

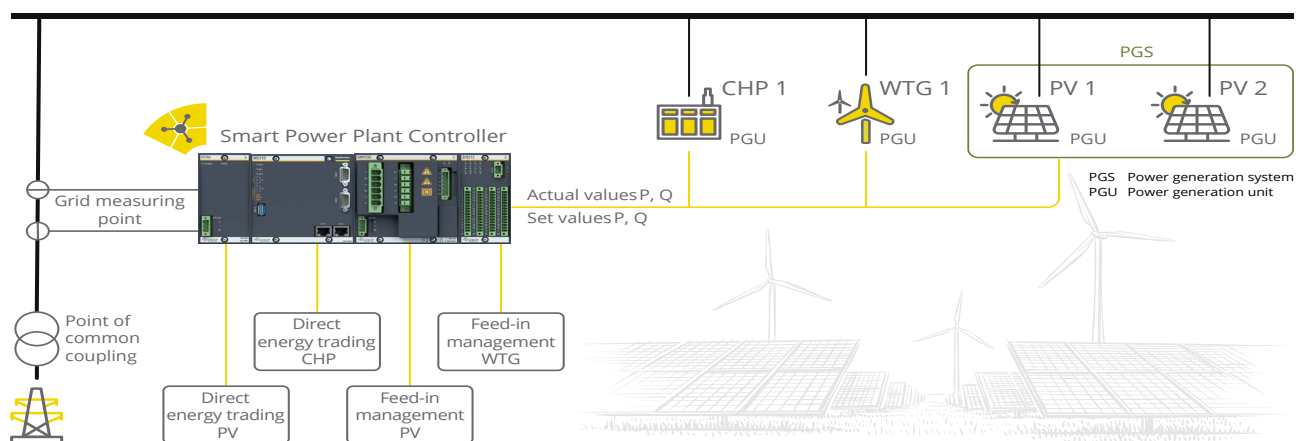


## SPPC Smart Power Plant Controller

Bachmann electronic has developed a product that offers the required functionality for controlling different energy generators and components combined to form a higher-level power station and also fully meets the requirements of the new VDE-AR-N 4120:2018 and the new VDE-AR-N 4110. An energy park consists of power generation units (PGU), such as wind turbines (WTGs), CHP units, photovoltaic installations (PVs) or battery storage systems, as well as consumers (hybrid farms). These must all be combined and controlled as generation plants by a controller at the point of common coupling (PCC) if the total connected load ratings are  $\geq 135$  kW (new VDE guideline from May 2019).

Bachmann has developed a controller as a software module for the M1 that provides all the functions and setpoint definitions required by the guideline for active and reactive power. Besides the controller module, a simulation model is also provided for the PC, which can be integrated in standard simulation software for certifying the customer's overall system.

Item	Item No.
SPPC Basic	00034083-63
SPPC Extended	00034084-63
SPPC Connection license:	
1 to 10 PGUs	00034881-01..10
Up to 15 PGUs	00034881-15
Up to 20 PGUs	00034881-20
Up to 30 PGUs	00034881-30
Up to 50 PGUs	00034881-50
Up to 80 PGUs	00034881-80
Up to 95 PGUs	00034881-00



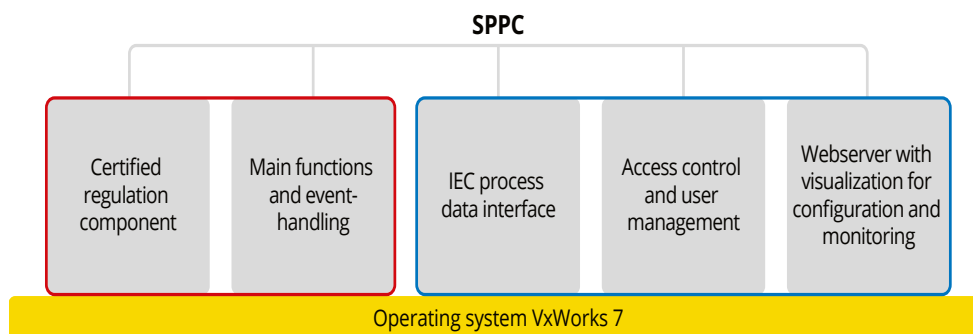
Connection example of a Smart Power Plant Controller system (schematic)

In addition to the actual controller core, the SPPC also features an operational management software which includes a status machine for general functions and controls as well as event handling. Bachmann offers a high-performance CPU as a hardware platform for the park controller, which offers in combination with the GMP232/x grid measurement and protection module an ideal solution for the acquisition of measured values at the grid connection point. Additional modules from the Bachmann hardware portfolio can also be incorporated as required. The modular software structure of the M1 makes it possible to expand this product to suit customer requirements.

