Powering ahead

AVC-20 bound for Germany – 07
ABB receives first order for PCS100 AVC-20
Three month payback for pharmaceutical manufacturing giant – 12
PCS100 AVC corrects voltage fluctuations at Apotex
Building the future in China – 16
ABB provides power protection to new LEGO factory in China
SuperSwitch®4 – 18
Next generation static transfer switch redefines reliability
Voltage irregularities are one of the greatest power quality issues facing industry today. In fact, about 95 percent of the problems revealed in electrical networks stem from voltage sags or surges. ABB’s power protection systems eliminate these common issues, improving your business’s overall performance.
Welcome to the first issue of power for 2016 and the year in which ABB celebrates its 125th anniversary in Switzerland. For 125 years ABB’s technology has been driving the modern world; 125 years of innovation and we hope that you continue with us on the journey ahead.

The outlook for power protection in 2016 continues to look promising. Through the ongoing development of new and existing products, our momentum in the power protection market is continuing to build across all industries. This is a result of our unique lineup of UPS, power conditioning and power switching products designed to solve power quality issues for commercial and industrial applications, and therefore enabling ABB to position itself as a leader in power protection worldwide.

In this edition, you can find out more about the new developments in store for the power protection team this year. This includes an introduction to the light industrial UPS PowerLine DPA, an extension of the existing industrial offering that will be released at HannoverMesse in April. The next generation of MV UPS will also be released this year by our team in Napier, New Zealand and we look forward to communicating further information about this product and its key features and benefits very soon.

From our US based team, the Cyberex® PowerBuilt™ Industrial UPS will extend its power range to 80 kVA. Also, building on the momentum from the 2015 launch of the Conceptpower DPA 500 480V UL modular UPS, the team plans to develop and launch the UL versions of the Conceptpower DPA 120 and 300 systems, extending the UPS power protection footprint in North America.

A significant milestone was reached this quarter for our power conditioning business when we received our first order for the PCS100 AVC-20. The product will be installed in one of the largest steel producers in Europe, Salzgitter AG based in Germany. We have received a great deal of interest in our PCS100 AVC-20 since its launch in October last year and are delighted to have secured the first official order of this product.

Highlighted in this issue is a noteworthy article on how the PCS100 active voltage conditioner (AVC) significantly improved the power quality at pharmaceutical manufacturing giant Apotex’s Signet drive facility. In fact, the AVC unit corrected voltage fluctuations almost immediately and within six weeks of commissioning, the PCS100 AVC compensated for forty-two events and the total installed cost was paid back within three months. This recent project highlights ABB’s commitment to providing our customers with technology that will propel them to the next level and beyond.

ABB’s flagship UPS, the Conceptpower DPA, is a true online double conversion modular UPS designed for medium-sized critical applications. In this issue, you can read about the key features and benefits of the product. Also covered this month is the SuperSwitch®4, now available for UL markets. This next generation platform static transfer switch is the cornerstone of redundant power for a wide range of applications including data centers, hospitals, semiconductor manufacturing and other installations where continuous power is critical to a facility’s mission.

In conclusion, it just remains for me to thank you all once again for your support and for reading this update.

Enjoy this issue of power.
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Next generation static transfer switch redefines reliability

Contact Us – power protection made easy!

Scan our QR Codes with your smart phone to find web links, videos or event pages, providing further details about ABB’s products and services.
Availability is everything when it comes to a UPS, so ABB’s modular UPS architecture is designed to make sure that power is always available when you need it. Each high-reliability, standardized module is self-contained and can be online-swapped at any time, so nothing has to be ever switched off – making routine maintenance safe and easy. And if one module gets into trouble, the others take over the load and keep the show on the road. Availability available now at www.abb.com/ups

ABB modular UPS. Always reliable and always available.
PCS100 AVC-20 bound for Germany

ABB has received its first order for the new AVC-20 active voltage conditioner which will be installed at one of Europe's largest steel producers.

Following the launch of the PCS100 AVC-20 active voltage conditioner in October last year, our power conditioning business is pleased to announce that we have received our first official order of this product from Salzgitter AG, a German steel and technology company. The PCS100 AVC-20 will provide power protection to their steel welding process where lengths of steel rod or steel strip are welded together with a laser welder. The welders being protected are 12 kW each.

Salzgitter AG is one of the largest steel producers in Europe, with an annual output of around nine million tonnes and a workforce of more than 25,000 employees. They produce heavy profile steel sheets, hot-rolled wide strips and steel strips, heavy and medium weight plates, sheet steel, and trapezoidal sheeting.

