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ESOLAR PV PARK

MONITORING SYSTEM FOR LARGE PER PHOTOVOLTAIC PLANTS

eSolar PV PARK is a system for the supervision and management of local or remote maintenance of fixed or tracking photovoltaic systems.

eSolar PV PARK integrates inside a home automation engine that uses the KNX communication protocol, the only worldwide open standard for home and building automation complies with CEI EN 50090 and ISO / IEC 14543.

It is able to communicate with most of the photovoltaic inverter on the market through RS-232 / RS-485 / Ethernet serial communication ports and acquire the measured quantities.

eSolar PV PARK is able to communicate with energy meters, fiscal metering system or network analyzers through RS-232 / RS-485, Ethernet communication ports or pulse outputs and to acquire the measured quantities. It can also manage groups of inverters in such a way as to ensure a detailed examination of each part of the system, where several photovoltaic technologies have been potentially arranged.

eSolar PV PARK is ideal for photovoltaic systems of great dimension. It enables support in real-time data visualization up to 800 strings. Its software capabilities can also be increased and customized thanks to the wide range of software modules which can be equipped.

eSolar PV PARK allows to calculate the production of each plant section, the performance ratio of the section of interest (according to EN 61724) and verify the economic performance of each section. It can calculate the energy production, the performance and economic data ratio of each section of the plant (in accordance with EN61724).

STRENGHTS

- Integrated web interface for easy consultation
- Easy installation and setup
- Compatibility with inverters, string controllers, multi-meters (after checking compatibility)
- Support and display real-time data up to 800 strings
- Wide availability additional software modules
- Support tool to O&M activities
- Analysis of technical and economic information
- Historical data management with opportunity to export multiformat data
- Advanced management module of virtual meters
- Plant units management module

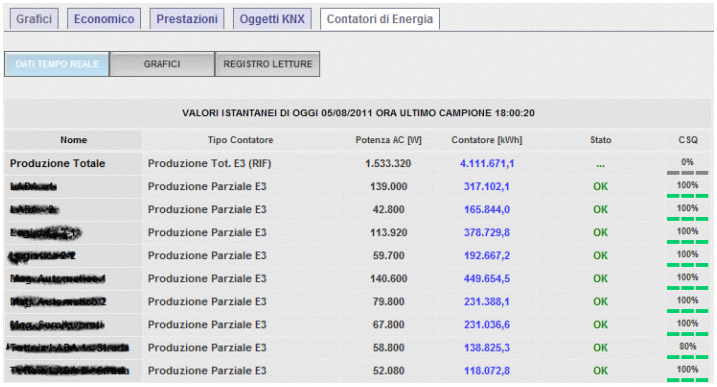
SYSTEM ELEMENTS

- Standalone monitoring system
- Compatible with cloud monitoring multiplant service, SINAPSI DATA SERVICE
- Via web / tablet / smartphone visualization
- Accessories for comnunication, sensors, advanced communication
- Plant units management module

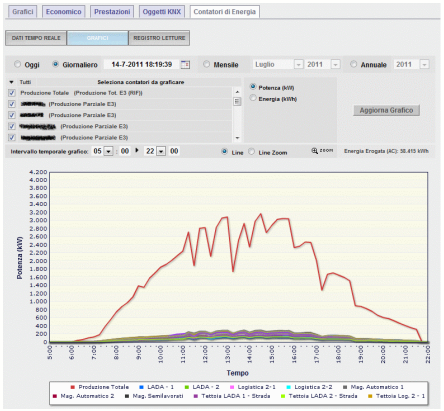
MODULE FOR ADVANCED VIRTUAL METERS MANAGEMENT

This module allows eSolar system to manage up to 10 “virtual” meters, compared to 3 meters (production / bidirectional) who eSolar runs in its standard version.
Through the virtual meters management module, the administrator of eSolar defines the function to be attributed to a given meter placed in the field by selecting from the following categories:

- Energy taken from E1 network
- Energy transferred to the E2 network
- E3 partial production
- E3 total production
- Partial Aux
- Virtual (virtualized sum of production meters connected to eSolar)



Nome	Tipo Contatore	Potenza AC [W]	Contatore [kWh]	Stato	CSQ
Produzione Totale	Produzione Tot. E3 (RIF)	1.533.320	4.111.671,1	...	0%
[redacted]	Produzione Parziale E3	139.000	317.102,1	OK	100%
[redacted]	Produzione Parziale E3	42.800	165.844,0	OK	100%
[redacted]	Produzione Parziale E3	113.920	378.729,8	OK	100%
[redacted]	Produzione Parziale E3	59.700	192.667,2	OK	100%
[redacted]	Produzione Parziale E3	140.600	449.654,5	OK	100%
[redacted]	Produzione Parziale E3	79.800	231.388,1	OK	100%
[redacted]	Produzione Parziale E3	67.800	231.036,6	OK	100%
[redacted]	Produzione Parziale E3	58.800	138.825,3	OK	80%
[redacted]	Produzione Parziale E3	52.080	118.072,8	OK	100%



For a maximum total of No 10 manageable meters.
Each meter can be acquired via RS232 / RS485 / TCP-IP / Gateway TCP-IP to RS485 (SIN.NP5130) / impulsive (KNX) communication channel.
For each meter it is also possible to turn a NO PRODUCTION alert in video, via email and/or via SMS.

The module for advanced virtual meters management allows the possibility to observe in real time the reading of the active energy [kWh] status and the quality of transmission on the serial communication line (CSQ).
It is possible to analyze the graph of each meter, enabling/disabling the reading of the individual.
The graphs can be analyzed back in time with a daily summary, monthly, yearly through a simple check.
The zoom tool allows detailed analysis of abnormal situations, and the ability to access a detailed view via "Zoom Chart" with on / off graphic mode CAD layer style.
In the readings register, it is possible to view the daily summary of each meter (with the possibility of selection via check) with detail on the quarter-hour. It also possible to analyze a given period of time within the day with the possibility of temporal window determination. From this page it is also possible to export in excel format all meter readings with detail on the quarter-hour.

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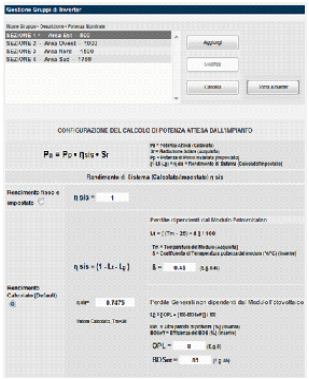
MODULE FOR SYSTEM SECTIONS MANAGEMENT

This module is particularly interesting in view of what has been proposed by the 4th energy bill on the predilection of photovoltaic systems "roof" and then where it is essential for the analysis of the functioning of a system, define performance indicators, economic reports, productions details for each section of the plant, through the provision of radiation sensors and the temperature of the reference module for each section of the plant.

By leveraging the capabilities to manage groups of inverter is possible to calculate the production of each plant section, calculate the performance ratio of the section of interest, check the economic performance of each section. During the configuration phase it is possible for each section / group of inverters, define:

- rated power and the surface of the single section
- a solar radiation sensor and a temperature reference module among all those connected to eSolar
- an alarm threshold that is activated in the event that the performance ratio falls below the value set
- the incentive and the amount paid for the plant section
- the monthly production data to design for a comparative analysis on the single section

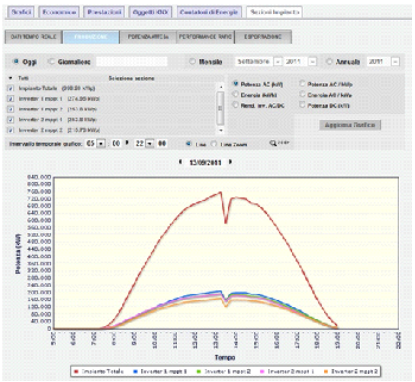


And it is possible to configure the calculation of performance expected from the section of the plant. This tool helps get to the detail structure of an algorithm for calculating the performance, considering all the parameters considered (see CEI EN 61724) essential for the calculation of the performance ratio of a photovoltaic system.

