

Innovation highlights

ABB's top innovations for 2012

ABB is continuously seeking to further strengthen and expand its product portfolio. Across the world, the company's research and development labs are hard at work creating the technologies, products and solutions that will further raise the productivity, efficiency and flexibility of its customers' operations. The successes

scored every year are numerous, and selecting the most notable of these is no easy task. The current selection is a cross section of recent highlights. Many of these, as well as other technological achievements, are discussed at greater length in this and forthcoming issues of *ABB Review*.

Advanced generator protection

ABB's generator protection REG670 IEDs (Intelligent Electronic Devices) belong to the Relion® protection and control product family, which offers a wide range of products for the protection, control, measurement and supervision of generators, transformers, power lines, etc. in a wide range of applications. To ensure interoperable and future-proof solutions, Relion products have been designed to implement the core values of the IEC 61850 standard.

The REG670 has now been enhanced to feature an innovative 100 percent stator earth-fault protection and a sensitive rotor earth-fault protection, both based on an injection principle. When the REG670's injection-based stator protection is used, 100 percent

of the machine stator winding, including the star point, is protected under all operating modes, even at machine standstill. This new feature makes the REG670 suitable also for very complicated and challenging installations, such as pump-storage power plants and large hydro and turbo machines. Further, a stator injection signal with a frequency higher than the power system frequency is used (eg 87 Hz signal in a 50 Hz power system).

This confers many practical advantages. In addition, a special tool module (Injection Commissioning) accessed via the PCM600 protection and control IED manager significantly simplifies the installation and commissioning of the injection-based stator and rotor earth-fault protection functions.

The picture shows REG670 with its new accessories for injection-based stator and rotor earth fault protection.



Controlling consumption

Few would disagree that an individual who takes responsibility for his own energy consumption consequently improves his usage behavior. And even small improvements, when accumulated over many such individuals, can have a significant, positive impact on resource conservation and greenhouse gas reduction. Yet how many can state with any degree of accuracy how much water, gas, oil or electricity they used yesterday? Very few, and that is because the relevant data is difficult for the individual to get at and meaningfully collate.

A new range of products from Busch-Jaeger now changes all that. The Busch-EnergyControl®, Busch-EnergyDisplay® and Busch-Comfort-Panel®, in combination with the energy-data gateway, ensure optimum energy transparency.



These products allow the consumer to closely monitor and control energy usage, and exploit off-peak energy. They are not only seamlessly integrated with the building system technology, but they can also provide Internet access, entertainment facilities and IP-based communication. Thus, from one display, the user can consult and control his energy usage as well as call up Internet pages, receive and send emails, exploit VoIP, play MP3s or watch video clips.

Internal communication with other Busch-ComfortPanels is possible via video telephone using the integrated video camera. The camera facilitates room monitoring and can even be used as a baby monitor.

These products will be presented more fully in issue 2/2012 of *ABB Review*.

Busch-Jaeger opens the door to design award

The Busch-Jaeger door communication system represents the very newest technology in door entry systems. But its aesthetics have also attracted attention: the product won the prestigious "Interior Innovation Award – Winner 2012" in the run-up to the imm cologne 2012 trade fair.

The Busch-Welcome® range of products allows tenants to communicate with visitors at the front door. The product range goes from audio-only all the way up to an outdoor, high-resolution color camera delivering images to the indoor 17.8cm (7") TFT touch-panel display.

Photos of visitors can be taken and, during absence, three photos of each visitor are taken automatically after the bell has been rung. The display can be used as a digital picture frame to show favorite photos.

If a building has multiple entrances, then several outdoor video stations may be connected to distribute audio and video throughout the building. This can also be used as an indoor video intercom system.

Its intuitive operation, elegant installation, unobtrusive aesthetics and overall harmony has inspired the design world: the Busch-Welcome was awarded the prestigious "iF product design award 2012" and has now also been awarded the label "Interior Innovation Award – Winner 2012" for four of its products.



Busch-Jaeger is a member of the ABB Group. For more information about the Busch-Jaeger door communication system please refer to "Winning by design" on page 53 of this issue of *ABB Review*.

Taking the direct route

One business segment enjoying growth is the data center industry. In other words, the collections of servers and storage devices that support websites like Facebook (incidentally, ABB has been chosen to power Facebook's first data center outside the United States) and Google, as well as banking systems, health records and a myriad of other applications. Recently, though, data centers have come under scrutiny for their conspicuous energy consumption.

Before power from the AC grid finds its way down to individual micro-processors or disc drives in a data center, it will have undergone multiple AC-DC-AC conversions, during which some 50 percent of the energy can be lost.



An attractive alternative is DC power. Using a DC approach makes for a simpler overall architecture that is less costly to install and takes up less space. DC requires fewer voltage transformations, it produces less heat and requires less cooling. It also facilitates the exploitation of the native DC produced by wind and solar sources.

There are already a number of data centers running on DC power systems. A confluence of trends points to a broader proliferation in future. It is likely that as these trends continue and the data center industry evolves, more DC-powered data centers will appear on the landscape.

These developments will be discussed more fully in an upcoming edition of *ABB Review*.

Caution: Sensitive load

Next time you see a thunderstorm discharge thousands of amps at several million volts, spare a thought for the sensitive manufacturing processes which have to withstand these mighty onslaughts from Mother Nature. ABB is a major supplier of technology which enables them to do so, and the PCS100 Active Voltage Conditioner (AVC) and the PCS100 Uninterruptible Power Supply (UPS-I) are just two of the latest examples of such technology.

