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A customer magazine
of the ABB Group

insider



Power conditioning

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Providing power conditioning for the public transport industry

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ABB will help to ensure power stability for Aktogay sulphide plant

Power and productivity
for a better world™



ABB's Reactive Power Conditioner (RPC) is providing power protection to the public transport industry for the first time.



Front cover photo taken by blue polaris

Insider



John Penny
General Manager
LV Power Converter Products (DMPC)

From a 100 kVAr PCS100 Reactive Power Conditioner (RPC) conditioning the supply to the DC drives running the iconic cable car in Wellington, New Zealand, to a 32 MVAR STATCOM applied in a challenging mining application in Kazakhstan, ABB's power conversion products are finding wide global application.

Reactive power conditioning is now available from small product based solutions through to large scale containerized packages. Motors and drives create some challenging issues, particularly on weak power supplies, and ABB is now well placed to correct the power factor, load induced voltage drop or even low order harmonics.

The Newave team in Quartino, Switzerland has been busy developing and releasing even larger versions of their very successful DPA modular range of product. With modules now available up to 100 kVA ratings and able to be massively paralleled to a 3 MVA rating with high availability and efficiency, even the largest of data center applications can be addressed with the new DPA 500 UPS product.

In the semiconductor industry the focus is often on removing costly voltage sags and outages so voltage conditioning technology provides the ideal solution. Taiwan's ASE, world leader in semiconductor packaging, Taiwan's ASE has ordered three Active Voltage Conditioner's (AVC) and are currently using an 1800 kVA PCS100 AVC in their Kaohsiung plant. The small foot print and high electrical efficiency make the AVC an ideal solution for these sorts of applications increasing plant productivity.

From 1 January 2014 the Napier, New Zealand-based team, responsible for the successful PCS100 range of products, will become part of the Power Protection product group with Newave.

The teams are already working closely together, however the change in structure will allow ABB to even more effectively deliver an extremely comprehensive range of power protection solutions globally. The more systems oriented containerized STATCOM and BESS business will remain with the Turgi, Switzerland based Power Control product group who will continue to be supported by the PCS100 team.

Enjoy this issue of the magazine!



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A success for ABB's PCS100 Active Voltage Conditioner

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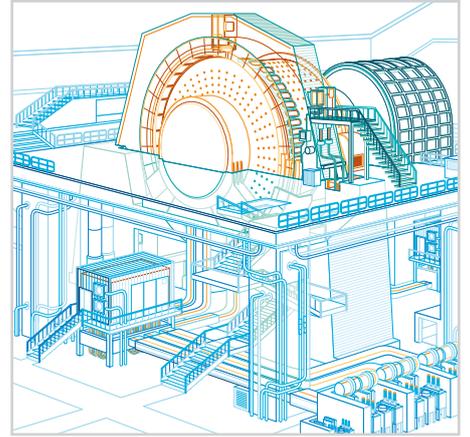
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The Power converters and inverters playlist can now be found on the ABB YouTube channel.

Click [here](#) to watch the latest videos.

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UPS and Power Conditioning: www.abb.com/UPS

Latest Videos

[ABB's PCS100 Reactive Power Conditioner](#)



[PCS100 Industrial UPS](#)





Public transport reliability

ABB's PCS100 Reactive Power Conditioner powering one of New Zealand's most popular tourist attractions.



Passengers will be treated to a smooth, uninterrupted journey on Wellington's iconic cable car, courtesy of ABB's 100 kVar Reactive Power Conditioner (RPC) which is helping improve the power quality for the cable car's electrical drive system. This project on New Zealand's capital city's funicular railway includes many exclusive milestones for ABB. As well as being the first PCS100 installed in New Zealand, it is the first in the public transport industry globally. It is also the smallest footprint PCS100 product ever built.

The cable cars are driven by a DC drive which produced notching and harmonic disturbances onto the electrical distribution network and draws a poor power factor. With ABB's PCS100 RPC employed, the power factor is corrected back to unity as required as well as mitigating the low order harmonics.

Gavin MacIntyre, Wellington Cable Car's Maintenance Manager, highlighted how the RPC will improve the cable car's performance, "The RPC will correct power factor grid compliance and dampen the harmonics that can disrupt the cable cars positioning system and relays".

An economical solution

Based on a unique modular design providing high reliability, the PCS100 RPC will provide such benefits as;

- Preventing costly penalties due to poor power factor or harmonics.
- 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.

Gavin comments that grid compliance was important and a specific business driver for this project, "Several times a journey, the cable car regenerates, returning power to the grid, so grid compliance was very important to us". Gavin further comment that using a capacitor based solution would not be financially viable and why ABB's RPC was an economical option, "We looked at a capacitor based solution but with the specific usage we have, we would be having to replace capacitors so often, that it would be become financially nonviable".



PCS100 Reactive Power Conditioner being commissioned

A tourist attraction

In 2012 the cable car celebrated 110 years of service to the City of Wellington. A favorite of locals and visitors alike, the cable car allows easy access from its terminal on Lambton Quay in the CBD, to the top entrance of the Botanic Garden and the Kelburn lookout. Three intermediate stops allow for easy access to local residential and business addresses, and at Salamanca access to the Kelburn campus of Victoria University.