The PCS100 AVC-20 is a power protection system designed for use in industrial and large commercial operations in environments where an unstable network or utility voltage affects productivity. The system ensures a continual, regulated supply of utility voltage where the electric infrastructure is stressed, unstable or unreliable. The result, a reduction in downtime, improved productivity and increased manufacturing quality.

To find out more about ABB’s PCS100 AVC-20:

Web: www.abb.com/ups
Video: The features of the PCS 100 AVC-20
Email: powerconditioning@abb.com
Powering ahead into 2016

A new year brings exciting new developments for our power protection systems here at ABB. New products, such as the light industrial UPS PowerLine DPA and extensions to the PCS100 MV UPS with the introduction of higher voltages and new technologies; just a few of the developments that will assist in enhancing our power protection offerings across the globe.

An extension of the industrial product offering will see the introduction of the new light industrial UPS PowerLine DPA at HannoverMesse in April.

This product is based on ABB’s decentralized parallel architecture (DPA). It will be available with rated powers of 20 to 120 kVA and IP31-rated protection that can easily cope with dust, water condensation, excessive humidity (up to 95 percent), corrosive air contamination and rough manhandling. The UPS is designed to operate in a temperature range of -5 to +45 C. High priority has been given to safety and the PowerLine DPA features a high degree of protection for users and maintenance staff.

It is compliant with the relevant standards IEC/EN 62040-1 for general and safety aspects, IEC/EN 62040-2 for EMC and IEC/EN 62040-3 for performance and test. PowerLine DPA, an online double conversion UPS, has a small footprint and cable access at the front (top and bottom), which eliminates the extra space required for rear access.

Additionally, this year will also see extensions to the PCS100 MV UPS technology, with developments well underway. This exciting new product will be officially launched later this year and further information, market positioning and key features will be released soon.
From our US based team, the Cyberex® PowerBuilt™ Industrial UPS will extend its power range to 80 kVA. This single-phase industrial UPS system is designed to support the continuing demand from downstream refining and petrochemicals, upstream oil and gas, power generation, and the growing regulatory and safety needs of today’s industrial complexes.

Also, building on the momentum from the 2015 launch of the Conceptpower DPA 500 480V UL modular UPS, the US team plans to develop and launch the UL versions of the Conceptpower DPA 120 and 300 systems, extending the UPS power protection footprint in North America. Stay tuned for new product updates to follow in future issues of power.

ABB’s Power Protection Research and Development team are constantly improving the technology of the platform. Setting trends for hardware and control platforms, ensuring the highest reliability, efficiency and the smallest footprint, will shape the future of power protection in commercial and industrial applications.

To find out more about ABB’s power protection solutions: Web: www.abb.com/ups
ABB’s Power Protection portfolio

ABB has all bases covered when it comes to the power protection of sensitive loads. Covering applications from computer rooms, to large data centers and complete industrial plant protection. From a few kVA, right through to applications of many MVA and a wide range of supply voltages, ABB has the UPS and voltage conditioning technology for every need.
## Power protection – product portfolio

### Standalone UPS

<table>
<thead>
<tr>
<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PowerValue 11 RT</strong></td>
<td>1 kVA - 10 kVA</td>
<td>Up to 93% efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parallel to 20 kVA</td>
<td>Protection against power outages and disturbances</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Battery energy storage</td>
<td></td>
</tr>
<tr>
<td><strong>PowerValue 11/31 T</strong></td>
<td>10 kVA - 20 kVA</td>
<td>Up to 93% efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parallel to 80 kVA</td>
<td>Protection against power outages and disturbances</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Battery energy storage</td>
<td></td>
</tr>
<tr>
<td><strong>PowerValue 11 RT</strong></td>
<td>10 kVA - 50 kVA</td>
<td>Exceeding 98% eco-mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parallel to 200 kVA</td>
<td>Protection against power outages and disturbances</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Battery energy storage</td>
<td></td>
</tr>
<tr>
<td><strong>PowerValue 11/31 T</strong></td>
<td>10 kVA - 100 kVA</td>
<td>Exceeding 99% eco-mode</td>
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<tr>
<td></td>
<td>Parallel to 400 kVA</td>
<td>Protection against power outages and disturbances</td>
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<td></td>
<td></td>
<td>Battery energy storage</td>
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</tbody>
</table>

