

Synchronizer premiere at Schiffmuehle



— Peter Rothenfluh (left) and Werner Zimmerli with the latest SYNCHROACT device in front of the Schiffmuehle Power Plant.

Synchronization devices allow automatic synchronization of generators with the line frequency. They can also be used at substations to connect two transfer lines in parallel. Synchronization devices connect power plant generators with the line by closing the generator circuit breaker. This can happen only if the generator frequency is synchronous to the line frequency. Otherwise, enormous surges can appear which could lead to damages on installation parts such as the generator or transformer.

Successful worldwide since the 1960s

The SYNCHROACT is the most successful synchronization device in the ABB portfolio, having sold over 22,000 units since SYNCHROACT 1 was launched in the 1960s. SYNCHROACT 5 came on the market in 2000. “A proven solution on multiple levels,” says Werner Zimmerli, SYNCHROACT product manager from ABB Switzerland, “but throughout the years, the electronic system has been significantly developed. And new requirements have emerged in terms of communication ability.”

The new SYNCHROACT 6 by ABB was used for the first time ever at the Schiffmuehle Limmat Power Plant in Untersiggenthal. The sixth generation of the successful synchronization device had proven itself perfectly in operation.

ABB has therefore developed the next generation for top safety, always with a view of designing a retrofit that would be as simple as possible to implement. Therefore, SYNCHROACT 6 has the same mechanical installation dimensions and the same electric control concept as its predecessor. The new generation product has two diversely constructed channels in the same device. The channels therefore operate with different hardware and software, to deal with the danger of a systematic error. They also monitor each other. SYNCHROACT 6 fulfills the requirements for functional safety for level SIL2 in accordance with IEC 61508. Furthermore, the device is compatible with communication standard IEC 61850, edition 2. One device can synchronize up to 20 generators with individual settings.

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A power plant rich in tradition

For the premiere installation, ABB managed to win over the Schiffmuehle Power Plant of Limmatkraftwerke AG, a facility rich in tradition and located in the vicinity of ABB sites Baden and Turgi. Here, the use of the power of the Limmat River waters goes back to the founding of the Confederation. Already in the 13th century, a flour mill was operated here, powered by a water wheel, which had been installed on a vessel to tune into the differing water levels. That is where the name of the power plant and the neighboring industrial zone came from.

Electric energy has been generated here since 1892. Today, the Schiffmuehle canal hydroelectric power plant belongs to Limmatkraftwerke AG. There are three machine groups in operation, which had been fully revised in 1988 and now have a total nominal capacity of 3.5 megawatts, with an average annual production of 17 million kilowatt hours. The discharge power station launched five years ago, which uses residual water, generates another two million kilowatt hours.

“During the 1988 revision, a SYNCHROACT 3 was installed to synchronize the generators,” explains Peter Rothenfluh, in charge of power plant operation and maintenance at Limmatkraftwerke AG. “It has been functioning flawlessly for nearly three decades now.” But the time had come to replace it; as an electronic device, it had reached the end of its technical life expectancy.

Rothenfluh wanted to order a SYNCHROACT 5 from ABB as a replacement. “But at that exact moment, SYNCHROACT 6 was released from our Development Department,” Zimmerli recalls. “So I proposed to Limmatkraftwerke AG that they install our latest-generation synchronization device.”

An innovative client

Yet premiere installations do sometimes have their pitfalls. As a client, you prefer to fall back on solutions, which have already been proven in day-to-day operations elsewhere. But Zimmerli did not have to employ any special powers of persuasion with Rothenfluh. “We have a broad horizon in terms of the availability of our installations,” the operations manager explains. “The new solution should if possible hold out just as long as the previous one. So it makes sense to install the latest generation and not fall back on the SYNCHROACT 5.”

Still, the existing SYNCHROACT 3 was at first left in the installation and the SYNCHROACT 6 was installed in parallel. That was done quickly. The installation was completed in just a few hours. The adaptation to the existing control system, including preliminary analysis and subsequent commissioning, took only a few days. The implementation was complete at the end of November 2016. Rothenfluh also viewed the proximity of ABB as an advantage; after all, the ABB Switzerland power electronics competence center is located only a few hundred meters downstream.

“From day one, the SYNCHROACT 6 has proved itself in operation without the slightest issue,” Rothenfluh explains. There was no need at all to switch over to the proven yet aged predecessor. “It is fascinating to see how relatively simple it can be to link such a modern pioneering device like the SYNCHROACT 6 with existing technology,” says Peter Rothenfluh to conclude his experiences. “I would certainly go through this premiere installation together with Werner Zimmerli again.”