ABB's PCS100 RPC is the ideal solution for improving power quality in commercial and industrial electrical installations, across a wide range of industries like the public transport industry. With power ratings from 100 kVAR to 2 MVAR, the RPC responds instantly to power quality events while providing continuous reactive power correction.

Watch the Wellington Cable Car video [here](#)

For further information please visit:
www.abb.com/converters-inverters
 (Converters for power protection)



PCS100 Reactive Power Conditioner

ABB has a variety of power protection products and the PCS100 Reactive Power Conditioner (RPC) is the latest addition to this portfolio. Specifically designed for industrial and commercial applications, the RPC is able to respond instantly to power quality events, while providing continuous reactive power correction.

Power problems can manifest themselves as power factor issues, inrush-generated sags, voltage imbalance or voltages outside regulatory requirements (a particular problem for direct online connected motors) and harmonics. These can result in financial penalties and costly electrical equipment malfunctions if left uncorrected. Although the PCS100 RPCs prime role is to condition current, by injecting reactive current to stabilize the voltage, the PCS100 RPC can provide a very cost-effective solution to these problems. Because the PCS100 RPC conditions the current drawn by the customer's load, it fits well with ABB's other products in the PCS100 family, such as the PCS100 UPS-I uninterruptible power supply (UPS) and the PCS100 Active Voltage Conditioner (AVC), which provide power supply to critical loads and condition voltage, respectively.

The PCS100 RPC is rated for applications from 100 kVA to 2,000 kVA and uses high-speed IGBT inverter technology to control reactive power flow into the AC network. By injecting capacitive or reactive current at different frequencies and phase angles, the PCS100 RPC efficiently and reliably provides:

- Fast dynamic reactive power
- Unity power factor
- Correction of current imbalance
- Harmonic cancellation

The inverter technology employed means the compensation is stepless, unlike many other solutions, which minimizes disturbances and ensures seamless power conditioning.

PCS100 RPC technology

A complete range of cabinets for the PCS100 RPC is available, suitable for direct connection to typical low-voltage supplies (380 to 480 V). The devices are rated from 100 kVA to several MVA. Combined with the PCS100 UPS-I and the PCS100 AVC, the RPC can be applied to a wide range of situations, from computer room backup through to large data centers and complete industrial plant protection. The highly reliable modular redundant design means the system is scalable and can be easily expanded as power needs grow. In addition, if one of the power modules fails, the system will not trip, but will continue to operate at reduced capacity. Because the granularity is small, the manufacturer can get full redundancy at very low cost; this level of reliability at such low cost is unique in the industry.

Proven PCS100 solutions

A comprehensive power assurance package can be created by combining the ABB PCS100 RPC with an ABB PCS100 UPS-I. Precisely this has been done for one particular customer to help protect his critical polyimide film manufacturing line.

This turnkey solution means that, if a power outage occurred, the PCS100 UPS-I would disconnect the load from the utility and supply the manufacturing line with full power for five minutes. Simultaneously, the PCS100 RPC would provide power factor control above 0.90. The customer's expectations were that, should a power outage occur, the UPS-I would supply power to the load of 1,000 kVA. ABB's PCS100 UPS-I is able to go beyond that expectation and supply 1,050 kVA to protect the load should a shutdown occur.

The PCS100 UPS-I includes a high speed static switch, meaning that a faster transfer to stabilize the power flow would occur if an outage prevailed. After further evaluations were undertaken, the company found that no other competing products could provide this. The final deciding factor related to system efficiency, as the manufacturer was able to save a large amount on air conditioning requirements, due to low heat loss from the PCS100 UPS-I. As well as an efficiency of 99 percent, the ABB PCS100 RPC itself has a small footprint, thus saving costly real estate.

The modular and scalable architecture of the ABB PCS100 RPC and its compatibility with the other members of the ABB power protection family, as well as its success in combating common industrial power problems has resulted in significant interest being shown in power protection applications.

[Download](#) ABB's PCS100 RPC brochure

[Watch](#) ABB's PCS100 RPC video

For further information please visit:

www.abb.com/converters-inverters
(Converters for power protection)



ABB's PCS100 – innovation in power protection

PCS100 AVC (Active Voltage Conditioner)

- Protects sensitive loads from the most common disturbances in utility supplies
- Sags, surges, unbalance, flicker and poor regulation are corrected within a few milliseconds
- Rated 160 kVA - 30 MVA
- High power and performance inverter-based system
- Operating efficiency 97 to 99 percent (model dependent)
- Very small footprint due to no storage to operate

PCS100 UPS-I (Industrial UPS)

- The PCS100 UPS-I is the ideal solution where very deep sags or short term power outages are a problem
- The PCS100 UPS-I uses energy storage coupled through an inverter to allow the downstream load to ride through very deep sags and short term outages
- The PCS100 UPS-I is an offline system. It is inactive unless the voltage increases by 10 percent or falls by 10 to 13 percent. This enables it to be very efficient, up to 99 percent



PCS100 RPC (Reactive Power Conditioner)

- ABB's PCS100 RPC is specifically designed to condition the current drawn by industrial and commercial loads. The PCS100 RPC uses leading-edge power electronic conversion to inject current into supply, correcting for common problems such as:
 - Unbalanced load current
 - Fast varying current causing voltage flicker
 - Low order harmonic currents
 - Power factor problems including leading power factor
 - Load current induced voltage drop
- As a purely static device, the PCS100 RPC provides extremely fast correction. Its modular redundant design makes it a very reliable, scalable and serviceable product, backed by ABB's global support network. Packed with new features to suit industrial and commercial applications.