### Modular UPS

<table>
<thead>
<tr>
<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PowerWave 33</strong></td>
<td>60 kW - 500 kW</td>
<td>Protection against power outages and disturbances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parallel to 5 MW</td>
<td>Battery energy storage</td>
<td></td>
</tr>
<tr>
<td><strong>PowerScale</strong></td>
<td>10 kVA - 50 kVA</td>
<td>Up to 96% eco-mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exceeding 99% eco-mode</td>
<td>Protection against power outages and disturbances</td>
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<td></td>
<td></td>
<td>Battery energy storage</td>
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</tbody>
</table>

### Industrial UPS

<table>
<thead>
<tr>
<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCS100 UPS-I low voltage</strong></td>
<td>150 kVA - 3000 kVA</td>
<td>Exceeding 99% efficiency</td>
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<td></td>
<td></td>
<td>Outage protection</td>
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<td></td>
<td></td>
<td>Supercapacitors or batteries</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Single conversion</td>
<td></td>
</tr>
<tr>
<td><strong>PCS100 medium voltage UPS</strong></td>
<td>1 - 6 MVA</td>
<td>Exceeding 99% efficiency</td>
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<td></td>
<td></td>
<td>Outage protection</td>
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<tr>
<td></td>
<td></td>
<td>Supercapacitors or batteries</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Offline system</td>
<td></td>
</tr>
<tr>
<td><strong>Cyberex® PowerBuilt™</strong></td>
<td>10 kVA - 80 kVA</td>
<td>Online double conversion technology</td>
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<tr>
<td></td>
<td></td>
<td>Fully rated digital static transfer switch</td>
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<td></td>
<td></td>
<td>Active current limitation in IGBT based PWM inverter</td>
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<tr>
<td></td>
<td></td>
<td>Design life of 20 years</td>
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</table>

### Voltage Conditioning

<table>
<thead>
<tr>
<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCS100 AVC-40</strong></td>
<td>150 kVA - 3.6 MVA</td>
<td>Exceeding 98% eco-mode</td>
<td></td>
</tr>
<tr>
<td>(Active Voltage Conditioner for sag correction)</td>
<td></td>
<td>Serial connected</td>
<td></td>
</tr>
<tr>
<td><strong>PCS100 AVC-20</strong></td>
<td>250 kVA - 3 MVA</td>
<td>Exceeding 98% eco-mode</td>
<td></td>
</tr>
<tr>
<td>(Active Voltage Conditioner for voltage regulation)</td>
<td></td>
<td>Short circuit protected</td>
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<tr>
<td></td>
<td></td>
<td>Rugged overload capability</td>
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<td></td>
<td></td>
<td>Low maintenance</td>
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</tbody>
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### Power Factor Correction - Low order harmonics and current voltage imbalances

<table>
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<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCS100 RPC</strong></td>
<td>100 kVA - 2 MVar</td>
<td>Exceeding 97% eco-mode</td>
<td></td>
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<tr>
<td>(Reactive Power Conditioner)</td>
<td></td>
<td>Shunt connected</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Grid compliant</td>
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<tr>
<td></td>
<td></td>
<td>High and low voltage ride through</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Power factor control</td>
<td></td>
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</tbody>
</table>

### Frequency Conversion

<table>
<thead>
<tr>
<th>Products</th>
<th>Power range</th>
<th>Main features</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCS100 SFC</strong></td>
<td>125 kVA to 10 MVA</td>
<td>High efficiency power conversion</td>
<td></td>
</tr>
<tr>
<td>Static Frequency Converter</td>
<td></td>
<td>Small footprint design</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Clean sinewave output voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Built-in module redundancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lowest total cost of ownership</td>
<td></td>
</tr>
</tbody>
</table>
# Power protection – product portfolio

