**Power quality issues in Healthcare**

**Addressing Power Stability Challenges in Healthcare with REO's Medical Isolation Transformers**

Recent events in Spain and Portugal have highlighted the importance of grid stability and the challenges associated with the increasing integration of renewable energy sources.

On April 28, 2025, a major blackout affected millions of people, including critical infrastructure like hospitals. Early investigations suggest that the grid's instability may have influenced the outage, potentially exacerbated by the high wind and solar power quotient. This event highlights the need for robust solutions that protect sensitive equipment from electrical disturbances in an increasingly dynamic power landscape.

In healthcare environments, power stability is not just a matter of convenience; it's critical to the safety of both patients and staff. Medical devices, including ventilators, MRI machines, and infusion pumps, rely on clean and steady power to function correctly. Even brief interruptions to the power supply can lead to equipment malfunction, data loss, or system failure, all of which could severely impact patient care.

As the reliance on renewable energy sources grows, so does the risk of electrical disturbances, such as mains-borne transients. These voltage fluctuations, whether caused by lightning, grid switching, or renewable energy variability, are becoming more common and can pose a serious threat to healthcare facilities where reliability is essential.

**Understanding Mains-Borne Transients and Their Impact on Healthcare Equipment**

Mains-borne transients are short-duration voltage spikes or drops that can occur for various reasons, including switching operations on the grid or integrating distributed renewable energy sources. As renewable energy becomes a more significant part of the grid, these disturbances are expected to increase. Solar and wind energy are variable, meaning their output can change unexpectedly, prompting grid operators to make rapid adjustments. These fluctuations can cause sudden voltage changes, which may disrupt medical equipment.

Another factor contributing to instability is **islanding**, a situation in which local renewable energy sources (like solar or wind power) continue to supply power to local loads after being disconnected from the primary grid. When these systems reconnect, the sudden shift in power supply can trigger voltage spikes or drops, creating disturbances that can affect medical devices.

These issues highlight the need for solutions to mitigate the impact of grid fluctuations on medical equipment. While the shift to renewable energy offers substantial environmental benefits, it also presents new challenges to grid stability, particularly in sectors such as healthcare, where consistent power is crucial.

**The Role of REO's Medical Isolation Transformers**

REO's medical isolation transformers are designed to help protect sensitive medical equipment from the harmful effects of electrical disturbances by isolating the mains power supply from the equipment. These transformers provide a vital layer of protection against mains-borne transients and other disturbances by helping to reduce the effects on medical devices caused by fluctuations in the grid.

**Isolating Sensitive Medical Equipment from Grid Disturbances**

REO's medical isolation transformers isolate medical equipment from the mains power supply. This isolation helps to reduce the impact of voltage spikes, harmonics, and electrical noise that may originate from the grid, protecting devices from potential damage or malfunction. However, it's essential to note that REO transformers do not provide backup power or "ride-through" capabilities in the event of an extended power loss; these issues are typically addressed through backup power generation at the medical site.

**Compliance with Safety Standards**

Safety is a top priority in healthcare environments, and REO's medical isolation transformers are fully compliant with the **IEC 60601-1** standard, which governs the safety and performance of medical electrical equipment. By isolating medical devices from potentially harmful electrical disturbances, REO's transformers help prevent risks such as electric shock, fire hazards, and overheating, while ensuring that sensitive equipment remains safe to use in clinical settings.

**Protecting Against Harmonics and Electrical Noise**

Many modern medical devices rely on power supplies that convert alternating current (AC) to direct current (DC). These power supplies can introduce harmonics and radio frequency interference (RFI) into the electrical system, which may cause overheating and wear on electronic components, as well as issues with compatibility with other systems in the vicinity. REO's medical isolation transformers are designed to help filter out these issues ensuring that medical equipment operates more efficiently and has a longer lifespan.

**Navigating the Future Grid and the Role of REO's Transformers**

The transition to renewable energy is driving significant changes in power grids worldwide. As the share of renewable energy increases, grid operators must address the challenges posed by solar and wind power variability. This variability can lead to more frequent power fluctuations, affecting healthcare facilities that depend on stable, clean power for their medical equipment.

REO's medical isolation transformers are designed to help mitigate the impact of these disturbances. While they do not provide backup power or function as a substitute for uninterruptible power supplies (UPS), they offer valuable protection by isolating sensitive equipment from voltage spikes, harmonics, and other electrical noise that may arise from the grid.

**Conclusion**

The growing reliance on renewable energy presents opportunities and challenges, particularly for industries like healthcare, where reliable power is essential for patient safety. The increasing frequency of electrical disturbances, such as mains-borne transients, directly results from grid instability, which the integration of solar and wind energy can exacerbate.

REO's medical isolation transformers provide a crucial layer of protection, ensuring that healthcare facilities are better equipped to manage the risks posed by grid disturbances and helping to protect sensitive medical equipment from the unpredictable nature of the modern grid.

As the transition to renewable energy continues, companies like REO remain committed to providing solutions that help healthcare facilities maintain the safety and reliability of their electrical systems, enabling them to focus on delivering critical care to patients.

**Ends:** 1090 words

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**About REO:** REO specialises in providing an extensive array of electronic power controllers and resistive and inductive wound components tailored for industrial use, particularly in demanding environments. As the company expands its footprint in renewable energy technology, ensuring exceptional power quality has become a paramount focus. With manufacturing facilities in Germany, the US, China, and India, REO stands at the forefront of innovation across the globe.