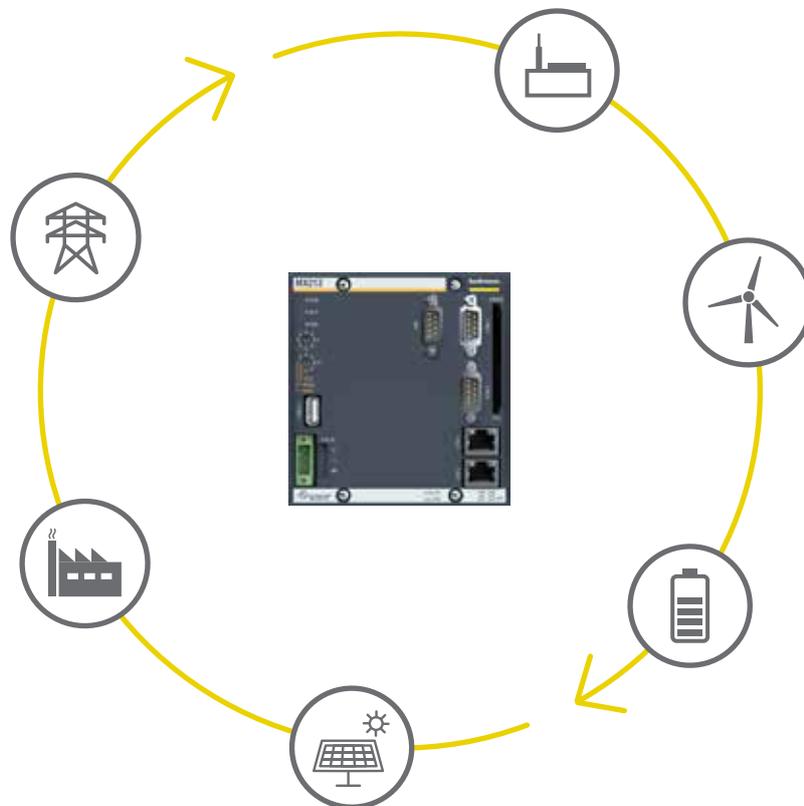


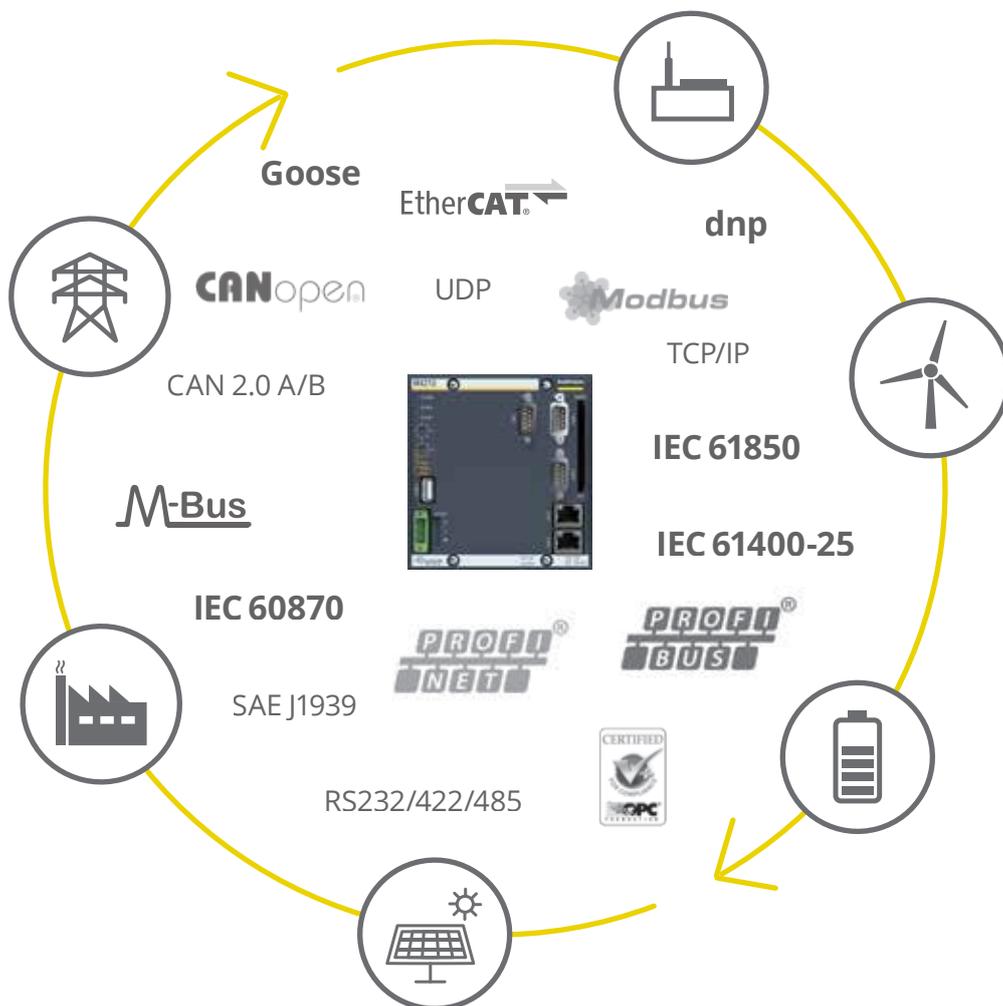
# Solutions for Energy Storage Systems

Open, modular, secure.



# Open Interfaces

Fieldbuses and protocols



## Open interfaces

- Problem-free integration of third-party systems and components
- Simple expansion of functions through the “eclipse market place”
- Reusability of existing functions through open operating system
- Free choice of protocol without changing the automation
- Plantwide data transparency in real time

# Solutions for Energy Supply

## Power management

The widespread use of electricity in all aspects of work and life offers a multitude of benefits, greater convenience and an improved quality of life. In order to ensure energy-optimized solutions in production, buildings and in infrastructures, there is a growing need for these to be based on suitable measuring systems. At the same time, the maintenance of supply security requires integrated solutions for operating grids and the standards compliant management of generating units. Bachmann offers both synergies through the direct integration in the PLC world as well as certified compliance with the latest regulations.

Application areas	GM260	GMP232/x	GSP274
Operational measurement	✓	✓	✓
Energy monitoring	✓	✓	✓
Power quality	–	✓	✓
Monitoring/grid connection	–	✓	✓
Protection function	–	✓	✓
Online fault diagnostics	–	✓	
Generator connection (synchronization)	–	–	✓



# Smart Power Plant Controller

*EZA controller, compliant with connection guideline VDE-AR-N-4110 for supply*

To operate a power plant (EZA) efficiently, the power management at the point of common coupling (PCC) is very important. The power plant could consist of different generation units (EZE), which are represented by combined heat and power units (CHP), photovoltaics (PV), wind turbines or storage components. A given power value could be set either manually or from a third party, e.g. direct energy trading. The resulting set-point for the different generation units in the park is calculated by the controller and then supplied to the units. According to the new requirements, which are valid from May 2019, it is mandatory for every power plant producing a power input  $\geq 135$  kW, to have a certified power plant controller, which has implemented the functionalities and follows the required rules.

