EMISSION-FREE LARGE BATTERY SYSTEM OF THE FUTURE

Proven reliability and a worldwide market presence bring Bachmann and GILDEMEISTER together

The CellCube large battery from GILDEMEISTER energy solutions is regarded as a milestone in the history of regenerative energy management. Whether in combination with wind power plants, biogas generators, PV installations or in parallel grid operation – the vanadium redox flow battery ensures an uninterrupted power supply. It is insusceptible to changing weather conditions, temperatures, length of daylight hours or unstable grids. The integrated approach of the system is implemented with the M1 automation system from Bachmann electronic.

Efficient performance and safety at the highest level: The CellCube – the large battery system of the future.

»The M1 provides an excellent basis for the further development of the control system for our CellCube energy storage systems.«

Dipl.-Ing. Dr. techn. Stefan Haslinger, Product manager / technical project management, Cellstrom GmbH (GILDEMEISTER energy solutions)

As part of the GILDEMEISTER Group, GILDEMEISTER energy solutions develops for industrial customers solutions for the generation, storage and use of 100 percent green energy. With products in the fields of wind power, solar power generation, and energy storage using large battery systems, the corporate division based in Würzburg, Germany, offers a comprehensive portfolio for the optimum use of regenerative energies. The customers benefit here from over 140 years of know-how in machine building that the company has gained.

Successful developments

Since 2002, the subsidiary company has already developed storage systems based on vanadium redox flow (VRF) technology. The first commercial and series produced VRF energy store with a 10 kW power output was launched in 2008. After the 200 kW system was launched at the beginning of 2011, GILDEMEISTER also caused a sensation in 2012 with the presentation of the new product series in the 10 kW to 30 kW range, and the large energy stores with outputs of 200 kW to 2 MW.

Trust in Bachmann systems

The company was in search of an industrial controller which ensures the reliable and safe use of the modular product family of VRF energy stores, the so-called CellCube, that has been available on the market since June 2012. "The widespread use of Bachmann products in the market for regenerative energy, particularly in the field of wind power and CHP units was one of the reasons why we chose the company," explains Stefan Haslinger, product manager for technical project management at Cellstrom GmbH. "This demonstrates the high level of trust that customers place in the robustness and stability of the Bachmann controllers."

Requirements profile of the PLC

Whilst the very important requirement of stable operation in regenerative energy applications was already fulfilled on the industrial controller, the robustness and reliability of the PLC were tested again. Extensive safety and performance tests were carried out as part of the prototype development, and the controller was already installed in the first plants for customer applications. "Bachmann provided us here with leased and testing systems for twelve months," Stefan Haslinger recalls. "We also appreciated the very good support provided by Bachmann."

Demanding battery management

The Bachmann M1 controller is used in the battery management of the CellCube FB 200–400 with a 200 kW power output and 400 kWh energy output. These can also be connected to form energy store clusters with up to 2 MW output. Besides sensors for monitoring the temperature and pressure of the redox flow fluid section, the battery management also includes actuators, pump drives and interfaces to different bus systems and much more. "The M1 was therefore required to control and monitor the entire battery management system, as well as to ensure communication to cluster and park management systems," the product manager describes.

Integral approach

The M1 is also used for the cluster management of the MW plants and in park management.

GILDEMEISTER energy solutions

DMG MORI SEIKI

Cellstrom GmbH is part of the GILDEMEISTER Group and is responsible for the development and production of energy storage systems in the Energy Solutions division. The Austrian company, headquartered in Neudorf, Vienna, has been successfully developing and producing storage systems based on the vanadium redox flow (VRF) technology, and is thus making an important contribution in the field of on-demand uninterruptible power supply.

The control of the MW system in the recently opened GILDEMEISTER energy solutions park in Bielefeld, consisting of PV, wind power and storage systems, is therefore implemented with a Bachmann solution. "Bachmann thus made it possible to implement the integral approach of the system," Stefan Haslinger concludes.

Bachmann in operation

An MPC270 controller with a CM202 CAN master were selected from the Bachmann portfolio to manage 80 serial bus interfaces to the DC links which autonomously regulate the charging and discharging of the energy store. "The Ethernet and serial RS232/RS485 interfaces provided on the MPC270 are also used and are a particular benefit," Stefan Haslinger describes in detail. In addition to this, three AIO288 analog modules and an AI208 module are used to integrate pressure sensors and cover the processing of analog signals. A DIO280 and a DI232 module are used for controlling the digital signals. I/O modules are primarily used because of the flexibility they allow in the configuration of inputs and outputs. The described configuration in a controller, consisting of several analog and digital inputs and outputs, as well as several interfaces, enables the holistic integration in a 200 kW energy storage system. The controller system is also used in the cluster and park management system, if several 200 kW systems are connected together to form storage solutions of up to 2 MW.

Optimum match

"In our view, Bachmann offers a comprehensive product portfolio with a large selection of modules that enable the industrial controller to be matched perfectly to the sensors, actuators and interfaces used," Stefan Haslinger expresses his delight with Bachmann. The product care and the continuous further development of modules which are closely designed to meet customer demands enable GILDEMEISTER energy solutions to follow a

CellCube FB 200–400

Charge rating	200 kW
Discharge rating	200 kW
Energy storage capacity (use independent of performance)	400 kWh
Duty factor/ response time	< 60 ms
Weight, dry state	20,000 kg
Weight, loaded state	60,000 kg

▲ **Monitoring service function:** All important operating parameters can be called up online at any time, e.g. the state of charge (SOC), electrolyte temperature or charge rating. An optional monitoring touch display can be fitted to the battery at additional cost.

long-term development strategy based on Bachmann modules. "Even with the continuous further development of our CellCube storage systems, we are always ensured the optimum use of the Bachmann industrial controller," the product manager expresses his praise.

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