For more information, please visit www.abb.com/powerquality or contact powerquality.nz@nz.abb.com
Click [here](#) to view ABB's power protection brochure.



Data center designed

ABB extend range
of modular UPS to
3 MW.

Conceived for data centers, ABB's Conceptpower DPA 500 modular uninterruptible power supply (UPS) fulfills power requirements from 100 kW to 3 MW and provides maximum availability for those who aim for zero downtime as well as a low cost of ownership. The modular, parallel architecture underpinning the Conceptpower DPA 500 delivers a highly reliable product that is easy to maintain.

It is astonishing just how dependent modern society has become on a reliable supply of electric power. On top of the traditional power users in the home, office and factory that consume electricity for cooking, washing, entertainment, production, administration and so on, a new major consumer has appeared in recent years: the data center. Storing our bank details, medical history, company files, both personal and work-related, pension records, tax returns, social media treasures (over 300 million new photos each day on Facebook) and a plethora of other data now essential for modern life, these silent, windowless buildings are dotted all over the landscape and are growing in number every year.

So reliant have we become on the data stored in these factory-sized buildings that zero downtime is now often an essential aspect of their operation. To attain zero downtime, a continuous supply of clean power must be guaranteed and a key component in ensuring this is the uninterruptible power supply (UPS). ABB is a world leader in UPS technology and have a range of high-efficiency UPS products that cover all types of application, particularly data centers. Because UPS reliability and zero downtime are so crucial, these features have been made cornerstones of ABB UPS design philosophy. Further, because data centers now consume more energy than some major industries, like paper or steel, the significant reduction in the energy bills delivered by the high efficiency of ABB UPS systems is greeted with open arms by data center operators.

ABB's newest UPS offering, the Conceptpower DPA 500, continues this tradition. With its modularity, standardized approach, low power consumption and high reliability, the Conceptpower DPA 500 provides an ideal UPS solution for all types of data center (and any other application) up to 3 MW.

The Decentralized Parallel Architecture (DPA™) upon which the Conceptpower DPA 500 is based means that each 100 kW UPS module contains all the hardware and software required for full system operation. The modules share no common components - each UPS module has its own independent static bypass, rectifier, inverter, logic control, control panel, battery charger and batteries. With all the critical components duplicated and distributed between individual units, potential single points of failure are eliminated. In the unlikely event of one UPS module failing, the overall system will continue to operate normally, but with one module fewer of capacity. The failed module will be fully disconnected and will not impact the operating modules.

This modular approach means you can size the UPS to exactly fit your needs and simply add modules as requirements grow (five 100 kW modules can be mounted in one rack and six racks can be configured in parallel to provide a top rating of 3 MW). This means that you only power and cool what you need. The Conceptpower DPA 500 is the only modular UPS on the market that can be easily added to incrementally in this way. The resulting savings in power usage over the service life of the UPS are substantial.

The Conceptpower DPA 500 modules can be hot-swapped, ie, removed or inserted, without risk to the critical load and without the need to power down or transfer to raw mains supply. This unique feature directly addresses continuous uptime requirements, significantly reduces mean time to repair (MTTR), reduces inventory levels of specialist spare parts and simplifies



system upgrades. This approach pays off too when it comes to serviceability and availability – online swapping of modules means you don't have to switch off during replacements, so there is no downtime and the service personnel don't need special skills.

This online-swap technology, along with significant reductions in repair time, can help achieve so-called six nines (99.9999 percent) availability - highly desirable for data centers in pursuit of zero downtime.