Sensitive manufacturing processes require a rock-steady and continuous power supply. But natural phenomena and events on the power grid conspire to make life difficult and, potentially, very

expensive. However, the PCS100 Active Voltage Conditioner (AVC) can protect plant against voltage sags of 30 percent and voltage dropouts of 30 seconds duration.

Should the power drop out completely, the offline UPS system PCS100 UPS-I (Industrial) will save the day. When trouble arises, it will immediately disconnect the load from the main supply and then maintain power until diesel back-up generators can be started. It is equipped with high-performance, low-maintenance capacitors or state-of-the-art battery technology and offers effective protection against short-term interruptions or power outages of up to 30s duration.

For more information about the ABB AVC and UPS-I products, please refer to "Power fitness" on page 30 of this issue of *ABB Review*.



ABB ServicePort service delivery device

ABB has developed a secure device for service delivery. The ABB ServicePort is a robust node that can be installed at a customer site. Using this gateway, services can be configured and deployed on-site, but also remotely using secure remote connectivity.

With its fully user-defined security features, this on-site node acts as a "service coordinator." ServicePort supports system configuration, preventive and corrective maintenance, work-order tracking, spare-parts management, system diagnostics, condition monitoring, corrective implementation, and service scheduling. It permits ABB to deliver preventive and corrective services quickly and cost-effectively. ServicePort provides diagnostic and remote-

enabled functionality to be added as it is developed.

Access between the plant network and ServicePort is controlled by the user: The customer can choose which data is to be securely shared with ABB. The device offers a substantial financial advantage by providing access to ABB experts without incurring the time or travel costs of getting a service expert to the site.

ServicePort provides immediate access to services that keep production running, maximize system life cycle, optimize processes and deliver operational excellence.

Services provided include event notification, control tuning, optimization and support services, software support, system health checks and remote troubleshooting.

The ServicePort will be presented more fully in edition 2/2012 of *ABB Review*.



From iron to silicon – the power-electronic traction transformer (PETT)

The traction transformer is one of the heaviest single pieces of equipment on a train. ABB is making this massive component of iron and copper lighter by introducing power electronics to raise the frequency. In 2011 ABB built a PETT demonstrator and fitted it to a locomotive. Testing of this locomotive began in early 2012.

The PETT replaces the transformer and inverter combination by a lighter and more energy-efficient alternative. It converts the line frequency (16.7 Hz in

the case of the demonstrator) to a higher frequency, which permits the transformer to be of much smaller and lighter construction. The future generation of PETT that is currently under development is set to achieve a power density of 0.5 to 0.75 kVA/kg (compared with 0.2 to 0.35 kVA/kg for a conventional transformer + inverter combination). At the same time, energy efficiency is being increased from the previous range of 88 to 90 percent to more than 95 percent.

For more information on the PETT, please see "Traction transformation" on pages 11 to 17 of this edition of *ABB Review*.



A palatable palletizing package

Highly adaptable and easy to use, ABB's automated robot-based system has made palletizing simpler, faster and more efficient than ever. Complete with three different robots, three grippers and software, the system is turning heads in the manufacturing industry.

For years, ABB's mainstream palletizing robot, the IRB 660, has been used for almost all forms of palletizing. Now, the capabilities of the IRB 660 are complemented by the addition of two new robots targeting bag, end-of-line and full-layer palletizing. This offering ensures that ABB can meet all palletizing requirements.

With a payload of 110kg and a reach of 2.4m, the world's fastest palletizing



robot – the IRB 460 – is perfect for bag and high-speed end-of-line palletizing. The IRB 460 occupies 20 percent less floor space and runs 15 percent faster than competing robots.

For high-output full-layer palletizing of larger products such as building materials and chemicals, ABB offers the IRB 760. With a payload of 450kg and

a reach of 3.2m, this robot can palletize full layers faster than any other robot. ABB's range of FlexGrippers includes a clamp for handling boxes, a claw for high-speed bag palletizing and a vacuum gripper capable of placing up to five products at once. The company's robot and gripper components are fully plug-and-play, significantly reducing customers' engineering time.

ABB's RobotStudio Palletizing PowerPac software allows users to configure, simulate and program ABB robots and grippers, with little or no robot programming experience required. All signals between the robot and gripper are predefined for quick configuration. And regardless of the production location, palletizing cells can be built upon the same standard ABB software, eliminating the need for customized programming at different sites.

For more information, please visit www.abb.com/robotics

Onboard DC grid

Imagine a ship with an efficient, modern and electric propulsion system. Then reduce the electric equipment footprint and weight by up to 30 percent, and reduce the fuel consumption and emissions by up to 20 percent: that is today's ship with an onboard DC grid from ABB.

The onboard DC grid is an extension of the multiple DC links that already exist in all propulsion and thruster drives, accounting usually for more than 80 percent of the electrical power consumption on electric propulsion vessels. This extension means that all the good and proven products used in today's electric ships remain, like AC generators, inverter modules, AC motors, etc. However, the main AC switchboard and thruster transformers are no

longer needed and the result is the most flexible power and propulsion system to date.

Efficiency improvements are mainly achieved by no longer having the system locked at a specific frequency. Flexibility of ship design and layout is improved by locating each power converter as close as possible to the respective consumer or producer, meaning there is no need to centralize all of the units. And the reduced

installation footprint allows for significantly more cargo space.

The system can combine different energy sources like engines, turbines and fuel cells. Various energy storage devices, like batteries or super capacitors, can easily be added to the system.

A longer article on this innovation will be published in issue 2/2012 of *ABB Review*.