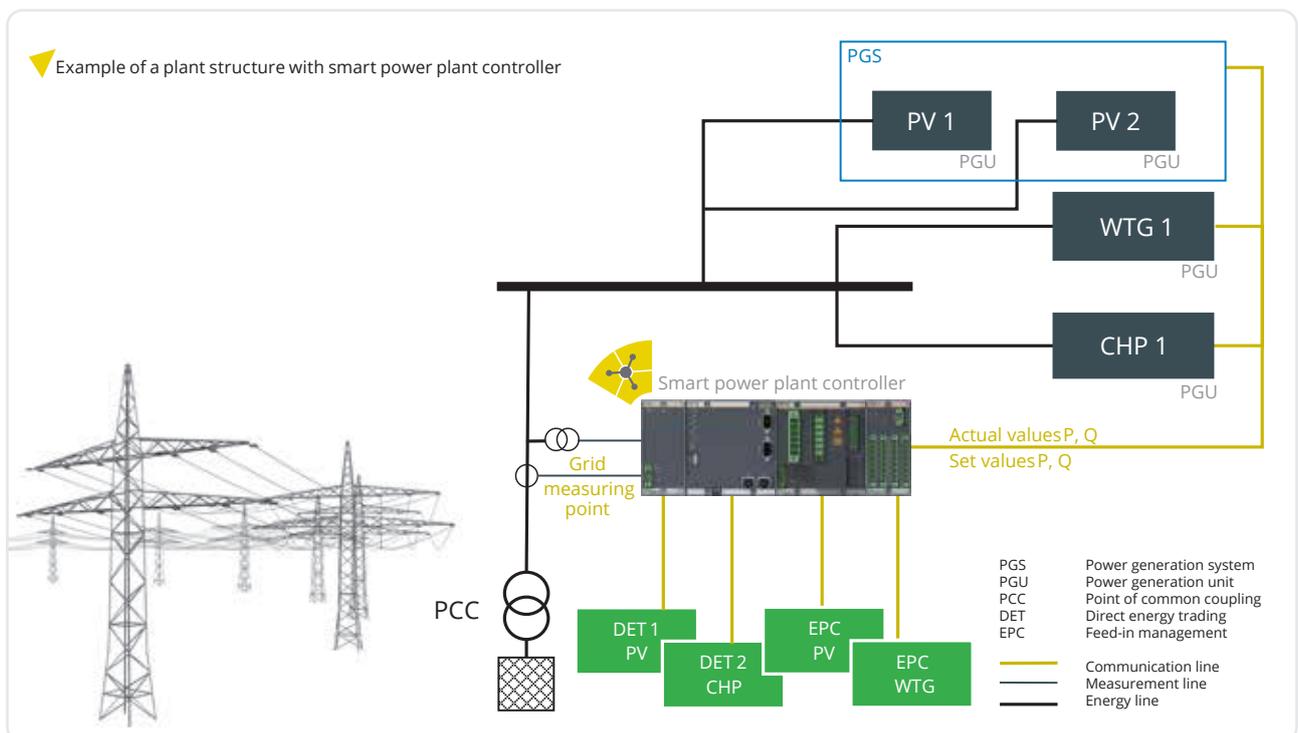
Bachmann electronic provides an EZA controller, based on the proven Bachmann CPU's and the extremely high accurate grid and measurement module (GMP232/x). In addition to this, it completely fulfills the connection guideline VDE-AR-N-4110 for power supply. The core component is the closed-loop-controller, which is a software module created by Bachmann with the extension

M-Target for MATLAB®/Simulink®. This software module meas-

ures the values at the point of common coupling and with using the actual values from the park grid, it calculates the set-points and sends them to the different types of generation units.

All the required functionalities regarding set-points for active and reactive power, also the supply of these set-points towards the generation units, e.g. CHP, are implemented. To complete this product, a local HMI is also provided. It could be used for configuration, monitoring and operation.

This product is also shipped with a simulation library of the EZA controller for PC. This could be easily integrated into common grid simulator programs, which are normally used to certify the whole energy plant. To allow the access of direct energy trading (DET) or feed-in management signals (EINSMAN), Bachmann has the most common communication protocols already included, e.g. IEC 60870-5-101/104, IEC 61850 or Modbus. These are easily to configure and beyond this, digital or analog signals could of course be used. In addition, this EZA controller solution provides the highest standards according to security, which checks and logs each and every access and change of value.

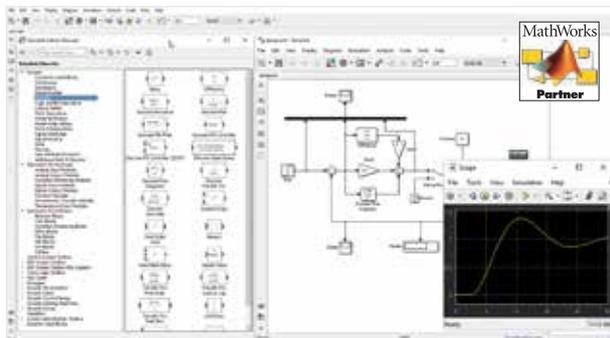


# Application Development in all Languages

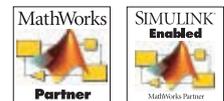
IEC 61131-3, C/C++ or MATLAB®/Simulink®

Programming is an essential part of the engineering process. Any possibilities to save time in this development step in particular are therefore desirable. The combination of optimum technology for the particular task and helpful functions increases efficiency and improves code quality.

