

# power

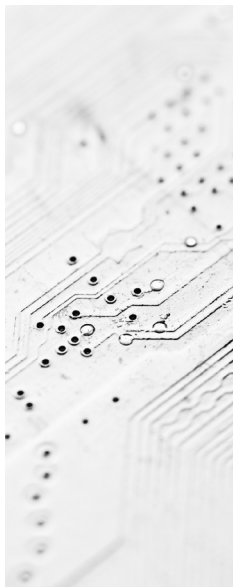
A power protection  
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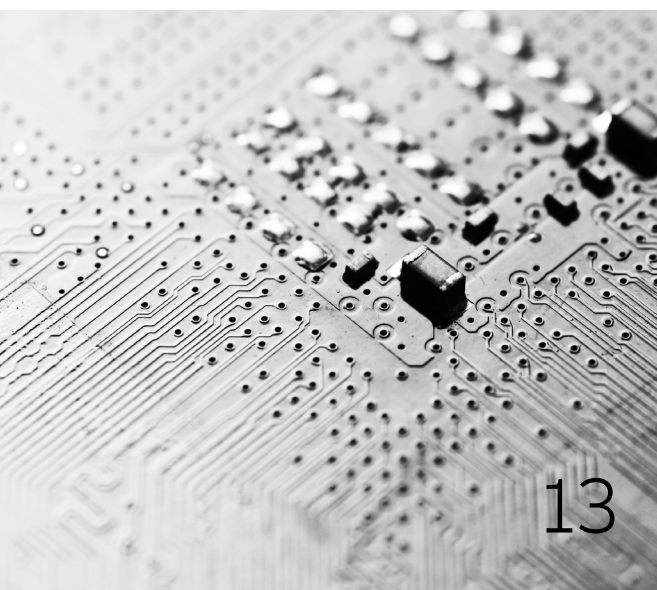
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## EDITORIAL



### Dear reader

How quickly the year has flown by! 2018 has seen great progress in our power protection business and we had many successes - thanks to your commitment and dedication - and in this last quarter, we have much to report in our Power magazine.

At this time of year, thoughts turn to giving presents to others. I wonder how many of those presents will contain semiconductor chips? The fabs that manufacture millions of these chips daily are highly dependent on a constant flow of clean electrical power: Lost production, poor quality and downtime equate to profit loss and loss of market share for fabs that are not sufficiently protected from power quality events. In this edition of our Power magazine you can read an interesting article that discusses ABB's offering of low-voltage and medium-voltage power protection systems that protect the semiconductor industry against voltage sags and interruptions.

Inovyn's PVC plant in Belgium has also recently benefitted from ABB UPS technology. The challenge here was that the production line must not stop! As

the atmosphere in the plant has dust, humidity heat and corrosive substances, a special solution was called for. For Inovyn, we delivered our PowerLine DPA UPS modules with a solid housing protected by filters, enabling the UPS to last 10 to 15 years despite the tough conditions.

And yet another new ABB power protection product! This quarter, we launched the latest in a long line of innovative UPSs: The single-phase output version of the PowerLine DPA, which was introduced in 2016 in a three-phase version. This modular UPS has a high current rating, giving a superior short-circuit performance that is ideal for selectivity and fault clearing in critical industrial applications. The UPS is ideal for applications like valves, meters, emergency lighting, fire and gas monitors, telecoms, security and public infrastructure such as railway control, safety and signaling systems.

For many hospitals, a continuous supply of good-quality electrical power can be, quite literally, a matter of life and death. The Regional Hospital of Bellinzona and Valleys is no exception. The hospital wanted to move from an older, centralized power protection layout to a decentralized one. Our DPA UPScale ST UPS fitted the bill here perfectly. And this 300 KW modular UPS is simple and cost-effective for them to run and maintain.

Now to switch from hospitals to television (we certainly have a wide range of customers for our power protection products!) The Swiss national TV broadcaster has mobile units that transmit from remote locations. But what happens if there is no local grid or the power fails, which is likely during a calamity? The answer is the two 3 kVA PowerValue 11 RTs UPSs we have newly installed in the vehicle. Also, thanks to

the double conversion technology, the normal input power supply is constantly modulated making sure viewers do not miss any dramatic moments if a glitch occurs!

