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Dear reader

Welcome to this issue of power, where you will find all the latest news on ABB’s power protection products and services.

Highlighted in this issue are several outstanding articles that underline the strength of our power protection systems.

Building on 40 years of experience in designing and manufacturing digital static transfer switch systems (DSTS), ABB has recently launched an extension of the Cyberex® SuperSwitch®4 DSTS product offering. Read about the enhanced 1600A Cyberex® SuperSwitch®4 design within.

With the world’s ever-increasing demand for high-quality power, driven by increases in industrial automation and large data centers, ABB has launched a solution well aligned to their customers’ needs. Read a noteworthy interview explaining ABB’s solution, the next generation medium voltage uninterruptible power supply (UPS).

Voltage sags or dips are constant issues, even in developed countries with modern power networks. ABB’s PCS100 active voltage conditioners are specifically designed to protect industries from voltage events, thus enabling them to carry out their operations without interruption. See page 8 for a recent ABB blog that outlines this power quality problem and rectifying solution in more detail.

ABB’s DPA UPScale RI 40 rack-type UPS has been selected to protect IT and communication systems against unanticipated power issues for a major ambulance service in Switzerland. And finally, at DataCloud Europe 2018, Rittal and ABB announced a new global level strategic alliance. Both companies aim to expand their solutions approach for modular, secure and high-availability data center infrastructure, primarily in countries, such as North and South America, Asia and Europe, read the recent press release within.

Enjoy this issue of power.

Leo Chae
Product Manager
Power conditioning
ABB launches extension of the Cyberex® SuperSwitch®4 digital static transfer switch product offering
The Cyberex® SuperSwitch®4 digital static transfer switch (DSTS) product offering now includes a highly optimized 1600A cabinet design with ETL listing to UL 1008S. Building on 40 years of experience in designing and manufacturing DSTS systems, this expanded offering continues to redefine power reliability and safety for data centers with its user-friendly interface, improved serviceability, and superior system performance.

The enhanced 1600A Cyberex® SuperSwitch®4 design enters the market as an industry benchmark in power quality detection and transfer performance for higher power density applications. With only front access required for installation, operation, and maintenance, the UL 480V augmented design reduces the required floor space by over 50 percent compared to the previous generation. In addition to the reduction in footprint, the 1600A model provides increased containment between the various sections of the system, supporting improved safety and ease of service access.

The SuperSwitch®4 is designed with a ‘true’ fault-tolerant architecture, ensuring there is truly no single point of failure by utilizing patented transfer algorithms and robust electrical components. It boasts improved power quality detection that is immune to harmonics and load imbalance between the phases. In applications with downstream transformers, the SuperSwitch®4 limits potential high transient inrush currents using state of the art digital signal processors and an innovative algorithm called Real Time Flux Control™ for dynamic inrush restraint (DIR). The results of this comprehensive approach are out of phase transfers up to 25 percent faster and inrush currents that are 40 percent lower than the SuperSwitch®3. This intelligent proprietary technology ensures performance that exceeds CBEMA and ITIC standards, regardless of phase drift between sources.

The Cyberex® SuperSwitch®4 is part of ABB’s broad range of products and integrated solutions that ensure data centers operate with optimum reliability and efficiency. From power distribution systems to enterprise management and grid connections, ABB provides savings in installation, energy, space and maintenance.

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Power quality – voltage sags

Voltage sags or dips are a constant issue, even in developed countries with modern power networks.

Although outages may not be frequent, the voltage issues caused by network faults, weather, or other power cable events are ubiquitous. With the advent of automation in modern industrial set-ups, the sensitivity of process to power quality events is growing. In fact, even a short event can halt processes unexpectedly, and this in turn would lead to production shortages, wastage and product damage.

Voltage is not generally properly regulated in developing areas or countries with a weak power supply. Without proper voltage, it is not possible to operate the process reliably. In situations where the voltage is unbalanced or low, overheating of motors presents a major concern. Voltage sags or dips can also be an issue in industrial areas, where a number of industrial sites are located together, even in developed countries with modern power networks. In such scenarios, the clustering of these power utilizations means if a particular user disturbs the utility voltage it will impact other industries. Faults or weather events in other parts of the utility network can lead to voltage sags well below the nominal value and stay there for a number of outages may not be frequent, the voltage issues caused by network faults, weather, or other power cable events are ubiquitous. With the advent of automation in modern industrial set-ups, the sensitivity of process to power quality events is growing. In fact, even a short event can halt processes unexpectedly, and this in turn would lead to production shortages, wastage and product damage.