Model-based development with graphical simulation and programming environments are becoming increasingly established tools for complex tasks. These reduce complexity and ensure that the focus is on what is essential: optimum task implementation.

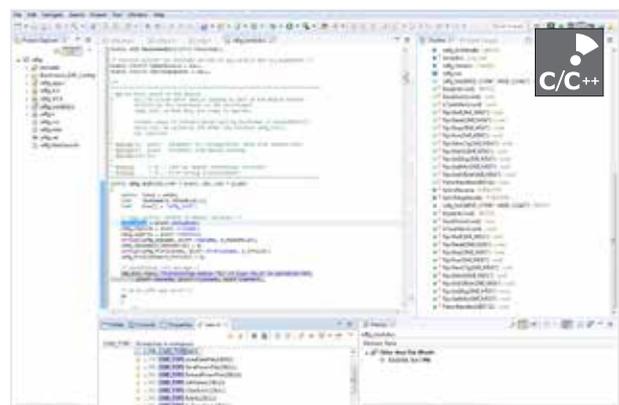
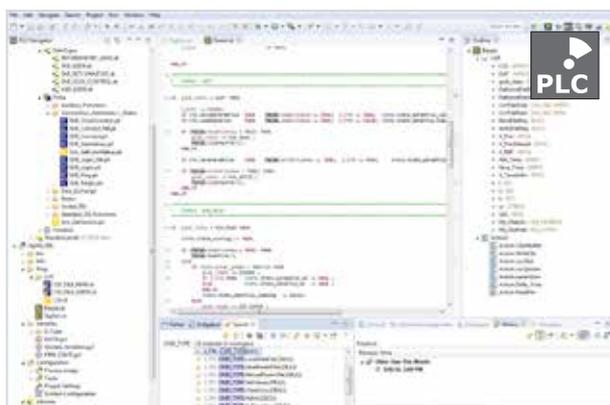


## Equipped for the future



The SolutionCenter and M1 controller support a wide range of programming languages: C/C++, all IEC 61131-3 languages and MATLAB®/Simulink®.

Programmers thus have the possibility to create applications in their familiar environment and language. Existing and established software code can also be reused without any problem. Libraries for PLCs can be created in all languages. The supported languages can also be combined as required.



# World of Visualization

— *One software for all applications*

## atvise® web.MI

Bachmann's M1 webMI pro is a new product on the market that revolutionizes the world of visualization. The latest communication technologies, such as a secure web server directly installed on the M1 controller, enable the connection of any visualization devices such as smartphones and tablets but also powerful operator terminals.

