

Reference Case Study

ABB helps British Sugar avoid reactive power charges whilst modernizing their automatic voltage regulator and synchronizers

Specially designed backplates required to fit tight footprint



British Sugar approached ABB for a replacement automatic voltage regulator (AVR) and synchronizers on a 13 megawatt (MW) steam turbine at its Cantley sugar factory, near Norwich in East Anglia, England.

At the heart of the Cantley factory's operations is the combined heat and power (CHP) plant. It produces steam and electricity using coal and oil fired boilers.

The combined heat and power plant produces steam and electricity and excess power can be exported to the local electrical grid. Cantley was the first UK beet sugar factory, established in 1912. Cantley supplies 200,000 tonnes of sugar to food and drink manufacturers in the UK and across Europe.

ABB had already supplied replacement dual-channel UNITROL1020 AVRs at two other British Sugar factories, but at Cantley there were additional challenges.

The existing AVR and synchronizers (the latter operating several circuit breakers had never properly worked) were built into a compact generator control panel, which also contained the AVR and controls for a second, smaller generator. Most importantly, British Sugar required a replacement grid volt-amp reactive (VAr) controller to maintain a constant reactive load on their grid incomer, in order to avoid penalty charges. ABB was also asked to replace the unit operator control plate and the abnormal earth alarms for both generators.

The dual channel UNITROL1020 AVR design, established and supplied for two other British Sugar sites at Wissington and Bury St. Edmunds, was used as the basis for the replacement AVR, but adapted for the Cantley project. Here the AVR had to be manufactured on a specially designed backplate in order to fit the space available inside the generator control panel.

The auto synchronizer SYN 5201-0271 and check synchronizer SYN 5100 were both mounted on a separate, smaller backplate, using the SYNCHROTACT surface mounting kit. The grid VAr controller was manufactured on a third backplate, as the only available space in the generator control panel was where the three original backplates had been sited.

For commonality of spares, an identical UNITROL 1020 AVR module was used for the grid VAr controller, which monitored the grid incomer potential transformer (PT) and current transformer (CT). When the generator output is above 5 MW the grid VAr controller is selected

as the 'master' controller, automatically adjusting the setpoint of the 'slave' AVR to maintain the site reactive power to the required level on the grid incomer.

The dual channel AVR and synchronizer were successfully commissioned in August 2015 and a second visit was made a few weeks later to commission the grid VAR controller when the steam demand had increased to a suitable load.

"We are delighted to have been working with British Sugar over a number of years to maintain and improve the reliability of their factories by implementing ABB's retrofit AVR solution," said Mark Garside, ABB's Operations Manager for Power Generation Excitation Systems in the UK. This is the latest in a number of contract successes that confirms that UNITROL is the excitation solution of choice in the UK for retrofit projects, particularly for its advanced technology."



Front view of UNITROL 1020 automatic voltage regulator (AVR)

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