

Welcome to the latest issue of the Procontrol P13 news bulletin

Dear Readers,

I'm happy to bring you edition three of the P13 news, intended for users of the ABB Procontrol P13 control system. I hope you have enjoyed our previous issues, and invite you to contact us any time. We appreciate hearing from our readers.

This issue focuses on our preventive maintenance program for Procontrol P13 systems, which includes application code backup and system analysis to provide hands-on help for plant operators. We also present an interesting project story from Denmark (Kyndby Power Station), which highlights a successful upgrade and overhaul that has extended the lifetime and performance of the P13 system.

In addition to the upgrade projects, we have an article about overcoming Windows XP end-of-life issues with ABB solutions like PC refresh, ABB Evolution and special maintenance services, which can help eliminate or mitigate the risks of maintaining an unsupported Windows XP operating system.

The articles we have selected consider essential topics for plant operators, including:

- increased hardware reliability;
- software updates that increase functionality, enabling up-to-date computer hardware for operations and engineering;
- new functionality to reduce unwieldy processes, increase information flow and provide flexibility for fast response;

- proven upgrade procedures that require very short shutdown times.

I hope you will find the information and insights valuable, and consider taking advantage of the support services described for your own operations. As always we look forward to your feedback and requests, and invite you to share your interests and comments with us. We are always happy to provide any additional information or advice you may need.

I wish you happy reading.

Kind regards

Matthias Bolliger
VP, Head of Global Execution
ABB Power Systems

Harmonizing power plant control in Denmark

Kyndby Power Station in Hornsherred is the emergency and peak load facility for Zealand. Operated by DONG Energy, one of the leading energy groups in Northern Europe, the 734 megawatt (MW) capacity Kyndby station's facilities can be started up within minutes if operational irregularities occur in the high-voltage electricity grid, or problems arise at other power stations.



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Built in 1972, Kyndby serves as a black start unit for the Danish grid. Its facilities include two GT13B gas turbines with an output of 63 MW each, which in 1995 were converted to the Procontrol P13 control system. An old Praut 8013 was used for remote control from the control room located 500 meters away.

The customer wanted to modernize the plant's control system. A solution came through the close cooperation of ABB Switzerland and ABB Denmark. ABB Switzerland supplied a complete P13 control system (hardware and software) featuring Progress III and P13 Connect to operate the black-start unit; ABB Denmark supplied and configured 800xA operations, and took the role of project manager.

Also included in the plant facilities are two ship diesel engines with an output of about 12,000 hp each and originally a conventional control system (not from ABB), as well as two Bastan VII gas turbines (aircraft engines) rated about 1,000 hp each, with control systems from Turbomach SA.

Finally, Kyndby power station controls one GT13C gas turbine situated at Masnedø CHP plant about 100 kilometers away, with an output of about 70MW and an ABB Decontic control system.

The customer wanted all machines in the plant to be operating under the same control system, and also wanted a remote control capability from the main control room in Kyndby, as well as high availa-

bility, reliability, and clearly structured programming.

This required an overhaul of the ABB P13 control systems in the two GT13B gas turbines, supplementing them with additional features and redundancy; replacing the old UA379 speed measurement modules with 70EI05 units and new encoders; and upgrading the engineering tool to Progress III, in order to upgrade the Praut 8013 control stations to 800xA operations for local and remote control.

For all other machines, the upgrade required installation of a new P13 control system featuring a new speed measurement module and the latest ABB HMI system for local and remote control, as well as Progress III for diagnosis and maintenance. The challenges of this type of upgrade included the fact that the control system for the turbo-engines had to be a top performer because of the high speeds and extremely short start-up phase involved (less than two minutes).

Additional challenges included the fact that the gas turbine in Masnedø is about 100 km away as the crow flies, so access via HMI and Progress III had to function reliably, as must the transfer of individual P13 local bus signals via the BK06-BK06 connection and TCP/IP.

Each of the local HMI stations had to function in stand-alone operation.



