Flywheel Systems Offer a Green Alternative to Power Protection

When disaster strikes from harsh weather environments, power surges, or rolling blackouts, mission critical computing systems and manufacturing processes are at the highest risk of going down. After the power goes out, uninterruptible power systems (UPSs) keep the facility up and running preventing the loss of vital information and protecting against costly equipment damage. Traditionally, UPS systems use lead-acid batteries to store the power required to sustain the facility during a power outage. However, several issues arise when using environmentally unfriendly lead-acid batteries including the need for expensive cooling, space considerations, frequent maintenance and disposal issues.

One alternative to the traditional battery-based UPS comes in the form of flywheel technology. The flywheel stores kinetic energy in the form of a rotating mass and is designed for high power, short discharge applications. Flywheels, such as those from Calif.-based VYCON, can operate in a wide range of temperatures and remove the need for costly and/or hazardous disposal issues. Also, the flywheel system requires far less maintenance and does not have to be continually replaced like batteries.

Recognizing the benefits of the flywheel system, industry-leading three-phase UPS manufactures have begun offering flywheel technology as a battery replacement to their UPSs for customers who are looking for a greener and more reliable power protection solution.

For example, Gambro, a global medical technology company who manufactures products for kidney and liver dialysis, is currently an end user of a three-phase UPS/flywheel combo (Figure 1). The use of the flywheel in place of three battery cabinets saves Gambro much needed space as well as thousands of dollars in maintenance costs over the 20-year life of the flywheel system. Another benefit Gambro found is that with VYCON’s flywheel systems as compared to other

flywheels on the market, there are no bearing changes which is significant as they can run $10,000 to replace every few years.

Gambro has enjoyed great success with the flywheel, as have countless other mission-critical facilities such as manufacturing plants, hospitals, health centers, data centers and universities. While battery traditionalists criticize flywheels for only offering seconds to minutes of runtime, the Electric Power Research Institute (EPRI) has stated that 80 percent of all utility power anomalies/disturbances last less than two seconds and 98 percent last less than 10 seconds. This point is validated by EasyStreet, a cloud, managed services and colocation provider who has three VYCON VDC-XEs running in parallel with double-conversion UPS systems in their state-of-the-art data center.

If there’s a power outage, the 300 kilowatt flywheel systems act as a bridge that seamlessly transfers to the facility’s diesel-engine generators. Jon Crowhurst, director of technical services explains why batteries are not needed, “Having thirty minutes or half an hour of batteries is, in my opinion, pointless. If the generator doesn’t start in the first thirty seconds, there’s nothing you can do. If you had two generator mechanics with their tools in hand, standing next to the generator and said, “I need this fixed in fourteen minutes,” they’d both laugh at you, because there’s nothing that can be done to diagnose or repair a problem with the generator in the time allowed. A well maintained generator plant doesn’t need fifteen minutes of batteries.”

Integrating a UPS into a facility takes consideration, and based on the facility’s needs, flywheels offer a compelling and low maintenance power protection solution. While the use of batteries for energy storage won’t entirely go away, the flywheel gives data center and facility managers a greener choice in protecting critical operations as well as an impressive ROI.

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