Like the television announcer, I'll sign off here. 2018 was a great year for us and I would like to thank you all for your great contributions during the year and for your commitment – without your passion and innovation to power the future, we would not have been able to accomplish our many successes. A big thank you to our employees, partners and customers for their great commitment and partnership. I wish you and your families all the best for the coming holiday period and a good start to 2019!

Enjoy this issue of power.

Lara Cortinovis  
Global Product Group Manager  
Power Protection

## ABB launches a single-phase UPS for industrial applications up to 80 kVA reducing the total cost of ownership

The modular UPS has a high current rating, giving a superior short-circuit performance that is ideal for selectivity and fault clearing in critical industrial applications.

### — 01 PowerLine DPA

ABB has launched the latest in a long line of innovative UPS products: The single-phase output version of the PowerLine DPA - launched in 2016 as three-phase output.

PowerLine DPA is an online double conversion modular device aimed at critical elements of manufacturing and process industries such as sensors, valves, meters, data concentrators, emergency lighting, fire and gas monitors, telecoms and security. Other applications such as distributed control systems (DCSs) and SCADA operations, motors, pumps, etc. can also be supported as can public infrastructure such as railway control, safety and signaling systems.

The PowerLine DPA features ABB's decentralized parallel architecture (DPA™). In contrast to monolithic UPS architectures, with DPA every UPS module has all the essential functional units needed for independent operation. DPA increases system reliability and availability compared to other modular UPS solutions, as there is inherent redundancy between the UPS modules on all functional levels. DPA is ideal for organizations seeking zero downtime and low cost of ownership. With DPA modularity, N+1 redundancy is simple to configure and each PowerLine DPA cabinet can host up to three 40 kVA modules for 80 kVA N+1 of redundant power. Cabinets with up to 30 modules total can be hooked up in parallel.

Featuring smart and secure power connectors, the PowerLine DPA modules can be online-swapped, while other UPS modules in the system support the load, which both speeds and simplifies maintenance. This unique aspect of modularity directly addresses continuous uptime requirements, significantly reduces MTTR (mean time to repair), reduces inventory levels of specialist spare parts and simplifies system upgrades. Cost of ownership is further reduced by the UPS's efficiency (up to 95 percent and more than 98.5 percent in Eco-mode).

The PowerLine DPA can easily cope with a variety of challenging environmental conditions including dust, water condensation, excessive humidity, corrosive air contamination and rough manhandling. High priority has been given to safety and the UPS features a high degree of protection for users and maintenance staff. A wide variety of battery backup technologies can be accommodated and fast re-charging can ensure batteries are quickly back to operational levels. UPS design lifetime is 15 years.

"Because the PowerLine DPA has a high-overload capacity and robust short-circuit capability, it is ideal for critical industrial situations where selectivity and fault clearing are important. Not only that but optional interface boards allow remote monitoring or the integration of the UPS into a larger network," says Giampiero Frisio, Managing Director of ABB's Protection and Connection business. "In a world where skilled labor is scarce, with tighter operating margins and greater demands on energy efficiency, the PowerLine DPA delivers the goods - and ensures the customer's critical load is never without power, all with a low cost of ownership."

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# ABB technology enables better broadcasts by RSI

A tailor-made solution from ABB guarantees that the Swiss Italian-language radio and television broadcaster can transmit from any place at any time.

—  
01 PowerValue 11 RT  
—  
02 RSI mobile unit in action



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As a Swiss public-service company, RSI produces and distributes radio and television programs over the entire territory of the Confederation through three radio networks, two TV channels and a wide multimedia offering. Outside the studio, RSI must be able to broadcast major events, live on location, such as the Film Festival in Locarno, or at the site of a natural disaster, like a landslide or flood. It is therefore crucial for the company to be able to arrive and transmit reliably from locations wherever events of journalistic relevance occur.