Procontrol P13 Preventive Maintenance

Even a safe and highly reliable system like Procontrol P13 needs maintenance from time to time on components with limited lifetime like capacitors. Maintenance of installed equipment and observing the required environmental conditions are key factors for guaranteeing the power plant control system’s reliability and availability.

Components with limited lifetime are electrolytic capacitors with wet electrolyte, relays, fuses, mini circuit breakers, and ventilators. In addition, certain electric contacts and connections have been identified as weak points.

Electrolytic Capacitors (ELCOs)
For ELCOs with wet aluminum electrolyte lifetime is expected to be 10 to 20 years. 10 years rather apply to older types whereas 20 years can be reached with long-life types in combination with optimal operation conditions.

Aging and the related evaporation through the capacitor’s end seal leads to a steady capacity reduction which also happens with ELCOs held on stock. Therefore, ELCOs are the most ambient temperature sensitive components. In the worst case, for each temperature increase of 10°C, lifetime can be shortened by half.

As the electrolytic capacitors are the crucial elements of the Procontrol P13 control system in order to ensure reliability and availability, we recommend their fitting every 10 years after initial installation of the equipment. We recommend the fitting of all main infrastructure modules as power supply, processing and communication modules, as priority one. The other modules, e.g. for preparing the field signals, we evaluate to priority two.

Relays
Aging of relays is mainly dependent on the number of switching cycles (normal lifetime about 106 to 108 switching cycles).

Moreover, for relays of digital output modules the load circuit characteristic is crucial. Capacitive (switch on) and inductive (switch off) loads shorten the lifetime of the contacts. The shortest lifetime is

to be expected for the analogue input module 70EA04.

Fuses, Mini Circuit Breakers
Aging of fuses is related to oxidation. They should be replaced every 5 to 10 years. Mini circuit breakers have a mechanical lifetime of more than 104 cycles. Therefore, they can be neglected.

Electrical Connections
Electrical connections have very high reliability values. However, we recommend the tightening of all screw terminals and screwing connections every 5 years. Especially for the following connections this tightening is very important:

- All connections of intra-plant bus cables (main wire and shield).
- The entire cabinet grounding and its connections to the ground bar.

Ventilators
The lifetime of ventilators varies within very wide limits. Their function should be periodically checked every 6 to 12 months. A check up after longer downtime is highly recommended. Air inlets and filters should also be cleaned at the same time.

The main benefit is the lifetime extension of your control system. ABB’s Procontrol P13 preventive maintenance and fitting is the most efficient solution to ensure the maximal lifetime of your installed control system and to maintain the precision, reliability and availability of your system.

You can send your inventory any time to your local ABB sales representative or the global execution center in Switzerland and ask about a recommendation for your modules.

Service & Support Contacts

Spare Parts & Repairs
Vivien Simor
Phone: +41 58 585 69 90
Email: vivien.simor@ch.abb.com

Support & Hotline
Phone: +41 58 585 88 80
(Office Hours)
+41 844 845 845
(24h Support line)
Email: plantcontrol.support@ch.abb.com

Shipping Information (Repairs & Returns)
ABB Switzerland Ltd.
Power Systems/PSPGS
Attn: Vivien Simor
Bruggerstrasse 72
CH-5400 Baden
Switzerland

P13 Webshop
Our tool for online spare part quotes and direct orders:
www.abb.com/powergeneration
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Power plant control back in shape

For obvious reasons, the highest standards are in place to secure operation of the Swiss nuclear power plants. Part of the concept is to provide an emergency command console to take over the functions of the normal control room in an emergency and to ensure that the plant is shut down in a controlled and secure manner.

ABB Switzerland was commissioned to clean the approximately 4,000 control cards in the two emergency control stations for the two reactor units at Beznau nuclear power plant. For approximately 1,400 cards, the wet capacitors also needed to be exchanged. The cards that were fitted in this manner then needed to be tested. 3 special testing devices were created for this reason by ABB engineers. “This service order has to be implemented during the regular overhaul period, which is fixed for ten days. Without a working emergency system, we can-not restart the reactor,” explains David Farruggio, Head of Maintenance for the nuclear energy section at Axpo AG.