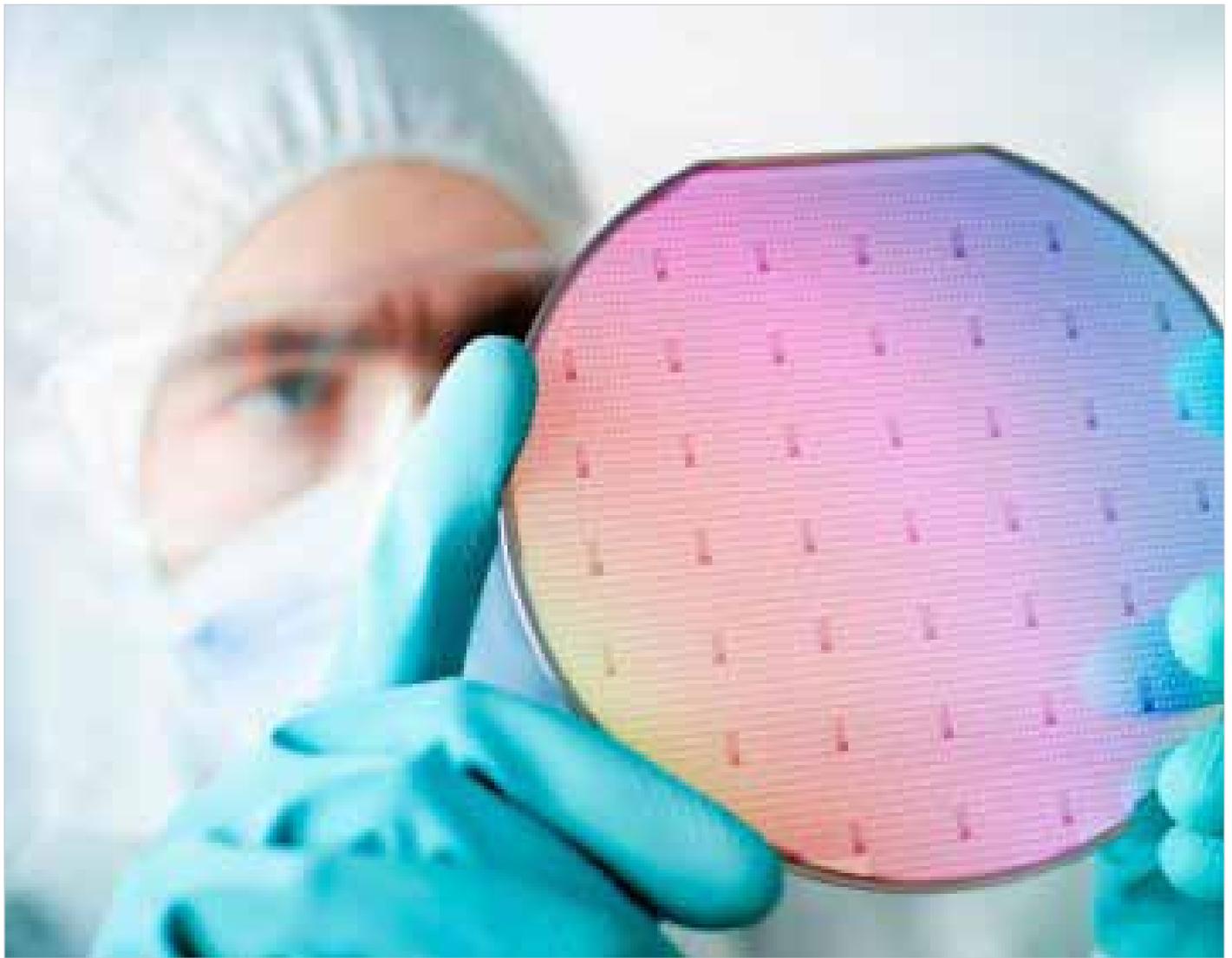
The Conceptpower DPA 500 has a very low cost of ownership, partly because of the modularity and scalability described, but also because of its best-in-class energy efficiency. ABB's Conceptpower DPA 500 operates with an efficiency of up to 96 percent. Its efficiency curve is very flat so there are significant savings in every working regime. This gives this particular product the lowest total cost of ownership of any comparable UPS system

Further, cooling costs in data centers are substantial. Because it consumes less power, the high-efficiency Conceptpower DPA 500 require less cooling effort, creating further savings. It also has a very small footprint – ideal for data centers, where real estate can be restricted and expensive. Installation is as easy as servicing: The straightforward concept of the Conceptpower DPA 500 simplifies every step of the deployment process - from planning, through installation and commissioning to full use. Standardization enables the use of ready-made interfaces and management modules and simplifies integration with other data center systems, such as ABB's Decathlon data center monitoring software.

To see further technology information please visit:

www.abb.com/UPS





Advanced semiconductor engineering

A success for ABB's PCS100 Active Voltage Conditioner (AVC).

ABB's power converter technology is making waves in the semiconductor industry. ASE Kaohsiung (Advanced Semiconductor Engineering) based in Nantze Kaohsiung, Taiwan, will use three PCS100 AVCs – a total power rating of 3600 kVA, to protect their chip assembly and testing equipment from power outages.

ABB's power protection solution

A high quality electrical supply is important in many industries, but for a world leader in semiconductor back-end solutions like ASE, it is a business requirement. Voltage sags were identified as the primary concern as power outages were very infrequent so the PCS100 AVC Active Voltage Conditioner was selected as the best solution. ASE sought high reliability, efficiency and small foot print along with fast and accurate voltage correction. By continuously monitoring the incoming supply and comparing it with perfect sinusoidal reference waveforms, voltage vectors can be created by the AVC using power electronics and injected in real time to provide a conditioned supply. ABB's PCS100 AVC can react within a few milliseconds provide an efficiency rate exceeding 98 percent, whilst providing continuous online regulation and voltage unbalance correction. ABB's PCS100 AVC has been widely applied in the semiconductor industry for process protection and achieved improved product yield and reduced waste.