This often means moving away from the television studio and out into mobile production units. From here, the flow of communication with the studio must be coordinated: the images, the audio, their editing and transmission, as well as live connections. In these cases, both the presence and the reliability of the power supply is the key for RSI, providing them with the assurance that they will be able to disseminate information to the public rapidly. That is why the company turned to ABB for a tailor-made solution.

In the event that the local public grid is not present or is interrupted, ABB has fitted RSI's mobile unit 1 with two PowerValue 11 RTs uninterruptible power

supplies of 3 kVA each. These can be equipped with up to four battery modules. The very compact and configurable technology of the PowerValue 11 RT not only allows great flexibility in the design of the mobile unit's load capacity but also offers an excellent weight/power performance ratio for the entire system, ensuring the best operating performance of the vehicle.

ABB engineers went even further, equipping the architecture with "intelligence" as well: An automatic power-off function of the PowerValue 11 RT allows the system to shut down in a programmed manner from the moment it stops working on the mobile unit. This function protects the autonomy of the batteries and is only initiated if the vehicle's power needs (preset by the user) are otherwise ensured.

With this solution, ABB guarantees the RSI mobile unit has power anywhere and at all times. In addition, thanks to the double conversion technology, the input power supply is constantly modulated a huge benefit during unfavorable conditions as voltage peaks are eliminated, improving the quality and continuity of the broadcast for viewers.



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# ABB's ruggedized UPS protects industrial applications with the beneficial concept of modularity







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01 Pierre Heneaux,  
Electrical engineer and  
Head of the HV and LV  
Electrical Sector, Jeme-  
ppe-sur-Sambre and Si-  
mon Lamsens, UPS Sales  
Engineer ABB in front of  
the PowerLine DPA

The Inovyn site at Jemeppe-sur-Sambre Inovyn Manufacturing Belgium produces 475,000 tons of PVC per year - the equivalent of 50 semi-trailers per day. Around 500 people work round-the-clock shifts to maintain the company's position as the largest producer of PVC in Europe. As only the best will do, Inovyn opted for ABB's industrial and modular UPS product: The PowerLine DPA 20-120 kVA UPS has been specially designed to ensure consistent power supplies in challenging environments (excessive dust, corrosion, humidity, heat, etc.) and boasts a service life of 15 years.

### The Challenge

This level of PVC production requires a precision system. "Our factory has a very high number of DCS I/O operations," explains Pierre Heneaux, Electrical engineer and Head of the HV and LV Electrical Sector. "The DCS - Distributed Control System- is a system that controls the plant: it starts the motors, opens and closes the valves, etc. In short, it controls all the equipment. Jemeppe has the highest number of I/O operations when compared with all the other factories in Europe. It's just not an option for the system to go offline and for us not to know what's going on!"

PVC is produced in batches and the DCS must be as efficient as possible, especially as the number of I/O operations will only increase as technology advances. "Our standards are very high, especially as we are a Seveso factory. One of our top requirements is for uninterruptible electricity supplies. If we lose control for two milliseconds, all is lost: the data does not get through and the system goes into safe mode. If we lose a DCS for longer than 40 milliseconds, it's a catastrophe!" Inovyn has its own electricity production system,

which produces one-eighth the power of a nuclear reactor, but even this is not immune to micro-outages.

### The Partnership

The link between Inovyn and ABB is nothing new. "We have been working together since 2000," says Simon Lamsens, sales engineer at ABB. "We have built up a relationship of trust." Pierre Heneaux adds: "ABB is a serious and competitive player. We are very happy with the equipment, which is top of the range, and with the service too. Our interpersonal relationships make it easy to convey our requirements. Here, we needed UPS systems that were durable and very robust. ABB heard us." Simon Lamsens explains what was on offer when the conversation took place: "UPS systems are mainly developed for data centers, and we have very reliable ones for ours."

"But here we are not a data center!" says Anthony Kinif, a technician at Inovyn, with a smile. Anthony is in charge of commissioning and maintaining the UPS. "Here we have dust, corrosive substances, etc." It was this requirement that led ABB's teams to come up with a new device. "It's clear that industrial environments now also operate within the Internet of Things and devices can send their status to the DCS." This market is now growing exponentially, but its needs are different from those of data centers. "We therefore had to use the technology that was available for data centers and adapt it to the extreme conditions found in industrial applications." This is how the PowerLine DPA UPS was born.