<table>
<thead>
<tr>
<th>Outage protection</th>
<th>Power range</th>
<th>Main features</th>
<th>Products</th>
<th>Single line diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital Static Transfer Switch</strong></td>
<td></td>
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</tr>
<tr>
<td>SuperSwitch®3</td>
<td>200A – 4000A 2 or 3 source 3 or 4 pole</td>
<td>Improved reliability  High speed transfers between sources  Allows concurrent maintenance  True fault-tolerant architecture  SuperSwitch® algorithm provides unmatched transfers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SuperSwitch®4</td>
<td>200A – 1200A 208V, 480V 60Hz</td>
<td>Advanced SuperSwitch® platform  Touch screen controls  25% faster DIR transfer times  40% lower inrush limiting  Enhanced power quality detection</td>
<td></td>
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</tr>
<tr>
<td>SuperSwitch®GT</td>
<td>200A – 1000A Grid tie switch</td>
<td>Improved reliability  High speed transfers between sources  Allows concurrent maintenance  True fault-tolerant architecture  SuperSwitch® algorithm provides unmatched transfers</td>
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<td></td>
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<tr>
<td><strong>Power Distribution</strong></td>
<td></td>
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</tr>
<tr>
<td>Cyberex® PDUs</td>
<td>50 kVA – 750 kVA</td>
<td>Three main cabinet sizes  Distributes, protects and monitors power to servers  Steps down voltage to utilization level  Nearly unlimited configurations of panelboards and sub-feeds  Support customization for diverse loads  Comprehensive system monitoring for data management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyberex® RPPs</td>
<td>Up to 240 V Up to 400A Up to 168 circuits</td>
<td>Two main cabinet sizes  Distributes and protects power to single phase circuits  Reliable and flexible power distribution  Comprehensive system monitoring for data management  Circuit management available</td>
<td></td>
<td></td>
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<tr>
<td><strong>Integrated Systems</strong></td>
<td></td>
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</tr>
<tr>
<td>Cyberex® MC</td>
<td>200A – 800A 75 kVA – 300 kVA</td>
<td>SuperSwitch® platform integrated with PDU  Patented algorithm provides unmatched transfers  Maximizes reliability and availability  True fault-tolerant architecture  Dynamic inrush for applications with downstream transformers  Expert power management  Waveform capture  Software-guided breaker operation and bypass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyberex® ZF</td>
<td>200A – 800A 75 kVA – 300 kVA</td>
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</tr>
</tbody>
</table>
A continual, regulated supply of utility voltage?

Absolutely.

The PCS100 AVC-20 is a power protection system designed for use in industrial and large commercial operations in environments where an unstable network or utility voltage affects productivity. The system ensures a continual, regulated supply of utility voltage where the electric infrastructure is stressed, unstable or unreliable. Visit [www.abb.com/ups/pcs100](http://www.abb.com/ups/pcs100)
Three month payback for pharmaceutical manufacturing giant

A PCS100 AVC corrects voltage fluctuations at Apotex's Signet drive facility.
Apotex Inc. is the largest Canadian-owned pharmaceutical company and is a trusted member of Canada’s healthcare community. The company’s pharmaceuticals can be found in virtually every pharmacy and healthcare facility across Canada and are exported to over one hundred countries across the globe.

Apotex’s Signet drive facility is the cornerstone of solid dose production and operates 24/7. The large, modern, multi-product facility had been experiencing frequent power quality events due to extreme weather conditions and older utility infrastructure.

Voltage sags and short interruptions are, by far, the two most common types of power quality disturbances and the most frequent causes of disrupted operation of many industrial processes, particularly those using power electronics equipment. Pharmaceutical manufacturing is a highly sensitive process that involves a number of precisely controlled steps, as well as the prerequisite to comply with the stringent sterility standards, set by the various drug regulatory bodies.

Therefore, the requirement to source a suitable power protection solution to produce a continuous production output without any interruptions was critical.

The solution
A large 4.8 MV Active Voltage Conditioner was supplied to Apotex through ABB’s Canadian partner, Omniverter. The highly efficient technology of the PCS100 AVC system means that voltage sags and swells are corrected whilst providing continuous voltage regulation and load voltage compensation.

Since the commissioning date in March 2015, the pharmaceutical manufacturing giant has seen an exceptional change in performance on their production processes. The AVC unit corrected voltage fluctuations almost immediately and within six weeks of commissioning, the PCS100 AVC compensated for 42 events and the total installed cost was paid back within three months. All of this has been provided by a system with extremely high electrical efficiency and resultant energy savings, when compared with alternative legacy solutions.

To find out more about ABB’s PCS100 AVC-40 solutions:
Web: www.abb.com/ups
Email: powerconditioning@abb.com

The large PCS100 active voltage conditioner installed on the roof of Apotex’s Signet drive facility.
Conceptpower DPA

The modular UPS for medium-sized critical applications.
ABB’s Conceptpower DPA is a true online double conversion modular UPS designed for medium-sized critical applications. The Conceptpower DPA’s robust, proven modular architecture provide a very flexible power configuration based on 30/40/50 kVA modules that can be added as power requirements grow. This eliminates oversizing, reduces energy costs and minimizes upfront capital investment.

Each DPA module is self-contained and can be online-swapped at any time, so nothing has to be transferred to the bypass or switched off – making routine maintenance safe and easy. A Conceptpower DPA UPS can be expanded step-wise up to 1.5 MVA.

The result of a UPS failure can be expensive, or even catastrophic, and for this reason, the most critical loads should be protected by the very best UPS design - decentralized parallel architecture (DPA). DPA provides not only the best availability, but also the best serviceability, scalability and flexibility. Taken together, these features deliver a low total cost of ownership.

