

EFASOLAR Power Plant Controller

Overview

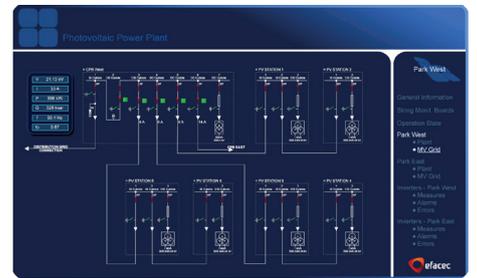
EFASOLAR Power Plant Controller, as a complete PV Power Plant monitoring and control solution, acts as a valuable tool to the power plant operator, ensuring a more reliable and optimized operation and maintenance plan with recognized benefits in the short and long term.

This solution is based on the strong experience held by Efacec on distributed platform for automation, control and monitoring solutions, implemented in major electrical system power plants and integrated in major electrical grid command centers, providing the user with high confidence levels on system availability and reliability.

Through advanced and adaptable closed-loop control algorithms, it enables utility-scale PV installations to comply with grid operator requirements, providing the capability to manage and control the grid power injection according with different regional, national and international grid codes.

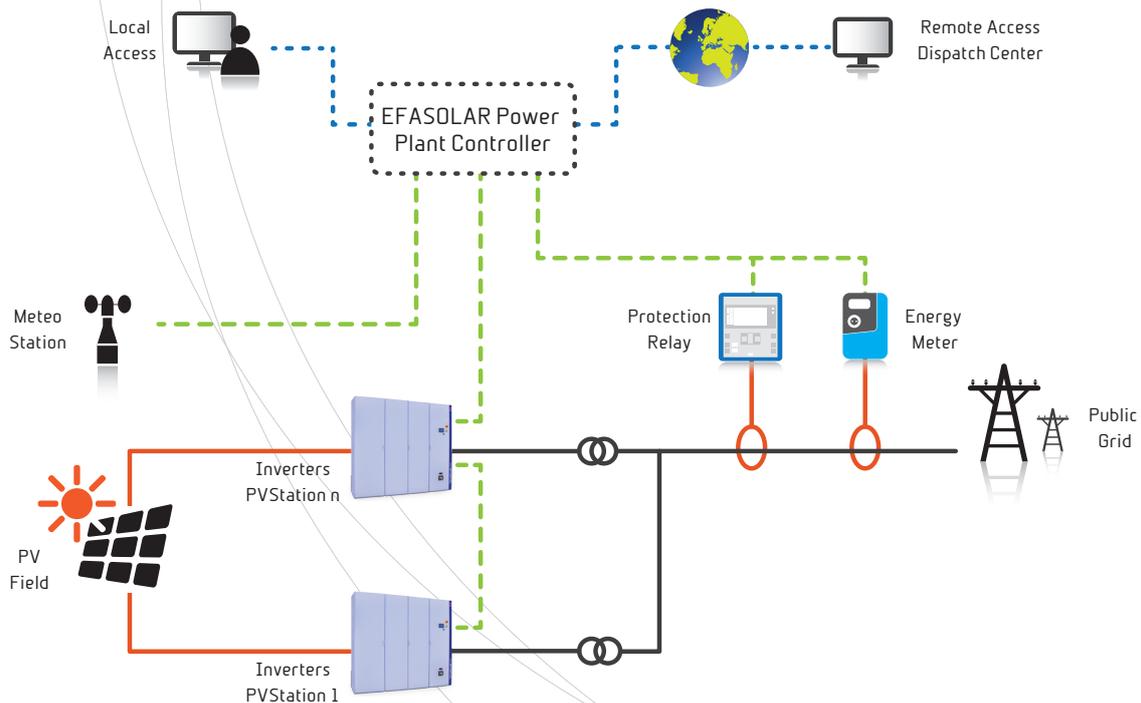
Due to the configurable monitoring features and communication capabilities, the EFASOLAR Power Plant Controller enables as well to concentrate all the power plant main operational data, both historical and at real-time, in one access point, by communicating and acquiring information from the inverters, grid connection protection relays, energy meter and meteorological stations. Communication with a high-level control system, such as a dispatch center, is also allowed, enabling the possibility to remotely control the PV plant.