**“We needed UPS systems that were durable. ABB heard us.”**

Pierre Henveaux, Electrical engineer and Head of the HV and LV Electrical Sector

#### The Solution

“We developed the PowerLine DPA UPS based on what had been designed for data centers,” explains Simon Lamsens. “ABB uses modular technology. We were among the first who developed this technology. At ABB, one module is one UPS. Each module contains all the equipment and software necessary to operate an entire system. One module’s operation is not affected by any faults found in other parts of the UPS. If one module goes down, the other remaining modules take up the slack.” Inovyn has factored in four PowerLine DPA units. Pierre Henveaux proudly shows off the serial numbers of “his” UPS machines. “We have numbers 4 and 5! We wanted equipment that was top-of-the-range and robust. Only ABB was able to supply this. Furthermore, our special relationship meant we felt we were being listened to.” On top of the equipment quality, Inovyn found this system to be the most robust as each module is enclosed in a solid housing protected by powerful filters. Simon Lamsens explains the product: “Here you have filters, condensers, fans, etc. These make up a whole system that enables the UPS to last ten to fifteen.”

#### The Advantages

“ABB was the only company to listen to our requirements and bring us a solution,” says a happy Pierre Henveaux. Simon Lamsens: “We’re talking about two electrical networks. The first supplies the batteries, which in turn output a constant supply. The modular system ensures that both of the circuits located in the same unit operate in parallel. If one component fails, the other one takes up the slack.” Inovyn opted for two units of four modules. “The probability of there being a problem with both units is very low.” The battery system is selected by the controller. “You can see that everything is

built to last. The boards have been ruggedized, the components are extra-large and the filtration systems are hyper-efficient. The cherry on the cake is that everything is made in Switzerland, with the degree of quality that comes with that. I expect to have no trouble for at least fifteen years!”

#### The Future

“We are currently using an older-generation DCS, but we plan to move to a more efficient system over the next eight years.” By choosing a PowerLine UPS, Pierre Henveaux is already preparing for the future. “These UPSs are suited to our needs and will be able to maintain top-quality power supplies even when the new hardware arrives.” This vision of the future will be applied to our expansion plans: “We will also install two new UPS systems in our new production line, which is to start operating in 2019.”

#### Inovyn

Inovyn is 100 percent owned by the INEOS group, a company with an annual turnover of 40 billion and around 18,600 employees. INEOS is present in 22 countries with 105 production facilities. Of the 18 different sectors it is active in, PVC is its main focus. With a strong presence in Belgium for historical reasons thanks to its partnership with Solvay, Inovyn has three production sites in this country. The one at Jemeppe-sur-Sambre began operating in 1871 as the flagship of the Solvay group. After moving from sodium hydroxide synthesis in 1897 to sulfuric acid in 1928, the site has been producing PVC since 1949. Today it is the largest PVC factory in Europe with an output of 475,000 metric tons/year. The group has started an expansion project that will increase production to 625,000 metric tons/year. “Would you like an example? The PVC in every credit card in Europe comes from here!”



**“ABB was among the first developing modular technology, where each module is in itself a mini-UPS.”**

Simon Lamsens, UPS Sales Engineer ABB



# ABB's DPA UPScale ST UPS ensures safe and reliable power for the Regional Hospital of Bellinzona and Valleys



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01 Regional Hospital of  
Bellinzona and Valleys

02 DPA UPScale ST

For many hospitals, a continuous supply of good-quality electrical power can be, quite literally, a matter of life and death. The Regional Hospital of Bellinzona and Valleys is no exception.

Located in the capital of the Canton of Ticino, the hospital is a key element of a health network, formed by the Regional Hospital of Bellinzona and the hospitals of Faido and Acquarossa, which was established in 2000. The Regional Hospital of Bellinzona and Valleys is a multi-specialist public hospital with modern infrastructure and state-of-the-art medical technology that provides the district of Bellinzona and surrounding valleys with basic healthcare as well as specialized services.