Voltage sags have been identified in many international studies as one of the most costly power quality problems for continuous process industry. They are very difficult for the electricity utilities to eliminate from even the most robust power systems even at transmission connection levels. Typically caused by lightning and system faults, sags will propagate quite large distances through the electrical network causing sensitive loads to trip. For some customers this can just be a inconvenience, but for many it results in expensive product loss and downtime.

The PCS100 AVC modular design and unique small footprint make it a very compact robust option when installing in small confined areas like at ASE. Coupled with easy installation and maintenance, the PCS100 AVC is an ideal solution for plant protection. ASE is currently using two PCS100 AVCs on their Fab K15 production line. These AVCs were employed to protect ASE's assets from power sags and surges. One of the AVCs with a rating of 1800 kVA and 210 VAC, is providing 5000 Amps, making it the highest current rated AVC ever built.

Know-how technology

The PCS100 AVC does not include any super capacitors or batteries for energy storage, but instead takes energy from the remaining supply at unity power factor, with little impact. As voltage sags typically make up more than 90 percent of the problems that impact plant performance, the AVC provides a reliable, efficient and compact solution for industrial plant protection.

The PCS100 AVC contains a redundant bypass that ensures continuity of supply in the unlikely event that the AVC power electronics fail. This ensures very high levels of availability and reliability. Some of the world's largest semiconductor manufacturers, with particularly high demands on plant availability, rely on this technology to protect their critical loads.

The PCS100 AVC ensures quick and full correction of three-phase voltage sags down to 70 percent of the nominal voltage and of single-phase voltage sags down to 55 percent of the nominal voltage.



PCS100 1800 kVA ACV currently installed at ASE to protect the K15 line

In the case of deeper voltage sags, it undertakes a partial correction, which will often prevent load shedding. In addition, all models are able to continuously correct voltage variations of ± 10 percent in the mains voltage. This takes care of imbalances, which are a particular problem for direct online motors and variable speed motor drives.

Right place, right time

ASE Kaohsiung, the flagship company in ASE Group, possesses valuable expertise in product and process technology for the manufacturing of CSP, high frequency packages, MCM, flip chip and wafer bumping manufacturing.

ASE is located in the Kaohsiung Nantze Export Processing Zone. This second science park for the region (first science park was Taichung Software Park – TSP), will provide high quality service and new achievements for software-based technology.

[Download](#) ABB's PCS100 AVC brochure

For further information please visit:
www.abb.com/converters-inverters
 (Converters for power protection)





Energy storage

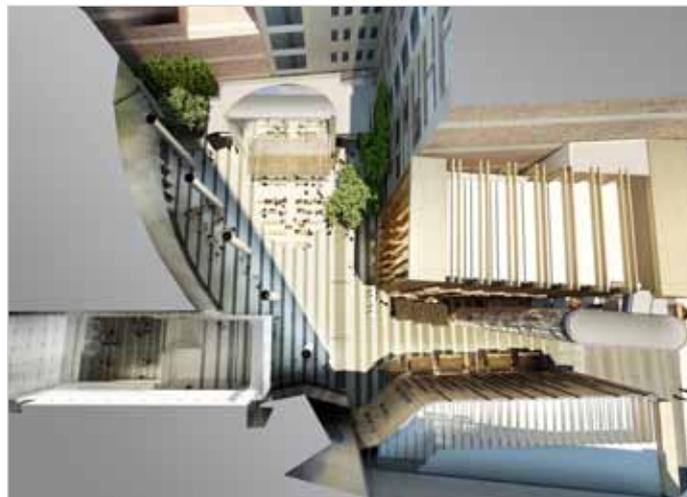
Microgrid technology turns heritage building into a green pioneer.

ABB's power solution has helped Grocon achieve an Australian first for a CBD office building. 'Legion House' is the first heritage listed building to be carbon neutral and capable of operating completely independently of the mains electricity grid and all without sacrificing the comfort of the tenants.

Legion House, which was originally built in 1902 by the YWCA operated as a women's hostel and outreach service for 60 years, is heritage listed and protected due to its social significance. It is located in the heart of Sydney's CBD and forms part of the Grocon flagship

development at 161 Castlereagh Street which includes a 50 storey building, retail space, office tower and a large open plaza.

The newly refurbished six-storey Legion House project has formally committed to achieve a 6 Star energy rating under the National Australian Built Environment Rating System (NABERS) and subject to regulatory approvals will soon create its own renewable electricity on-site through biomass gasification fuelled by waste paper collected from the 50 storey office tower.



To ensure the building tenants have continuous access to a reliable and renewable electricity supply, ABB's unique and versatile PowerStore grid stabilizing technology has been installed to stabilise the buildings' internal power network and to serve as an PCS100 Energy Storage Systems (ESS).

One of the PowerStore's main tasks is to dampen the effects of significant instantaneous step loads, which can occur in modern commercial buildings. Instantaneous step load are normally managed by the mains grid connection.

In the case of Legion House, ABB's technology stabilizes the internal (islanded) power network against fluctuations in frequency and voltage that can be caused by essential building services such as elevators and air conditioning systems. The solution uses advanced control algorithms to manage real and reactive power that is rapidly injected or absorbed to control the power balance, voltage, frequency and general grid stability.

