's flexible. It can be placed in front of electronic power supplies to shield the equipment from all power anomalies, or integrated into electronics themselves. For the first time, there is a holistic and intelligent approach, resulting in equipment that performs better, lasts longer and requires fewer service calls.

Conclusion
After a brief look at the history and present landscape of today's technology, I challenge you to consider the plug of 1904 and re-evaluate antiquated notions of power and how you are protecting your highly valuable medical equipment.

Do you have a holistic and intelligent approach to manage your medical equipment? Are you prepared for daily power disturbances that have damaging effects? By utilizing technology that manages and reports on the impact of power disturbances, medical providers can extend the life of equipment, resulting in improved product

reliability, improved patient care, and service-cost reductions.

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