The power supply for the hospital has been secured in the past through a combination of ABB uninterruptible power supplies (UPSs): a DPA UPScale ST 80 (3 x 20 kW) for administration and pediatric surgeries; a DPA UPScale ST 80 (4 x 20 kW) for the laboratory analysis center and helicopter landing strip lighting; and a PowerWave PW 33 160 kW for operating theaters, intensive care, emergency room, endoscopy, telephone systems and delivery rooms.

While this UPS constellation provided an adequate power backup system, the hospital authorities wanted to move away from a centralized to a decentralized UPS concept and exploit the many advantages that a modern modular UPS brings.





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As a long-standing reliable partner that provided 24/7/365 support, the hospital therefore turned to ABB for their new USP. ABB has a strong local presence and could provide the cutting-edge UPS technology and preventive maintenance contracts the customer needed. ABB also has local production facilities for UPS in Quartino and Riazino.

ABB specified, installed and commissioned a DPA UPScale ST UPS for the hospital. This modular UPS provides 300 KW of electrical power and is simple and cost-effective to run and maintain. The UPS's decentralized parallel architecture (DPA™) means that every UPS module has all the essential functional units needed for independent operation. DPA increases system reliability and availability compared to other modular UPS solutions, as there is inherent redundancy between the UPS modules on all functional levels.

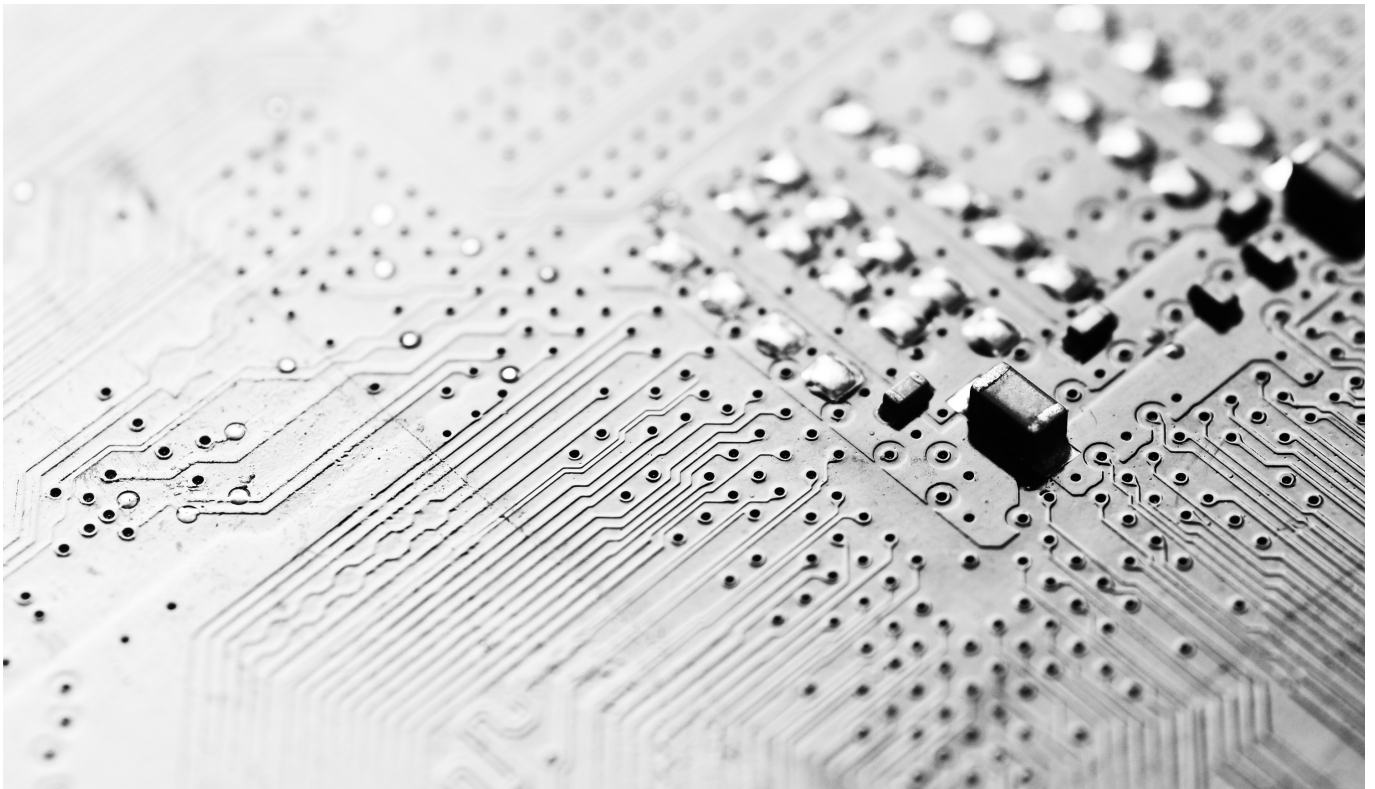
DPA is ideal for organizations like the hospital seeking zero downtime and low cost of ownership, because modules can be added or removed, adapting to requirements, even without powering down. Maintenance is easy and there is no need to oversize the original configuration, which reduces initial capital outlay. All these attributes, as well as the UPS's small footprint, made ABB's DPA UPScale ST UPS the perfect choice for the hospital.