Legion House can run in 'island mode' which means it can operate fully from on-site power generation. The building location meant it was not able to rely on traditional solar or wind for renewable power generation. The power is generated via two synchronised gas fired generators connected to the PowerStore, which serve a common power bus to provide electricity to both buildings.

The generators serve as the buildings' base electrical load while the PowerStore battery system, which utilizes lead acid batteries, dampens the effects of instantaneous load steps. The system exports spare electrical power to the adjacent tower building. The battery power system is also used to serve the overnight electrical load as well as minimise the generator operating hours.

The building is unique in that fuel gas (syn gas) is generated on site to run the generators. The gas is produced with the use of both delivered wood chips and briquettes made from recycled paper. This syn gas is created inside the gasifier which heats the wood/briquettes in a low oxygen environment and breaks it down into gas and char - the syn gas is then used to power the generators.

"We are pleased that our microgrid technology has made such a significant contribution to Grocon setting a new benchmark for the revitalisation of historical buildings," said Michael Jansen, manager for power generation at ABB in Australia. "ABB's microgrid stabilization solution is ideally suited for this type of commercial building application as it is grid compliant and provides the technology needed for reliable grid-connection and off-grid power generation for the carbon neutral buildings of the future."

Grocon's electrical contractor, KLM Group, in consultation with Umow Lai the electrical services design engineers, appointed ABB to design the PowerStore battery system. The engineered solution involved the supply of ABB's PowerStore control software, PCS100 inverter technology, which provides key benefits allowing for dynamic active and reactive power control.

The PCS100 features also support grid stabilization with (synthetic inertia and active damping) for applications where frequency regulation is critical. Other unique features of the PCS100, within the PowerStore system, are its islanding capability when functioning in virtual generator mode, which enables it to control its own voltage and frequency, thus enabling it to create a microgrid. For the Legions House application, corrective droop mode that allows power sharing between other generators has been

employed. The equipment is combined with the AC grid connect and DC battery connect circuit breaker panel together with a grid coupling transformer.

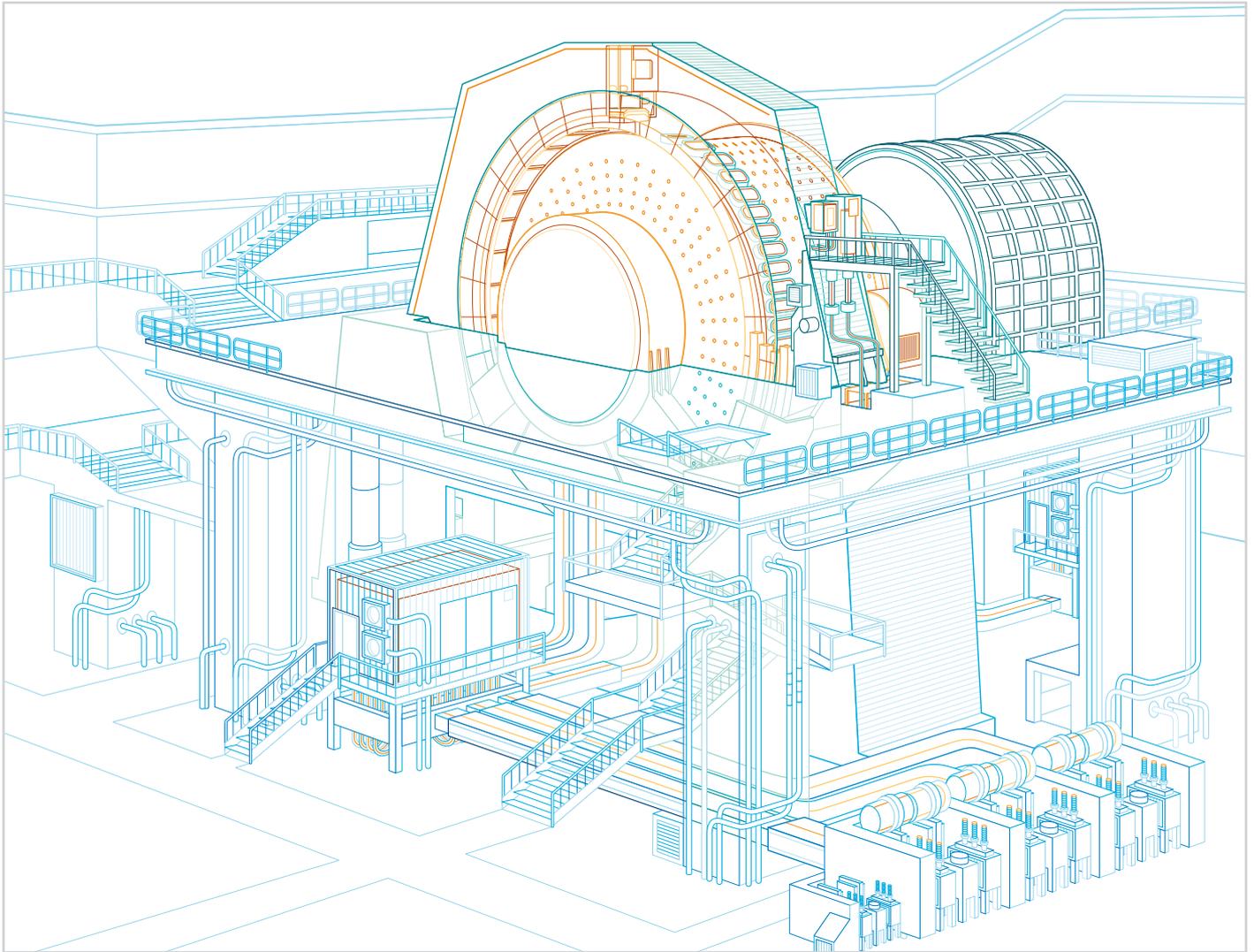
The energy monitoring control system and battery monitoring system monitor and control valve regulated lead acid batteries to provide 100 kVA/80 kW power for up to four hours of electricity supply. The system monitors and controls various battery parameters such as battery temperature to maximise the battery service life. The system also includes remote access capability for monitoring, fault diagnosis, parameter and software upgrades.