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of seconds. Such fluctuations can stop the operation of sensitive production equipment. If a manufacturing line stops, it has to be resumed and this can be a complex and costly process. Any damage to the equipment induced by power quality events can prove even more expensive. Moreover, equipment may largely depend on a steady power supply to give a quality end product. Hence, it would be best for companies to invest in equipment so that the risk of uncertain power supply is eliminated and at the same time a steady supply of clean and high-quality power is ensured.

The PCS100 active voltage conditioner (AVC) products developed by ABB perfectly meet these requirements. They are specifically designed to protect industries from voltage events, thus enabling them to carry out their operations without interruption.

ABB stocks a wide range of power protection products and among these the PCS100 AVC product is quite unique. It is specifically designed for commercial and industrial applications and responds quickly to voltage surges and sags, corrects for voltage imbalance, and removes voltage flicker. The PCS100 AVC system includes two converters, which are not on the current path between the utility and the sensitive load. As an alternative, the corrective voltage injection can be obtained with a transformer winding between the load and the utility. This configuration presents an effective method for voltage correction.

The PCS100 AVC system eliminates the use of batteries and draws the extra energy needed to make up the correction voltage from the utility supply. This means, the cost of ownership for PCS100 AVC systems is lower as there are no maintenance costs, which are commonly associated with batteries. In addition, a redundant bypass system integrated in the PCS100 AVC ensures that the load is constantly supplied from the utility in the event of a fault with the AVC. The PCS100 AVC comes with ratings ranging from 150 kVA to 3 MVA, realized in a low-voltage switchgear cabinet. The system provides high scalability in terms of power and voltage level as well as online voltage regulation in less than two milliseconds. It includes advanced control software, a reliable converter platform, and offers 99 percent efficiency.

The PCS100 AVC product range includes two models: the PCS100 AVC-20 for constant voltage regulation and the PCS100 AVC-40 for sag correction. Each system is designed to resolve different types of power supply issues.
The PCS100 AVC 40 is designed for sag correction in large commercial and industrial applications. Available in ratings from 150 kVA to 3600 kVA, the PCS100 AVC-40 offers continuous protection from the most common utility voltage problems found in modern power networks. Failsafe, worry-free operation even in harsh electrical environments and a faster return on investment due to low operation costs will ensure your business is protected from power quality events. abb.com/ups
Designing the next generation medium voltage (MV) UPS

An Interview with Dario Rozman, Product Manager, power conditioning

In this interview Dario Rozman, from ABB’s Power Conditioning team, talks about their new product, the PCS120 MV UPS, which is designed for large critical power facilities such as data centers.

ABB has designed the next generation medium voltage uninterruptible power supply (UPS) in the form of the PCS120 MV UPS. Please can you tell us a bit about the product?

The PCS120 MV UPS is intended for multi-megawatt power protection. It provides protection from a broad spectrum of utility voltage events and supplies continuous clean power. It is built upon the revolutionary ZISC (Impedance Isolated Static Converter) architecture, which introduces a flexible solution. This architecture is based on an isolating line reactor coupled with the high performance ABB power converters. This simple approach, backed up with advanced control, provides unmatched reliability and performance, with class leading efficiency.

Why did you decide to develop the product? Was there a gap in the market for a product like this?

ABB has developed a range of medium voltage UPSs as a result of the changing landscape in industry and data centers. To gain economies of scale, facilities are becoming larger and demanding increasing levels of power. As power requirements increase, moving to medium voltage is a natural step.

ABB introduced the PCS100 MV UPS in 2014, targeted for specific niche markets. As a result of its performance the product has been quickly established in the market. Following the successful operation of the first units, ABB was immediately challenged by customer demand from other markets to provide other possible MV power protection solutions.