Renzo Salmina, ABB Regional Sales Manager, comments. "Exploiting our experience in advanced UPSs, we have provided a tailor-made solution that is technologically advanced and reliable in every respect. Not only that but with our after-sales services, we guarantee the same quality and reliability, thus offering the customer a 360-degree service, from design to technical assistance."

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# Power protection for the semiconductor industry

Low and medium voltage power protection solutions from ABB help to prevent significant losses from voltage events.



## **Why is power protection important?**

Smartphones, PCs, servers, and the Internet of Things (IoT) have been driving the demand for semiconductor chips for decades. This trend has driven the demand for more chips, particularly memory chips, which in turn has spurred memory chip manufacturers to invest quickly in new chip fabrication plants.

Companies in China have also increased their investment in chip fabrication and back-end packaging plants, in line with China's 'Made in China 2025' plan. These newlybuilt leading edge technology plants cannot afford to lose time,

money, and market share through production losses due to power quality events such as voltage sags and power outages. Power protection is required to ensure these investments are protected.

## **Semiconductor industry**

The semiconductor industry is important for many products used in our daily life, including memory, processors, sensors, power devices, optoelectronics, and displays. Facilities can be split broadly into three categories: silicon wafer plants that produce bare wafers, fabrication plants (FABs), which produce the chips, and packaging plants, which package and test the chips.



Lost production, poor quality, and downtime, eventually equate to profit loss and loss of market share for semiconductor FABs that are not sufficiently protected from power quality events. Every day semiconductor facilities face a potential risk from voltage events. Often we do not read about them in the news, except when a major event occurs. However, a major event that was recorded in March 2018, when there was a brief outage at Samsung's Pyeongtaek NAND memory fabrication plant. An analyst estimated that 3.5 percent of the global NAND flash supply for March was affected by this event.

Instantaneous prevention of power interruptions  
ABB offers low-voltage and medium-voltage power protection systems to protect the semiconductor industry against voltage sags and interruptions. This equipment is designed for various voltage in-puts, power ranges and can be fitted for outdoor and indoor conditions.

- The PCS100 AVC-40 is an active voltage conditioner for large industrial and commercial applications. It uses no energy storage to correct sags and swells to ensure the critical facilities receive clean, premium power.
- PCS100 UPS-I is a high performance, high efficiency industrial UPS that ensures protection from power quality events, such as deep sags or short-term outages. It enables continuous power supply to modern industrial processes.
- The PCS120 MV UPS is the next generation of medium-voltage UPS intended for multi mega-watt power protection. Based on the revolutionary ZISC architecture, the PCS120 MV UPS introduces a flexible solution for higher reliability and higher efficiency in critical power facilities.



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# The importance of power protection for modern industries

Power supply events such as power outages, sags and surges represent one of the biggest threats to manufacturers and industrial facilities around the world.