As one of the main features, EFASOLAR Power Plant Controller also provides a direct user access for local and remote viewing of real-time data and alarms of all power plant equipment connected to the plant controller, enabling the plant operator to easily access the system alarms, event logs and to act on the power plant control setpoints.



EFASOLAR Power Plant Controller Topology Diagram

*Communications Network is out of the EFASOLAR Power Plant Controller scope. Optionally, it can be integrated in the controller scope the ring/antenna network switches and respective wall mounting boards.





Advanced Plant Control:

- Adaptable closed-loop control algorithms, with fast response times, for precise control of Active and Reactive Power Plant grid injections;
- Highly adaptable to grid operator specific requirements;
- Plant real-time data, alarm and event management capabilities;
- Flexible system that can easily be adapted to the needs and configurations of each particular plant, allowing implementation of specific plant automatism functions, necessary for PV plant stand-alone operation and contingency reaction.



Communication Capabilities:

- Communication with PV plant equipment is ensured through a set of communication protocols such as Modbus TCP/IP, IEC 61850, IEC 60870-5-104 and DLMS-Cosen;
- The Controller board is equipped with a dedicated ethernet switch, capable of integration in ring topology networks, for connection to an existing internal communications network.

Optional - A PV Station level controller board can be integrated with dedicated switches for Fiber-Optic ring or antenna communications network topology.



Data Accessibility & Control:

- EFASOLAR Power Plant Controller can operate as a stand-alone system or, alternatively, can be integrated on an existing Plant SCADA system or Grid Operator remote Dispatch Center for real-time data and setpoints report and remote control capabilities, through IEC 60870-5-104 protocol;
- Both local and remote accesses to EFASOLAR Power Plant Controller are ensured through a web-based interface, accessible through commercial browsers, providing a valuable tool for the plant operator to easily access and manage the plant data and control.



Compatibility with existing systems/equipment

EFASOLAR Power Plant Controller is designed in order to enable the integration of both old and new equipment in existing systems, making it the ideal solution to upgrade power plant control capabilities.



Wide-range System Management Capabilities

Due to the advanced control and management capabilities, EFASOLAR Power Plant Controller is efficiently applicable to the monitoring and control of different types/topologies of power plants, as, for example, with Energy Storage Systems integration, allowing the simultaneous control and monitoring of both the plant power generation and the Battery Storage System operation.



Full Dynamic Power Control



Customizable Power Control Functions



Grid Support Features



Energy Storage Integration



Grid Dispatch Interface



SCADA Integration

Technical data	
System interface capabilities	
HMI interface	Local & remote access to system HMI - web-based HMI server - Power system schematic (single line diagram) - Real-time data and alarm-management screens per group of equipment - Plant control screen - Others
Communication protocols	Modbus TCP/IP, IEC 61850, IEC 60870-5-104, DNP 3.0 (additional protocols can be considered according to project specification)
Remote control interfaces	Controller can be implemented as a stand-alone device or, alternatively, be integrated on: - Plant SCADA system - Grid dispatch center
Power plant controller functions	
Closed loop functions: ⁽¹⁾	- Dynamic power factor control ⁽²⁾ - Active power limitation control ⁽²⁾ - up/down act. power ramp limitation ⁽²⁾ - Reactive power control ⁽²⁾ - Volage Control ⁽²⁾
Plant monitoring functions: ⁽¹⁾	- Plant performance ratio calculation - String monitoring alarm algorithm (opcional)
IO's	
Digital	AC and/or DC inputs and outputs
Analog	4-20 mA / 0-10 V

