TRACKING TRENDS IN UPS TECHNOLOGY

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Leo Craig, Managing Director of Riello UPS Ireland, explores some of the recent advances in uninterruptible power supply technology and looks ahead to the next wave of high performing and efficient solutions

The stereotypical view of a UPS system as the big, bulky, inefficient black box buzzing away noisily in the corner of the IT room is certainly a thing of the past. Technology has come on in leaps and bounds over recent years, leading to significant improvements in efficiency and functionality in a reduced footprint across data centres or industrial, retail, and public sector settings.

Transformerless & Modular UPS

Historically, most UPS systems were transformer-based, where the power flows via the rectifier, inverter, and transformer to the output, with a transformer used to step up the AC voltage levels.

Although transformer-free alternatives have existed since the 1990s, it's only really during the last decade where they've grown in popularity and become a more mainstream and affordable alternative.

They operate in a similar way but use IGBT transistors capable of dealing with high voltages, which eliminate the need for the step up transformer after the inverter.

Removing this step up transformer enables the UPS to be much smaller and lighter. It also makes them more efficient as they generate less heat too, which in turn reduces the amount of air conditioning they need.

While transformer-based UPS are still the preferred choice for installations requiring galvanic isolation, such as industrial processing, transformer-free models are now the norm for power ratings below 10 kVA and are also available at the higher end of the spectrum up to around 300 kVA.

There's also been a boom in modular UPS. Compared to the traditional monolithic units, modular solutions provide flexible 'pay as you grow' scalability. You can mirror load requirements at initial installation, reducing the risk of oversizing, and when you need more capacity in the future, you simply add extra power modules or cabinets.

Because of their high power density, modular UPS have a compact footprint so they help to optimise valuable floor space too.

Smart Grid Ready

A trend likely to become increasingly important in the transition towards a decarbonised electricity network is the development of smart grid-ready UPS systems.

Thanks to advances in management and monitoring software, communications protocols, and battery technologies, some UPS can now communicate with local power networks. Then depending on the real-time conditions, they either draw electricity from the grid or push power from the batteries back in to help balance supply with demand and ensure a stable frequency.

Common applications for smart grid-ready UPS include peak shaving – which uses the batteries to limit the electricity drawn from the mains – and frequency stabilisation.

Such advances have the potential to transform a UPS from an essential but reactive piece of equipment (i.e. simply waiting to kick-in when there's a disruption to the electricity supply) into a dynamic 'virtual power plant', particularly in large-scale installations.

What's On The Horizon?

As we look to the future and UPS manufacturers continue to strive for even better efficiency, one key emerging trend is the wider use of silicon carbide (SiC) semiconductors. These are far smaller and lighter than the silicon-based components that have typically been used in UPS production. They also produce less heat, which in turn reduces the need for cooling.

The higher efficiency of SiC components cuts the overall energy needed to run the UPS. As an example, our new Multi Power2 modular range, which has power modules made with SiC components, is capable of ultra-high efficiency of up to 98.1% even whilst operating in double conversion online mode.

That's equivalent to the efficiency ratings you only currently see when a UPS runs in 'economy' mode, where any energy saving goes hand in hand with a trade-off in reduced protection. As the use of silicon carbide grows, the UPS systems of tomorrow will offer greater capacity at higher operating efficiency in a smaller footprint than even today's most cutting-edge solutions.

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As well as high-quality products, Riello UPS Ireland also offers a complete range of installation, servicing, and maintenance support, plus unrivalled sales and technical advice. Our maintenance contracts include guaranteed emergency response and fix times, while we offer a 5 year warranty as standard on all UPS up to and including 3kVA.