For these organizations, the damage caused even by a momentary interruption to an otherwise clean supply of electricity can be devastating. With the frequency and severity of power interruptions on the rise, many such facilities are opting to install power protection systems to safeguard equipment and maintain productivity even under extreme power conditions. Here, we look at the dangers of power supply fluctuations and how equipment such as voltage conditioners and uninterruptible power supplies can protect our industries from harm.

For most people, power cuts are nothing more than an infrequent nuisance. However, for large organizations and industrial facilities, they are a serious threat: General Electric estimate that a third of businesses would lose over \$50,000 in just an hour without electricity, while for larger companies this figure could rise as high as \$6.5 million.<sup>1</sup>

Manufacturers and industrial organizations are particularly vulnerable to power supply anomalies. For industries that produce cars, electronics, food and drink, pharmaceuticals or operate medical equipment; a power outage lasting ten seconds can mean much more than a momentary lapse in production. Even an incredibly brief loss of power can cause serious damage to sensitive equipment, machinery, final products, materials and the ensuing restarts can be incredibly time-consuming and expensive.

The extent of the damage caused by a power outage and subsequent surge can be difficult to comprehend. Electronic control system configurations may revert to their default settings and require reprogramming. Power loss in the middle of a critical stage in production or synthesis can ruin yields and end up wasting expensive materials.<sup>2</sup> Increased levels of automation in the modern industry mean that the negative impact of power cuts is greater than ever before.

Even temporary voltage drops can cause a mind-boggling array of problems for industrial facilities. These voltage 'sags' make up over 92 percent of all power-quality events, making them

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by far the most common power supply problem for businesses.<sup>3</sup> These, as well as voltage 'spikes', can wreak havoc with computers, servers and other sensitive electrical equipment. In May 2017, British Airways hit the headlines when a momentary power supply event forced a crucial data center to undergo an uncontrolled restart, resulting in around 800 flights from London Gatwick being cancelled. Though the interruption to normal power supply was only brief, this incident was estimated to have cost British Airways over \$100 million.<sup>4,5</sup>

Unfortunately, power supply problems are worsening worldwide, both in frequency and severity.<sup>6</sup> For example, the average number of power outages in the USA doubled every five years between 2000 and 2014.<sup>7</sup> Our electrical distribution infrastructures were originally designed to handle much smaller loads, and are now struggling to bear the strain of an ever-growing population and an increasing reliance on electrical and electronic equipment.

With this in mind, an increasing number of manufacturing and industrial facilities are opting to install power protection hardware to safeguard themselves against the spikes, sags, surges and blackouts of our aging and overworked power grids.

### Power protection equipment for industry and manufacturing

ABB is aware of the damage that can be caused by unpredictable power supplies and have designed a PCS100 range of advanced power protection solutions to keep industries on their feet even under the most demanding conditions.

The PCS100 range includes two Active Voltage Conditioners – PCS100 AVC-40 and PCS100 AVC-40 – developed to ensure a continuous and clean power supply during grid disturbances. The PCS100 AVC-40 was designed for especially demanding or sensitive machinery, offering a power range of 150 – 3600 kVA. The PCS100 AVC-20 has a power range of 250 – 3000 kVA, making it the ideal voltage regulator for most commercial and industrial applications.

These products detect anomalies in utility voltage and apply correcting voltages rapidly without relying on energy storage to ensure a perpetually clean and reliable 3-phase power supply. The units are built to act quickly and effectively: each unit can detect voltage disturbance within 250  $\mu$ s.

The PCS100 UPS-I (Industrial Uninterruptable Power Supply) is a power protection product that protects customers' loads during outages and major voltage disturbances. Such events can be caused by faults in the electricity network and, more commonly, weather events such as lightning.

The PCS100 UPS-I is a solution for recloser events, deep voltage sags (dips) or swells and it supports critical loads until the utility voltage returns to within specification or a standby generator starts. The length of the backup time is dependent on the power requirement of the load and the capacity of the storage system. The PCS100 UPS-I range has models up to 3 MVA at low voltage, making it suitable for even large industrial processes.



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For more information contact your local  
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