Once every aspect of each section is configured, the section MANAGEMENT of eSolar it is possible to control:

- Real-time data.
  Reading of up to 18 parameters per section, "scrollable" on the same page, selected by check box with

- Production data.
  Detailed analysis of the production of the plant from the point of view of each inverter with the possibility of zooming and graphic definition time interval custom trace



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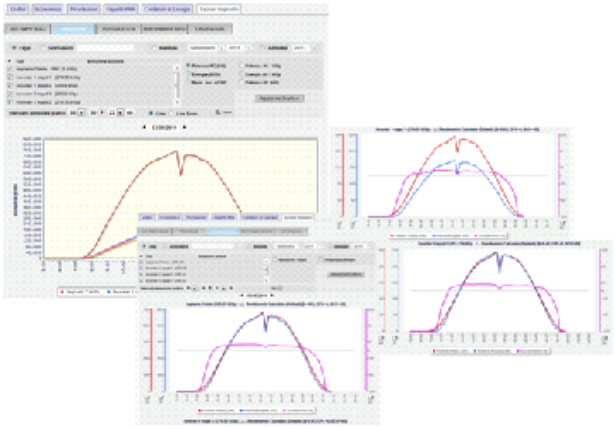
- Power Hold. Performance analysis system with detail at each inverter. Switch between display mode data in graphical and tabular form for verification actual behavior to expected behavior
- Performance Ratio. Analysis of the performance ratio of each section with the possibility of detail at each inverter. Switch between display mode data in graphical and tabular form for verification daily performance ratio and system performance parameters with respect to temperature reference module. Automatic determination of the sections with better performance



SOFTWARE OPTIONAL MODULE

eSolar PV PARK can be equipped with a wide series of software modules that increase exponentially the potential, thus ensuring a deep compatibility with the various elements/devices that may be present and therefore potentially monitored, in a photovoltaic large park. The following are some of the software modules of which eSolar PV PARK can be equipped with:

- In Modbus TCP Server enablement module
- Ftp server enablement module
- "Availability Inverter" calculation section activation module
- Compatibility activation module with digital inputs and outputs acquired by MOXA modules
- Activation module (Sensors-Weather Station section) of pyranometer management with global solar radiation (Tilt) - Global (horizontal) - Widespread

TECHNICAL SPECIFICATIONS

Color	Silver
Costruction	Aluminum and Heavy-duty steel
I/O Port system	• 2 x 9-pin D-Sub male connector, COM1, 3 for RS-485 • 1 x 9-pin D-Sub male connector, COM4 for RS-232 • 2 x RJ-45 connector for 10/100Base-T Ethernet • 3 x USB 2.0 connector • 1 x VAC power input connector
Data backup slot	1 x type II CompactFlash™ slot
System indicator	• 1 x green LED for system power-on • 1 x orange LED for memory activity
Power supply	Input rating: 1. VAC100-240 universal/0.5A 2. Max power consumption, 70W 3. Typical power consumption, 16W
Operating temperature	-20°C to 50°C
Storage temperature	-20°C to 80°C
Humidity	10-90% RH (non-condensing)
Vibration endurance	• 2Grms w/ CF (5-500Hz, X, Y, Z directions) 0.5Grms w/ HDD (5-500Hz, X, Y, Z directions)
Weight	2.15 Kg
Certification	CE
Dimensions	• 225mm (8.86”)(W) • 225mm (8.86") (D) • 51mm (2.01") (H)

ORDERING CODE: **SIN.ESPVPARK**

Advanced system for the supervision and management of local and remote maintenance of photovoltaic systems integrated home automation engine that uses the KNX communication protocol, can support up to # 10 meters and calculate the PR (according to EN 61 724) to detail of a single inverter

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