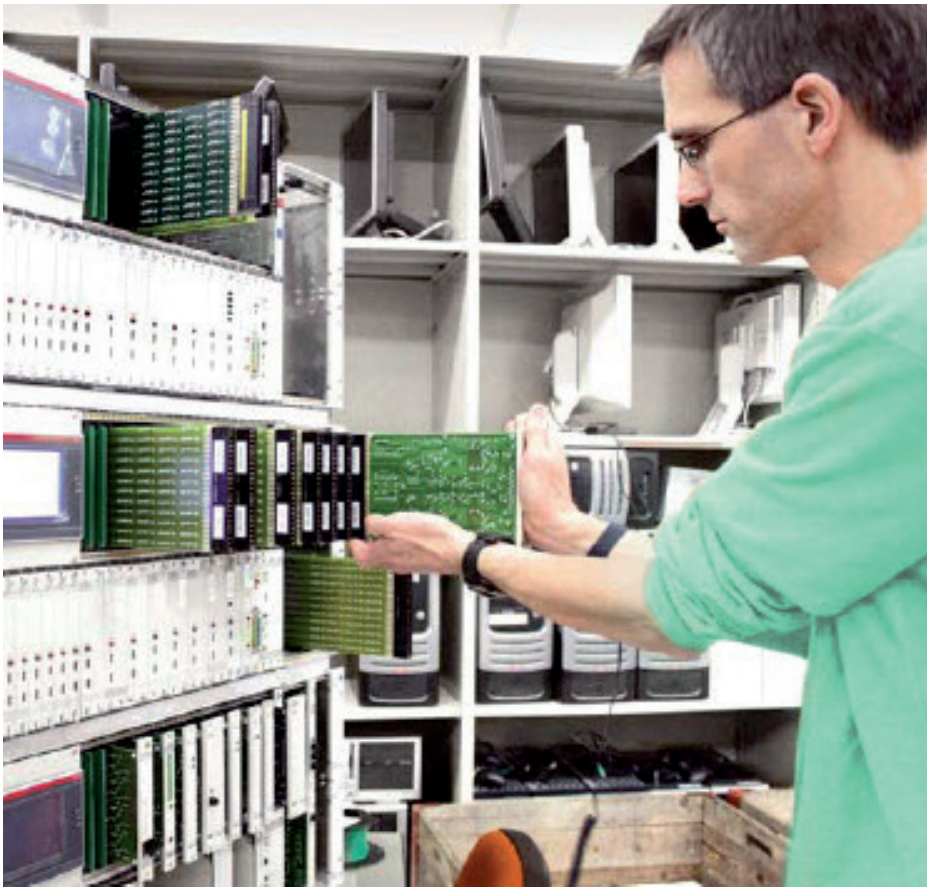
Working in parallel
“Due to the tight time frame, we produced three testing devices – two to allow parallel working and one as a spare. Every possible delay has to be eliminated for this service,” emphasizes Christian Baltensperger, project manager for ABB. The control cards for the emergency system in unit 2 were fitted in the summer 2011, and those in unit 1 followed in summer 2012. The testing stations are able to test nine different types of control cards. For this, they have been equipped with power plant technology Procontrol P13 devices and a CP420 control panel from the AC500 product range. The testing station software feeds every plausible case of input signal into the control card and checks that the action is correct.

“Our team cleaned the control cards on site and installed new wet capacitors for around one third of them,” Christian Baltensperger explains. “Axpo provided us with the appropriate infrastructure for this at Beznau.” Due to the time pressure,

the team worked at weekends as well. “Upon completion of the task, we were able to locate the error source in some of the control cards that had been identified as being defective and performed simple repairs ourselves immediately,” Baltensperger continues. These can now

be returned to the spare parts depot. “All the control cards that ABB fitted worked perfectly during the testing before recommissioning of the plant. I am therefore convinced of a successful service to be performed on the control cards for unit 1,” Farruggio concludes.