Conceptpower DPA architecture
If one part of a UPS that is based on a centralized parallel architecture fails, the whole UPS can fail. With the Conceptpower DPA, on the other hand, the UPS is modularized and each module has all the hardware and software needed for autonomous operation - rectifier, inverter, battery converter, static bypass switch, back-feed protection, control logic, display, and mimic diagram for monitoring and control.

The modular architecture of Conceptpower DPA is ideal for N+1 redundancy, ie, when one more module is installed in addition to the minimum number required to supply the critical load. If one module fails, the others take up the load.

DPA makes Conceptpower DPA a very robust UPS with an extremely low failure rate.

Scalability
As UPS power requirements grow, the modular nature of Conceptpower DPA makes it really easy to add modules and increase the power capabilities. So, the initial configuration does not have to be oversized to cater for future expansion and the user only cables, powers and cools what is currently needed.

Online-swapping and serviceability
Conceptpower DPA’s modules can be removed or inserted without risk to the critical load and without the need to power down or transfer to raw mains supply. This unique aspect of modularity directly addresses continuous uptime requirements, significantly reduces MTTR, reduces inventory levels of specialist spare parts and simplifies system upgrades. This approach pays off when it comes to serviceability as the service personnel do not need special skills.

Energy and space costs
Conceptpower DPA has excellent energy efficiency (up to 95.5 percent true online efficiency and ≥ 98 percent in Eco-mode) and its efficiency curve is very flat, so there are significant savings in every working regime. A Conceptpower DPA modular rack has a small footprint and when extra modules are added, no extra floor space is taken up.

Standardized modules
Conceptpower DPA modules are standardized. This keeps costs low as modular systems with standardized connections can be pre-wired, tested and field-configured at the factory.

Conceptpower DPA for mission critical processes
Highly dependable UPSs are increasingly mission-critical for many parts of industry. Conceptpower DPA is a proven mature product that delivers unparalleled UPS availability and the serviceability, scalability, flexibility and low energy usage - made possible by the modular DPA approach. An ultimate UPS architectures available for those users whose critical electrical loads represent a valuable commercial asset that must be kept powered at all costs.

Figure: each UPS module has all the hardware and software required for autonomous operation; there are no shared critical elements.
Building the future in China

ABB provides power protection to new LEGO factory in China.
Construction of the LEGO Group’s first factory in Asia is well underway as the world’s second largest toymaker taps into the ever increasing demand in the region. LEGO’s sales have tripled since 2007, with Asia playing a big part in its success as their annual sales have increased by more than fifty percent in recent years. The new Asian factory will be fully operational in 2017 and is expected to meet nearly 80 percent of the total regional demand for LEGO.

The factory is located in the city of Jiaxing, approximately 100 km from Shanghai where the LEGO Group is also planning to locate their regional distribution center for Asia. Once up and running, the entire toy manufacturing process will require significant reliable power resources to ensure consistency and maximum productivity.

China’s electrical infrastructure is the largest in the world, and the country has the greatest capacity for energy generation, globally. However, demand outstrips supply and the utility grid is frequently overstretched and poor power quality is common. LEGO therefore turned to ABB for a power protection solution designed to improve power factor and reduce harmonics, which will result in an improved reliability of power supply within their Asian factory.

The total solution
Installed in the switch room of the new factory are ten single module PCS100 reactive power conditioners (RPC) which are able to respond instantly to power quality events, while providing continuous reactive power correction.

Key benefits
Based on a unique modular design providing high reliability, the PCS100 RPC will provide LEGO’s factory with benefits such as:
- Ensuring correct operation of 3-phase rectifier loads, extending their lifetime, by correcting for voltage unbalance
- Lowering maintenance costs by not exposing equipment to poor quality power
- Eliminating the risk associated with traditional power factor capacitor correction systems such as, overheating caused by harmonic resonance problems
- Improved factory supply

Production plants and many other facilities are often confronted with a number of disturbances, from distortion of supply voltage, to harmonics and high inrush currents. An unstable supply can result in downtime, and either reduces the life of expensive electronic equipment or causes damage to it. For that reason, ABB sees a great demand for the PCS100 RPC which is available from 100 to 2000 kVA and responds instantly to power quality events, while providing continuous reactive power correction.