While Legion House can be referred to as a Carbon Neutral building, it is technically classified as an 'Autonomous Zero Carbon Life Cycle Building' under the Australian Sustainable Built Environment Council definitions. This essentially means the building is disconnected from the electricity grid and uses renewable energy to offset carbon emissions from its operations and embodied energy over the life cycle of the building.

Grocon, who lists safety, sustainability and innovation as core values, is the largest privately owned development, construction and investment management company in Australia.

Michael Jansen concluded, "We're proud that Grocon believed in the design and service ability of our PowerStore battery solution which has now played such a vital role in the development of this world class and highly impressive sustainable city precinct."

For further information please visit: www.abb.com/converters-inverters (Converters for energy storage and grid stabilization)



Gearless milling

ABB's STATCOM will help to ensure power stability for Aktogay sulphide plant in Kazakhstan.

ABB has secured a contract with Aker solutions on behalf of Kazakhmys PLC for engineering, for the delivery and installation of three gearless mill drive systems (one 28 MW and two 22 MW GMDs), the first to be delivered in Kazakhstan.



Aktogay GMDs similar to the above, for a 38-foot autogenous (AG) grinding mill

In close cooperation with both ABB's Main Technology Center for grinding solutions and the Main Technology Center for electrification, control and instrumentation systems, the Power Converter department of ABB in Turgi has received an order to deliver a 32 MVAR STATCOM system for the Aktogay Sulphide plant in Kazakhstan. These will be the first ABB Gearless Mill Drive (GMD) systems delivered in the Commonwealth of Independent States (CIS) region and they are among the largest units manufactured today in terms of power rating and power density.

ABB's mining solution

ABB's STATCOM will provide voltage stability for the sulphide concentrator plant where three GMDs are connected to a very weak grid, (three GMD, each >22 MW). Each start-up causes voltage dips of >10 percent. ABB will deliver a STATCOM system, that includes a 32 MVAR STATCOM converter in an IP56 outdoor container and a 41 MVA transformer. The scope of supply also includes spare parts, commissioning support and training. The solution

The scope of supply also includes spare parts, commissioning support and training.

consists of one 28 megawatt GMD for a 40-foot semiautogenous (SAG) mill and two 22 megawatt GMDs for two 28-foot ball mills. Each GMD system includes phase and excitation transformers, a ring motor with its associated local mill control panel, a containerized electrical house (E-house) including cycloconverter, advanced specific grinding control software with the full system protection and auxiliary distribution.

The three GMDs ordered are among the largest units manufactured today in terms of power rating and power density. This magnitude of equipment will lead to high economies of scale in regards to process and production of the low-grade ore deposit. In addition, ABB's GMD systems have been designed to operate with the highest levels of efficiency possible while withstanding the most extreme environmental conditions.



Similar containerized STATCOM installation as intended for the Aktogay mine

ABB's GMDs will provide improved energy efficiency, superior reliability, increased process availability, and an extended life span for all equipment. They allow bi-directional operation, have integrated frozen charge protection and offer automatic positioning and creeping without an auxiliary drive.

This order follows a previous delivery in 2010 for three GMDs for Kazakhstan's Bozshakol mine, with identical design and manufacture. With this order, Kazakhmys will also benefit from interchangeable capital spare parts, equipment and service specialists between both mine sites.

About Aktogay sulphide plant

Aktogay is located in the eastern part of the Republic of Kazakhstan (Oblast Province). Aktogay plant site is located 25 km to the south-west of Aktogay city. The Aktogay Sulphide plant is a concentrator of sulphide ore with a processing treatment rate 25 Mt/a.

The Aktogay oxide and sulphide facility in the southeast is expected to process 30 million tons of ore annually and is among the world's largest undeveloped copper deposits that will contribute to Kazakhstan's long-term industrial development.

Click [here](#) to view the GMD info-graphic

For further information please visit:
www.abb.com/converters-inverters



PCS100 Product training 2013

Register your interest now for 12-14 November 2013



Enhance your technical ability and knowledge in the PCS100 product range. Receive the benefit of interactive practical training with real devices for demonstration purposes and functional exercises.