ABB took up the challenge to meet customers’ needs. This meant developing an approach to include multiple voltage levels – enhanced performance – flexible system sizing – and the ability of continuous power conditioning; which resulted in the PCS120 MV UPS.
How does the PCS120 MV UPS compare to other models out there?
The PCS100 MV UPS is extremely compact for the level of power protection offered. It can be placed on less expensive real estate located further away from the loads, such as electric rooms and substations. Also ABB’s ZISC topology backed by the PCS120 converter technology achieves efficiencies of up to 98 percent, significantly better than the segment alternatives, which are based on old technology.

What are the key features and advantages of the PCS120 MV UPS?
One of the greatest benefits of the ZISC architecture is the medium voltage power protection with outstanding dynamic performance. That, combined with fault-tolerant system design compatibility such as ring bus systems, creates a robust and extremely reliable power protection device for critical load facilities.

Due to state of the art power electronics and robust control strategies, ABB’s PCS120 MV UPS is able to provide ultra-fast voltage recovery response – in the order of milliseconds – meeting the most severe international standards and specific customer system requirements. These include large load step, severe fault scenarios and a large variety of power quality events.

Flexibility is another feature, the architecture allows for a single unit at 2.25 MVA up to 40+ MVA – in a ring bus configuration to provide high levels of power and redundancy. The PCS120 MV UPS has versatile energy storage options, offering autonomies from a few seconds to several minutes. The system is available as an indoor or outdoor solution - dependent on the customer’s requirements and space allocation.

What industries will primarily benefit from the PCS120 MV UPS?
Large-scale facilities who rely on a power supply quality much greater than a utility can provide will benefit from this product. This is valid not only for data centers but also semiconductor factories and other critical load industries such as pharmaceutical, and the food & beverage sector where clean continuous power is paramount.
How will PCS120 MV UPS benefit larger critical power facilities such as data centers?
These facilities have been highly impacted by economies of scale, pushing single locations to grow even larger with correspondingly higher power demand – often well into the tens of megawatts. They require extremely reliable power supply as well as robust power distribution and power protection designs, which the PCS120 MV UPS provides. The end result is that business is continuous with zero downtime. All systems have to be up and running, and whatever happens on the infrastructure side, load-drops are not an option. This is to guarantee a safe data transaction, storage and recovery. The absolute requirement of maximum reliability and optimum efficiency is vital to keep these critical load industries competitive.

Why is the transition from low voltage (LV) to medium voltage (MV) a natural progression for data centers?
Providing power protection at medium voltage allows for multiple advantages hence why it is becoming a natural transition. It increases reliability and reduces costs of the critical power facility build and operation.

Increased reliability is derived from the MV design approach with larger protected load blocks, lower switchgear count and the operating culture of medium voltage systems.

Installing the power protection at the MV level provides the most energy efficient configuration as the lower currents at this voltage result in smaller cables and lower losses.

How does the PCS120 MV UPS compare when it comes to operating costs and efficient clean power?
Operating costs were one of the main drivers during the development of the PCS120 MV UPS product. We listened to the voice of the customer who was looking for a cost effective solution when it came to the operating cost.

With the PCS120 MV UPS customer savings will be remarkable in the lifetime of a system, which is approximately 20-plus years. The PCS120 MV UPS achieves efficiencies of up to 98 percent, much higher than existing comparable solutions. Therefore, the customer will not only achieve remarkable savings from reduced electrical energy losses, due to the lower heat dissipation, the cooling costs will be reduced. The PCS120 MV UPS also has the benefit of minimized downtime as you only need to shut down the unit every five years compared to once a year for other systems, consequently reducing financial impact through less down time and service expenditure.
Emergency power concerns for an emergency care provider

A major Swiss ambulance service is inoculating its IT and communications systems against unanticipated power issues by installing the latest UPS power supply system from ABB.

SALVA (Ambulance Service Association for Locarno and Surrounding Valleys) provides the Locarno area in Switzerland with a medical transport service, as well as pre-hospital medical treatment and care. The organization is also dedicated to the training and education of the paramedics and volunteer staff who help to provide full geographic, 24/7 coverage and cope with the some 5,000 health emergencies annually in its district.

When a medical response is, literally, a matter of life and death, it is essential that IT and communication systems are 100 percent available to the response team. However, grid power can be lost at any time, without warning. For this reason, SALVA's new 1,800-square-meter Locarno headquarters, which will be inaugurated in June 2018, will be equipped with ABB’s DPA UPScale RI 40 rack-type uninterruptible power supply (UPS).