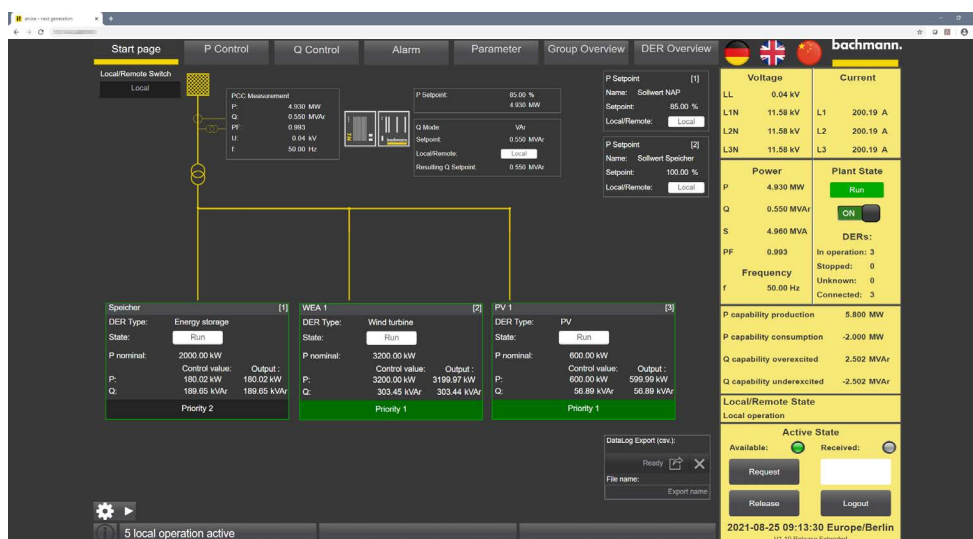
The product also includes a local operation and configuration visualization tool which can be called with any browser via a web server on the controller. Topologies, signal flows and charts can be displayed, and setpoints can also be defined.

The historization of active power setpoints, as required by the guideline, has also been implemented on the system and data can also be exported via the visualization. There is also a separate area that makes it possible to carry out various tests for commissioning, in order to ensure that the parameters of the Smart Power Plant Controller are correct.

Bachmann places prime importance on access security. For this reason, the Smart Power Plant Controller also features a user and access management system that meets the highest safety standards while still enabling a flexible setup by the user. Thanks to the host of communication protocols available in the Bachmann automation system, it is possible to respond flexibly to the wide range of different communication connections, e.g. to direct energy trades.



Software structure of Smart Power Plant Controller on M1 controller



Browser-supported operating and configuration visualization tool

Smart Power Plant Controller		
General / Communication		
Technology	Expandable software package for M1	
Hardware	NT255, MC206 (SPPC Basic) oder MC212 (SPPC Extended), GMP232/x (recommended), GIO2xx (recommended), other modules (optional)	
Interfaces to the PGU	Analog (4-20 mA), Modbus TCP, IEC 60870-5-101/104, IEC 61850, IEC 61400-25, DNP3, bluecom, PROFIBUS®, PROFINET®, EtherCAT®	
Interface to the power supply company/energy trader	Analog (4-20 mA), Digital (24 VDC), Modbus TCP, IEC 60870-5-101/104, IEC 61850, IEC 61400-25, DNP3, bluecom	
Engineering		
Mapping configurations for communication protocols	SolutionCenter with special plug-ins (WTT configurator plugin)	
Controller configuration	HMI visualization	
Functionality	»Basic«	»Extended«
Active power	<ul style="list-style-type: none"><li>• Active power control (P) according to setpoint definition</li><li>• P(f) characteristic</li></ul>	<ul style="list-style-type: none"><li>• Power reserve</li><li>• Primary control (FCR)</li></ul>
Reactive power	<ul style="list-style-type: none"><li>• Reactive power control (Q) according to setpoint definition using the following procedures:<ul style="list-style-type: none"><li>- Q setpoint definition</li><li>- Q(U) characteristic</li><li>- Q(P) characteristic</li><li>- Q setpoint definition with voltage limitation function</li><li>- Power factor setting (cos φ)</li><li>- Cos φ (P) characteristic</li></ul></li></ul>	
Higher-level functions	<ul style="list-style-type: none"><li>• Controller bridging (slave mode)</li><li>• Operational control with status machine</li><li>• Grouping and prioritization function for PGUs/PGSs</li><li>• Integration of non-controllable consumers (balancing)</li><li>• Event system</li></ul>	<ul style="list-style-type: none"><li>• SCADA link via OPC UA</li><li>• Email notification on event triggering</li></ul>
Historization	<ul style="list-style-type: none"><li>• Dynamic data historization for 18 months</li></ul>	<ul style="list-style-type: none"><li>• Data archiving in free, relational database (mariaDB)</li></ul>
Number of PGUs	<ul style="list-style-type: none"><li>• Up to 15 PGUs</li></ul>	<ul style="list-style-type: none"><li>• Up to 100 PGUs</li></ul>
User Management		
Access security and user management	<ul style="list-style-type: none"><li>• Extended software package for the M1</li><li>• AES256 encryption of users/passwords</li><li>• Location based prioritization control</li><li>• Highly granular structuring of access rights for groups and users</li><li>• Logging</li></ul>	

Smart Power Plant Controller	
Visualization	
Web visualization	Browser-supported local operating and configuration visualization tool via M1 webMI (web server for M1)
Engineering	atvise® builder for M1 webMI
Licensing	
»Basic« runtime license	Hardware (M1) connected runtime license Basic function set with connection of up to 3 PGUs, components (e.g. energy storage system) or consumers included
»Extended« runtime license	Hardware (M1) connected runtime license Extended function set with connection of up to 5 PGUs, components (e.g. storage system) or consumers included
Connection license	Each additional PGU or component