For more information on ABB’s PCS100 RPC:
Web: www.abb.com/ups
Email: powerconditioning@abb.com
SuperSwitch®4

Next generation static transfer switch redefines reliability

Reliability through design excellence

The SuperSwitch®4 is now available for UL markets. This next generation platform static transfer switch is the cornerstone of redundant power for a wide range of applications including data centers, hospitals, semiconductor manufacturing and other installations where continuous power is critical to a facility’s mission. Engineered to protect critical loads in both commercial and industrial environments, these switches can transfer power between any two sources of power, including any combination of utility, UPS and generators.

SuperSwitch®4 covers power ranges from 200A to 1000A and utilizes the latest DSP technology to deliver transfer time 25 percent faster and controls transformer in-rush 40 percent lower than prior generations. New features in this generation include industrial long life touch screen user interface, USB port for easy access to event logs, more customer input/output connections, enhanced metering, and waveform capture. SuperSwitch®4 provides maximum reliability through its innovative design.

The modular components, from the power stage to the redundant bus architecture, have been engineered to unprecedented standards. Fully rated hockey puck SCRs are employed to prevent system damage after load faults. The superior cooling design of the assembly enables higher current applications.

As much as 30 percent smaller than comparable industry models, the ultradense design maximizes floor space. Ease of installation and flexibility are ensured by flexible access from either the front, side or rear. Power connections are made from either the top or bottom. Infrared scans are easily accomplished without removal of assembly. Connections and maintenance are made easier by staggered phase connections and ample gutter space.
**State of the art performance**

- Expands SuperSwitch® technology with enhanced platform and features
- 10.4" color TFT industrial use VGA LED touch screen GUI with backlight life of up to 70,000 hours
- 25% faster transfer times
- 40% lower inrush limiting
- Enhanced power quality detection
- Field calibration support
- USB port for data uploads and event downloads
- 16 user configurable alarm relays
- 10 user inputs for communications control
- Enhanced meters and trending
- 10 cycle waveshape captures of critical power events
- Improved circuit redundancy

The 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 units to static transfer and uninterruptible power supply systems, ABB can optimize your centralized power protection design.

For more information visit:
Web: [www.abb.com/ups/static-switches](http://www.abb.com/ups/static-switches)
A secure energy supply is a foundation for success and continuity for many enterprises — be they industrial plants, offices, healthcare facilities, utilities or data centers. A power outage in some of these enterprises — such as a semiconductor plant or financial IT system — can be a very expensive business indeed, with costs sometimes running into the tens of millions of dollars. This is why many businesses install an uninterruptible power supply (UPS). However, to ensure the highest availability and faultless function of the UPS, it is essential to carry out regular and professional maintenance on the UPS and its ancillary systems. ABB has developed a comprehensive range of service technologies to keep its UPS products running smoothly over the entirety of their useful lives.

Power network faults can occur in many ways. In addition to complete blackouts, the voltage can temporarily drop or increase. Also, there may be electrical noise, fluctuations in the mains frequency or harmonics in the voltage. These problems can be addressed by installing a UPS. A UPS can filter out upstream power disturbances as well as bridge any power dropouts to ensure a constant supply of clean, reliable power for all critical systems. When power is lost for a longer time, the UPS can handle the switchover to a generator or other long-term energy supply, such as an auxiliary battery bank.
ABB has a full range of single-phase and three-phase UPSs and ancillary products that meet the performance requirements of industrial, commercial and data center customers. Recognizing the criticality of keeping the power on, these products have been based on a robust design philosophy that guarantees excellent performance, ease of use and environmental compatibility.

However, a UPS can only do its job properly when it is supported by a professional service approach: To ensure the highest availability and the faultless function of power infrastructure, it is essential to perform regular and professional maintenance on the UPS and its ancillary systems. If the UPS fails for any reason, the costs can be dramatic.

The price of failure
“Over 95 percent of large enterprises with more than 1,000 employees say that on average, a single hour of downtime per year costs their company over $100,000; over 50 percent say the cost exceeds $300,000; and one in 10 indicate hourly downtime costs their firms $1 million or more annually” [1]. Whatever the particular circumstances of a company, the costs of a power-down episode can be high. These losses are reflected in five areas.

Salary costs: Many employees are fully dependent on electrical power to be able to carry out their work - whether they use IT equipment or tend machines, or rely on the power to facilitate their work or ensure safety (eg, tools, lighting). Employees are usually the most expensive element in any enterprise and costs can quickly mount when dozens or hundreds of employees are sitting around waiting for the power to come back on.

Corrective action: The originating fault needs to be fixed and any knock-on damage has to be put right, too. Moreover, there could be an expensive restart procedure and some production lines do not take too kindly to stoppages so there may be significant scrappage costs (eg, in the semiconductor industry or processes that involve heating cycles). Also, external temporary staff may have to be brought in, or overtime payments made, for “catchup” work.