The RI 40 has two slide-in 20 kW redundant modules, which can provide 25 minutes of total autonomy at full load power.
The UPS is an all-in-one solution that includes the frame, UPS, battery and communications. The UPS design is based on ABB’s decentralized parallel architecture, which delivers unprecedented reliability, availability, low total cost of ownership, and simple service and maintenance.

Because DPA allows modules to be added as power needs grow, there is no need to over specify the original configuration. DPA reduces capital outlay and makes maintenance and service easy, since modules can simply be hot-swapped.

“We are proud to offer our expertise and product excellence to provide an optimal solution for such a sensitive customer as SALVA,” comments Renzo Salmina, ABB’s UPS sales manager in Ticino. “SALVA personnel should only be concerned with medical emergencies, not power emergencies, and the RI 40 will stand as a highly reliable technology to help SALVA focus on its core mission.”
ABB and Rittal enhance global partnership to drive digitalization in industrial applications

ABB and Rittal to provide industrial grade edge data center solutions for industrial customers who need to deploy robust IT capacity close to their operations
At DataCloud Europe 2018, Rittal and ABB announced a new global-level strategic alliance. Based on their proven partnership in the uninterrupted power distribution business, both companies aim to expand their solutions approach for modular, secure and high-availability data center infrastructure, primarily in countries, such as North and South America, Asia and Europe. The strategic partnership covers various solutions and services including those for uninterruptible power supply (UPS), secure edge data center solutions with fire protection, edge data centers for OEM manufacturers, scalable modular data centers in cooperation as well as new power container solutions.

Leveraging the joint global network of sales, engineering and service teams of both companies ABB and Rittal intend to execute a joint strategic approach focusing on the conception and development of modern data centers, e.g. for edge computing.

These prefabricated and resilient data center solutions – such as the recently launched Secure Edge Data Center (SEDC) with HPE – are purpose-built for harsh industrial environments to help customers digitalize their operations, which will allow customers to run enterprise-grade IT in close proximity to their operational technology (OT) environments, machines and equipment to enable low-latency, secure and reliable digital processes. “The enhanced global partnership with ABB provides our customers with the expertise of two global leaders in the OT and IT industry that complement each other perfectly. Our turnkey and proven solutions help companies implement the needed IT infrastructure for secure edge computing and other smart applications in order to capture the value of the digitization,” said Andreas Keiger, Executive Vice President Global Business Unit IT, Rittal.”

“ABB has supplied UPS systems and electrical distribution solutions to Rittal for some time already and both companies agreed to deepen their partnership on an international level to support their growth strategies in the last few years. “Rittal not only deploys ABB UPS systems as part of their data center solutions but also leverages local ABB services to strengthen sales activities and services in local markets,” adds Lara Cortinovis, ABB’s Global Product Group Manager Power Protection.

New era of decentralized computing
Modern edge data centers are essential for data-driven economies, where the Internet of Things (IoT) are generating a massive amount of data. An edge data center brings IT capacity closer to the place of data generation to enable low-latency, secure and reliable digital processes needed for many Industry 4.0 scenarios.

Proven achievements for driving digitization
Rittal and ABB look back on a successful cooperation. Joint IT reference projects include critical infrastructures, for instance the implementation of a new data center at a European airport.

Other project is the Lefdal Mine Data Center. This is a maximum security and highly energy efficiency data center for colocation services built in a decommissioned ore mine in Norway, offering an IT capacity of over 200 MW in the first phase of expansion. Here, both companies work hand in hand offering turnkey and scalable IT infrastructure for a very flexible use of IT systems. Selected solutions of the joint portfolio, such as the Secure Edge Data Center with HPE (SEDC), were shown at international trade fairs, including CEBIT 2018 in Hanover (11-15 June) and DataCloud Europe 2018 in Monaco (12-14 June).
Power conditioning
Designed for commercial and industrial applications.

By choosing from ABB’s PCS100 power conditioning solutions you are selecting from a portfolio of advanced technologies and expertise. The product range includes the active voltage conditioner, reactive power conditioner, static frequency converter and low and medium voltage UPSs. A unique line up giving superior value to operations in the industrial, utility and commercial sectors. Providing energy efficiency, high reliability and increased productivity. abb.com/ups