Everything Must Converge: How Intelligent Switchgear Is Powering the IIoT Revolution

A Vertiv Application Brief

Overview

Switchgear has existed since the end of the 19th century, providing consistent power switching and distribution that protected electrical equipment and enabled modern industry to flourish. Now, this utilitarian, but important, solution is joining the digital era, thanks to new trends in smart metering and the development of intelligent power systems.

The EMEA market has been a leader in adopting smart metering for power, in the European Union's quest to create a digital grid that's efficient, harnesses renewable sources of energy, and reduces fossil fuel use and greenhouse gas emissions. Smart meters measure electricity consumption, voltage, current, and power factors in real-time. Businesses and utilities use this data to monitor, control, and adjust usage, typically with an eye to reducing costs.

Whether mandated by governments or simply adopted as an industry best practice, smart metering enables exciting new Industrial Internet of Things (IIoT) use cases. For example, smart meters can enable data centers to pursue their quest of improving power usage effectiveness (PUE) and reduce their environmental impact. With smart meters, businesses can become prosumers, storing energy, measuring it, and returning it the grid. In addition, businesses can identify and mitigate sources of waste, such as technology or equipment that's idle and consuming power but could be switched off.

These intelligent solutions can enable utilities to monitor networks, gaining both a holistic and granular view of electrical usage and issues. They can identify tampering alerts, diagnose problems to avoid unplanned downtime, or provide advance warning of outages.[1] And they also allow teams at heavy industry companies to monitor operational technology health and performance, prevent unplanned outages, and enable preventive maintenance.

Smart Metering Requires Intelligent Circuits and Switchgear

So far, so good. But smart meters, which are connected devices with bi-directional communication, don't function on their own. They need to collect information from connected power equipment, such as switchgear. That's driving a transformation of switchgear design to include smart meters, intelligent circuit breakers, and networking equipment, where previously only electrical componentry existed.

Intelligent switchgear, such as the low-voltage switchgear Vertiv manufactures for the EMEA market, provides a virtuous cycle of benefits including:

- **Identifying and addressing electrical faults:** Many issues can cause electrical faults, such as component failures, power surges, short circuits, arc flashes, and more.

Thanks to sensors and integrated networking equipment, intelligent switchgear can collect data, self-diagnose problems, and send teams alerts. Teams can then rapidly troubleshoot issues, configure systems remotely, or perform controlled power shutdowns when needed. In addition, they can direct local staff to perform onsite servicing when and where needed. As a result, it's easier for teams to protect electrical equipment and ensure the high availability of powered equipment, such as servers, networking gear, and operational technology.

Vertiv develops intelligent low-voltage (LV) switchgear up to 690V and 800A to 6300A. Our solutions feature modular designs, enabling easy and rapid customization with intelligent equipment.

In addition, these solutions provide segregation up to Form 4 Type 6, separating busbars from functional units and all functional units from each other via metallic or nonmetallic rigid barriers. This process limits the risk of arc flash, protecting workers when they service equipment.

- **Gaining a wealth of new data insights:** Connected equipment, including sensors, intelligent circuits and smart meters, collect real-time data that teams can remotely monitor and analyze to gain real-time insights into power, computing, and operational technology performance. For example, sensors can collect data on switchgear system temperature and humidity, in addition to power usage and performance. This information can be used to continuously optimize operations.

Vertiv flexibly integrates intelligent circuits from all leading manufacturers, in fixed, withdrawable, and plug-in configurations, providing customers with choice and flexibility. In addition, we can integrate energy monitoring systems (EMS) and programmable logic controllers (PLC), bringing greater intelligence to your switchgear. Despite the addition of new technology, our patented modular designs are smaller than competitor solutions and can be maintained from the front, saving space for other industrial equipment.

- **Protecting electrical operations with automation:** Intelligent switchgear can act on the data its gathers. In addition to raising alarms, these solutions can use zone-selective interlocking to reduce the stress on equipment when short circuits and ground faults occur and automate the shedding of non-critical loads to optimize electricity usage.[2] As a result, intelligent switchgear is better able to protect equipment and reduce costs.

Conclusion

Vertiv™ PowerBoard Low Voltage Switchgear is used by a wide range of companies, including data centers, commercial and industry companies, and utilities. Vertiv develops its low-voltage switchgear for the EMEA market in state-of-the-art facilities include Ireland, UK & UAE as well as Nove Mesto, including busbar manufacturing and metalwork. Our modular solutions are highly customizable and can typically be manufactured and delivered 50 percent faster than our competitors.

Vertiv can provide complete power packages with low-voltage and medium-voltage switchgear, busbars, PLC programming, energy management solutions, and UPS devices, as well as providing ongoing maintenance. This capability enables industry buyers to simplify sourcing, while bringing greater quality control to their operations.

The opportunities for intelligent switchgear are boundless and will bring more control, precision, and cost savings to EMEA businesses.

Learn more about Vertiv™ PowerBoard Low Voltage Switchgear today.

[1] *Plant Engineering article*

[2] *Electrical India*

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(R03/24)