Loss of work and revenue: When the power disappears, work-in-progress may be irretrievably lost. Also, further production is halted. For enterprises such as data centers, customer data could be jeopardized – a fatal occurrence in such a business. Customers may be lost to competitors.

Penalties: If the power loss leads to contraventions of service agreements, regulatory compliance obligations or delivery commitments, data loss, or substantial financial penalties could be incurred.

Prestige: The cost of reputation damage is difficult to quantify. However, no company wants to have its name attached to unreliability of any kind, especially as the reported facts of the case can quickly be exaggerated far beyond the actual facts on social media and specialist websites.

In other words, it pays dividends to carry out effective maintenance on the UPS and associated systems.

ABB’s four-phase life cycle model
Life cycle management of an ABB UPS system is based on a model with four phases: Active, Classic, Limited and Obsolete. This model presents customers with a transparent procedure that enables them to plan their investments in UPS technology.

In every phase, the customer can clearly see what life cycle services are offered and decide to retrofit or replace the equipment. The availability of individual services depends on the life cycle phase of each UPS /1-2.

<table>
<thead>
<tr>
<th>Active</th>
<th>Classic</th>
<th>Limited</th>
<th>Obsolete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product and spare parts are available.</td>
<td>Although the product has been replaced by a new active product, it may be available as a spare part or for extension purposes.</td>
<td>Product is no longer available.</td>
<td>Product is no longer available.</td>
</tr>
<tr>
<td>Product life cycle enhancements are supported through upgrade and retrofit solutions.</td>
<td>Migration to the active product generation is recommended.</td>
<td>Migration to the active product generation is recommended.</td>
<td></td>
</tr>
<tr>
<td>Spare parts are available.</td>
<td>Spare parts are available but delivery time might be affected.</td>
<td>Spare parts are no longer available.</td>
<td></td>
</tr>
<tr>
<td>Full range of life cycle services and support is available.</td>
<td>Full range of life cycle services and support is available.</td>
<td>Limited range of life cycle services and support is available.</td>
<td>Migration support is available.</td>
</tr>
</tbody>
</table>

The four-phase life cycle model.
Technical support on three levels

ABB’s service for the UPS product line is global and is provided by ABB itself or by qualified members of ABB’s partner network. All ABB and partner service engineers go through intense product-specific training before they are allowed to carry out service work at a customer site. If an issue arises, the end customer contacts their local ABB representative or the nominated ABB partner for assistance. The resulting technical support from ABB is structured on three levels:

**Level 1:** Local ABB service or authorized technical partner. A local field service engineer will help the customer to solve the issue, either by phone or by going to the site.

**Level 2:** 24 × 365 Supportline (based in Switzerland). If the field service engineer is in need of assistance, he can contact the round-the-clock, 365-days-a-year ABB Supportline in Switzerland for assistance. The support team experts are always on duty and will return any call at any time.

**Level 3:** R & D and technical office (Switzerland). R & D and system engineers are always available to help the support line experts whenever a deeper investigation is needed.

During this whole process, the support line expert will be the only point of contact for the local service engineers. This ensures consistency, guarantees that the customer is kept fully informed and enables a rapid resolution of the issue. ABB or partner service personnel will often be on-site in any case – for regular maintenance management, on-site commissioning and start-up, training, product care and so on.

Service portfolio for ABB UPSs

Designing and manufacturing a high-quality UPS is only half the story - the equipment must also be correctly specified, installed, commissioned and maintained. The idea of ABB’s service portfolio for UPSs is to ensure that the appropriate proactive support is provided throughout the entire life cycle of the UPS equipment so that power availability is guaranteed – no matter what happens on the power supply side. This pre- and post-sales support infrastructure comprises a comprehensive range of services:

**Installation and commissioning**

ABB installation services are available anywhere in the world, regardless of project size or complexity. The engineers involved have extensive practical experience gained in many installation and commissioning assignments. Commissioning activities include full installation, testing, onsite configuration, startup process and commissioning.

**Maintenance**

The primary goal of maintenance is to prevent failures and eliminate potential damage as quickly and as safely as possible – at the lowest feasible cost. A life cycle assessment carried out by ABB, or an ABB channel partner, provides the foundation for developing a long-term maintenance and improvement plan. The purpose of the assessment is to define measures to be taken to lower operational costs, improve productivity, reduce environmental impact and enhance safety.