## atvise® scada

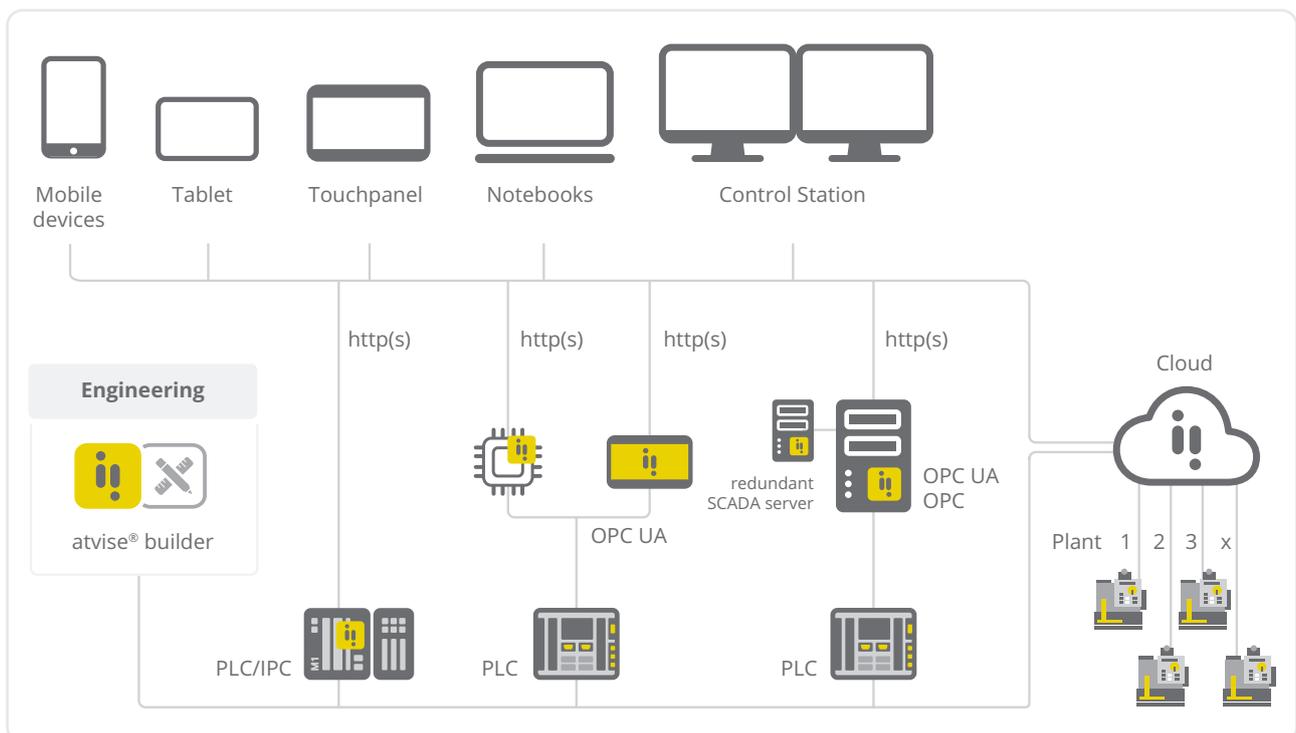
Bachmann's SCADA system offers a convenient and comprehensive system solution for web-based visualization projects. Maximum flexibility and openness ensure rapid implementation, good maintainability and the possibility to expand the installation efficiently. For example, the process values can be depicted fully according to the IEC 61400-25 interface. This

not only simplifies internal communication but also provides external operators and energy companies with uniform access to the specific characteristic values.

## atvise® portal

Information is one of our most valuable resources. Data has to be refined in order to optimize processes. The private cloud is the answer to sustainable data usage: The atvise® portal and the connected M1 controllers enable you to implement either an entry level solution without any major investment in the network infrastructure or product developments over several years, as required. A private cloud solution can increase the efficiency of your remote monitoring applications – simply through the use of existing atvise® visualizations with just a single click.

▼ The Bachmann HMI product portfolio offers the right solution for any application in the highest quality and can be tailored to your specific requirements as needed.



# Security Integrated in the M1 System

## Multi-level IT security concept

A selective security management system not only helps with unwanted and potentially destructive hacker attacks. Particularly in the protected environment of production plants, any accidental modification of machine parameters or configuration errors in the machine network are difficult to fully exclude. The effect of these, however, is often as serious as outside threats.

### Level 1: Protected network



- Tap-proof data transmission through encrypted network connections
- Band width limitation to defend against overload attacks and for protection from faults in the network periphery

### Level 2: Tap-proof communication



- Access control based on integrated user and password management
- Server and client authentication for the protection of automated teleservice accesses
- Secure end-to-end encryption to the latest state of the art (TLS 1.2)

### Level 3: Authorized access control



- Rights are examined irrespective of the access path to the controller (visualization, SolutionCenter or with OPC UA)
- Restriction of system and execution rights for every user
- Role-based access control with groups (users inherit group rights)
- Configuration of access protection and visibility of files and process variables

### Level 4: Hardened operating system



- The saving and running of additional applications can be prohibited
- Memory protection measures so that third-party processes cannot access the memory of the application
- Detailed logging of all user accesses with all user data and partition encryption

### Level 5: Secure user applications



- Open interfaces to adapt and enhance all access control functions and for the use of cryptographic functions in applications
- Backup and recovery mechanisms
- Predefined security levels as templates for simple configuration

▼ **Security as standard:** Bachmann protects plants from production failure caused by unauthorized manipulation with a 5-level security concept. The entire Bachmann CPU product range comes with all security functions as standard. This therefore provides the user with an optimized ready-to-use security package.

**bachmann.**



**[www.bachmann.info](http://www.bachmann.info)**

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