Perfection is mandatory. The service for several thousand control cards for the replacement control console for the Beznau nuclear power plant requires diligent work and the development of a special testing device.



Managing Windows XP end-of-life

Windows XP background

As announced several times, Microsoft stopped supporting the ageing Windows XP operating system on April 8, 2014. XP users will no longer receive software updates or tech support from Microsoft, although the company announced earlier this year that it will continue to provide virus warnings for Windows XP until 14 July 2015. (Windows Server 2003 server operating system will also reach its end-of-life in July 2015.)

Risks to consider

Microsoft is recommending XP users upgrade to Windows 7 or 8, but this involves costs for new operating system software, and could also require investment in new hardware since the PCs (or other hardware devices) that have used to been run XP for some years may be incompatible with the latest Windows operating systems.

Computers using XP Windows after support ends could become more vulnerable to security risks and viruses, and XP users will find new software and hardware is optimized for more current Windows operating systems, so that greater numbers of apps and devices will not work with XP.

XP end-of-life presents some critical risks to the safe management of assets and plants operating on XP-based solu-

tions, a situation that also affects ABB automation and control systems.

ABB can help you

For our customers using Windows XP, ABB has two solutions to help eliminate or mitigate the end-of-life risk.

1. Our intermediate solution is a “PC refresh,” which involves replacing existing PCs with new hardware capable of running Microsoft’s existing and out-dated operating system for an extended time. The solution isolates a system, meaning it is separated from Internet and intranet connections in order to reduce cyber security risk. The end user should also introduce organizational measures to prevent malware from entering the system through careless use of CD’s, USB memory sticks, external drives, etc.
2. The ABB Evolution pathway updates and upgrades an existing system to the actual versions of operating systems as well as product and application software. In addition, for customers not yet subscribed to ABB Evolution programs such as Sentinel, ABB offers special maintenance contracts for a specific time period as a means of upgrading and avoiding end-of-life operating system issues.



Procontrol P13 platform solutions for XP obsolescence

The Procontrol P13 platform is fully supported by ABB and has overcome the XP obsolescence issues for quite some time.

For all products required to operate and maintain a Procontrol P13 system ABB is offering upgrades and seamless evolution paths to the latest versions:

- Progress 3 supports Windows 7 (32 bit) since version 2.6.0.
- S+ Operations including P13 Connect fully supports Windows 7/Server 2008 (R2) for 32 bit and 64 bit since Version 1.0.
- System 800xA including the P13 Connect fully supports Windows 7/Server 2008 (R2) for 32 bit and 64 bit since System Version 5.1 Rev.A.

For details about the available upgrade paths specific to your configuration and type of application, please contact your local ABB Power Generation contact.

ABB Ltd.
Business Unit Power Generation
P.O. Box 8131
8050 Zurich, Switzerland
Phone +41 (0) 43 317-5380
Fax +41 (0) 43 317-5382

[www.abb.com/
powergenerationration](http://www.abb.com/powergenerationration)



Procontrol P13 presence worldwide

We are here to support you

P13 Global Execution Center
ABB Switzerland – Power Systems
Matthias Bolliger
Bruggerstrasse 72
CH-5400 Baden, Switzerland
Phone: +41 (0)844 845 845
Email: plantcontrol.support@ch.abb.com



Contact us

P13 Global Execution Center

ABB Switzerland Ltd

Power Systems

Bruggerstrasse 72

CH-5400 Baden, Switzerland

Phone: +41 (0)844 845 845

(customer contact center 24 hours/365 days)

Phone: +41 (0)58 585 88 80 (during office hours)

Email: plantcontrol.support@ch.abb.com

www.abb.com/powergeneration

Procontrol® P13 Product Portal:

www.abb.com/industries/us/9AAC30301251.aspx



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