A well planned service approach increases return on investment and allows facilities to be operated with maximum efficiency and availability throughout their life cycle.
An effective improvement plan not only helps customers budget maintenance costs but also helps them organize future upgrades, retrofits and replacements. Maintenance activities include:

- Inspection and diagnostics
- Refurbishment/reconditioning services
- UPS service assessment
- Preventive maintenance

Remote monitoring

Visibility of the power system status is critical and, for this reason, ABB provides intelligent solutions that monitor the status and thus ensure the data storage equipment or control process continues to receive clean, reliable power. The monitoring devices provide real-time condition information and help identify problematic trends before they become critical. For example, power downtime may threaten to exceed battery autonomy and it is essential the relevant staff are fully aware of this fact as soon as possible so that remedial action can be taken.

Environmental sensors can be connected to the cards that link the UPS to the network and data from these sensors can be displayed alongside other UPS status information. The status of each UPS cabinet, each UPS module or the entire system can be presented on a separate mimic diagram. These diagrams provide users with clear, real-time information. During normal operation, records of all events are kept in a log file. In the case of a power failure, battery autonomy is monitored and network shutdown of the protected devices is initiated.

The remote shutdown or reboot software can manage a particular workstation, network or servers. Also, text messages, e-mails, pop-ups and mobile messages can be dispatched or displayed before the devices are shut down – giving the user the flexibility to manage or cancel the operation.

Highlights of this connectivity are:

- Remote monitoring via the Web
- Environmental monitoring
- Extensive alarm handling and dispatching
- Redundant UPS monitoring
- Integration into network or building management system
- Integration into multivendor and multiplatform environments
- ModBus TCP/RS485/RS232, Telnet FTP, HTTP, SNMP, SMTP (e-mail)

Repairs

Round-the-clock, on-site technical assistance together with advanced product and application support via telephone or e-mail offer fast failure analysis and rectification. Corrective maintenance, workshop repairs, on-site repairs and technical support are all part of this.

Spares and consumables

Good parts availability and the most efficient delivery mechanism are the keys to the success of ABB’s spare parts services. For the customer, parts availability contributes to a smaller inventory and lower long-term ownership cost. ABB can help plan spare part stocking throughout the life cycle of the equipment.

Because all spare parts are verified, customers can be assured that they meet all safety and reliability standards and that all warranties are valid. Depending on the particular life cycle model, support covers not only spare parts but also services related to repairs and replacements.

Extensions, upgrades and retrofits

Upgrades for ABB UPSs are designed to improve the performance and extend both the functionality and the lifetime of the equipment. Upgrade services comprise both hardware and software updates.

Training

In some situations, customers may prefer to train their own staff to maintain the UPS. To accomplish this to the required level, ABB offers standard or customized classroom courses in one of its certified training centers or on-site by experienced trainers. Participants learn the skills required to install, start up, maintain and operate the UPS. Every service engineer is required to attend technical training at least once every two years and to be up-to-date on ABB’s equipment and safety procedures.

Well-trained and highly motivated employees will reduce costs and increase operational efficiency by ensuring safe, correct and reliable operation, and reducing downtime.

Service agreements

Depending on the needs of the customer, individual services can be bundled into one contract. Spare parts agreements and agreements on preventive or corrective maintenance are examples of such a contract. Benefits of a comprehensive service agreement include improved cost control, enhanced operational efficiency, lower capital expenditure, reduced downtime and extended equipment lifetime.
Advanced services
Implementing the right action at the right time can be a challenge. ABB can support asset managers in defining a proactive maintenance strategy that can lead to significant savings. ABB takes care of the actual condition of the equipment, optimizes its performance and defines new features to fulfill today’s and future requirements while complying with safety and new standards. These advanced services provide a customized approach to address specific needs relating to asset condition optimization, remote equipment monitoring or new features.

Factory acceptance tests (FATs)
Factory acceptance tests are also a key part of the ABB service portfolio – standard FATs, special FATs on customer request, FAT management and reports, and associated logistics coordination are all part of this activity.

Prevention is better than cure
There is little point in installing an advanced UPS system only for it to run into trouble when it is most needed. Top-quality service will ensure that the UPS performs with full integrity and safety throughout its entire lifetime.

Reference
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18. **Data center boost**
   Latest modular UPS technology

08. **ABB wins back major Chinese manufacturer**
   Power protection for CSOT’s new flat panel display factory

10. **DPA 500 bound for Nigeria**
   ABB’s Conceptpower DPA 500 modular UPS fits bill in Nigeria

15. **North American debut**
   New DPA 500 UL 480V system unveiled

17. **White paper**
   Preventing transformer saturation in static transfer switches

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