Product training

Products, applications, markets and technical basics

- Power protection
- Frequency conversion
- Grid connect interfaces

Marketing

- PCS100 tools and support

Hardware

- Power modules, aux.module, interfaces

Control modes, interfaces, options

- Power protection
- Frequency conversion
- Grid connect interfaces

Order handling process

- PCS100 sizing and pricing

PCS100 outlook

- Ongoing and future developments

Who should attend?

ABB channel partner sales and service engineers.

Training locations

ABB's low voltage power converter product training is conducted in our well-equipped manufacturing and R&D facility in Napier, New Zealand, by highly qualified engineers and instructors.

Enrolments

Register your interest for any one of our courses via email to: pq.supportline.nz@nz.abb.com

Confirmation

Confirmation of acceptance and course information will be sent approximately two weeks before the start of the course. We will inform you by email or phone if there are no vacant places.

Course program

The course program and all related information about the course times and venue are sent to the participants with the confirmation. The course normally runs from 9.00 a.m. - 4.00 p.m. over a three day period.

Reservations

We reserve the right to change any course schedules, programs and their contents. A course could be cancelled due to minimal enrolment. The maximum number of students varies between 10 - 12 persons.

Cancellation

In the case of cancellation, inform us as soon as possible. This will allow another applicant to attend the course. Your place on a course can be transferred to another person in your company or department.

Training schedule 2013

Course	Day one	Day two	Day three
Four	12 November	13 November	14 November
Agenda a.m.	PCS100 product platform overview	PCS100 frequency conversion	PCS100 sizing and pricing tools
Agenda p.m.	PCS100 power protection	PCS100 grid connection	Outlook / future developments

Service and commissioning training 2013

Register your interest now for 19-21 November 2013

Your knowledge. Your power.

ABB is a leading supplier of power electronic systems. This extensive experience and history of innovation helps customers around the world to improve plant performance and production.

Our customer awareness means that we are committed to supporting customers globally in their plans for growth. ABB offers a wide range of professional training courses adapted to meet the needs of customers and partner channels.

Benefits of the training

Service and commissioning training courses give valuable support to increase return on investment, reduce costs in down time and improve skills and motivation of personnel.

Training participants profit from our extensive experience and modern training infrastructures which enable them to:

- efficiently operate and maintain ABB's PCS100 low voltage power converter systems
- extend the lifetime of the product

Training locations

ABB's low voltage power converter product training is conducted in our well-equipped manufacturing and R&D facility in Napier, New Zealand, by highly qualified engineers and instructors.

Course profile

Our service and commissioning training courses are aimed at qualifying maintenance engineers to undergo unsupervised first level support of ABB's PCS100 applications. The main goal of the course is to learn how to operate, troubleshoot and maintain the system.

Upon completion of the course, maintenance engineers will be able to locate and identify hardware components, download fault loggers and important information for first analyses by support personnel, replace parts and perform preventative maintenance. Trainees will gain practical experience using available tools and techniques through organized practical exercises.

Who should attend?

ABB partner channel and customer service engineers.

Confirmation

Confirmation, reservation details, and all related course information including schedule and venue details will be sent approximately four weeks before the start of the course.



Enrolments

Register your interest for upcoming courses via email to: pq.supportline.nz@nz.abb.com

Training schedule 2013

Course	Day one	Day two	Day three
Four	19 November	20 November	21 November
Agenda a.m.	PCS100 platform service introduction	PCS100 service power protection	PCS100 service grid interconnection
Agenda p.m.	PCS100 platform service detailed	PCS100 service frequency conversion	Outlook / future developments

Seamless power



Power protection

6. The power of water

Wöhrle system solution based on ABB UPS for wastewater business

11. Smart technology

ABB's PCS100 UPS-I protects Samsung's mega-investment in China

Grid interconnection

13. Onshore engineering

PCS100 frequency converters for ship building and ship repair activities

Industry watch

15. Steel industry

ABB's high quality PCS100 STATCOM provides a robust solution that improves power quality to the steel plant

16. Vyksa Steel Works

PCS100 STATCOM providing a turn-key solution for Vyksa metallurgical plant in Russia

Powering ahead



Power protection

6. Faster than the wind

ABB providing a power conversion solution to Emirates Team New Zealand

8. Power protection solutions

ABB's PCS100 UPS-I and AVC securing big orders

10. Offshore success

A milestone success for ABB's uninterruptible power supply

12. Railway industry technology

Railway UPS supporting 50 Hz and 16.67 Hz

Project completion

14. Mountainous engineering

ABB in the world's highest solar power plant

16. Powering up

PCS 8000 powering a pumped storage



Connect renewable power to the grid?

Definitely.



Electricity generated by water, sun and wind is most abundant in remote areas like mountains deserts or far out at sea. ABB's PCS100 ESS (Energy Storage System) helps renewable power reach about 70 million people by integrating it into electrical grids, sometimes over vast distances. Our effort to harness renewable energy is making power networks smarter, and helping to protect the environment and fight climate change.

www.abb.com/converters-inverters

Power and productivity
for a better world™

