Etneo Italia Smart off-grid solutions

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Commercial Proposal

Supplier: Etneo Italia
Contact: Alessandro Drappo
Project name: SELF-SUFFICIENT HYBRID SYSTEM WITH DUAL RENEWABLE SOURCE

Delivering the Next Generation of Power with Smart Off-Grid

Our vision

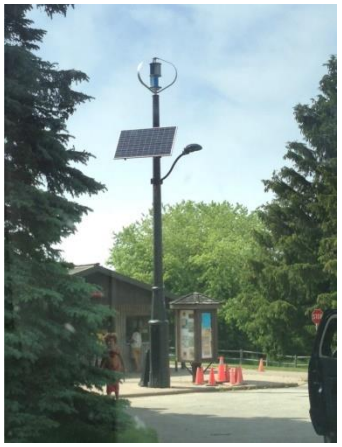
Etneo Italy, the Smart Off-Grid company, was founded on a vision of delivering clean, managed, “wireless power” to meet the global need for reliable, low-cost, solar and hybrid power for lighting, telecom, security, and Internet of Things devices.

What does Etneo offer and what solutions do you adopt?

- **Company: Etneo Italia srl**
  - Smart Off-Grid technology integrated into a variety of OEM products and Smart City product line
  - Charge controllers, communications, Illumience cloud management and control software
  - Managed off-grid power supply service
  - https://www.etneo.com/en/hybrid-energy/




- **Monitoring: integration of monitoring via cloud to off-grid solutions**
  - Hybrid lighting solutions (sun + wind) with remote control
  - Hybrid e-bike charging solutions (sun + wind)
  - 24V low voltage devices (sun + wind) power supply solutions

Software & Hardware

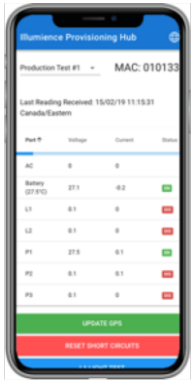
PRE SALES	INSTALLATION	AFTER SALES

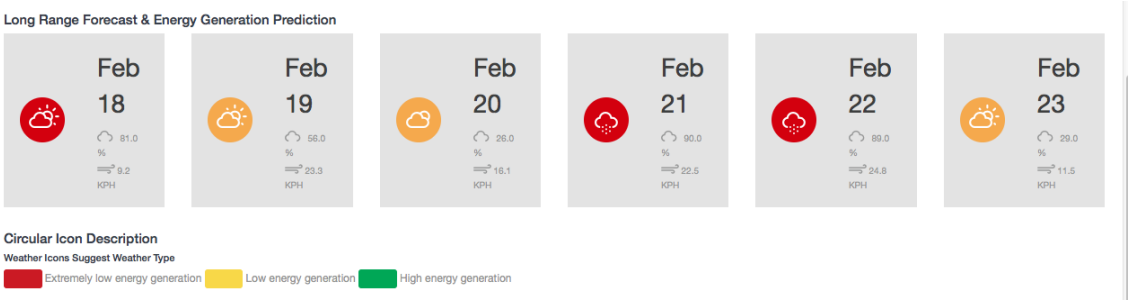
• Site lighting and power analysis
• Configured according to local conditions never undersized
• Quality components
  • Extensive options
  • Modular poles with options and customizations possible
  • Sun/Wind
  • Choice to charge 24 or 220V devices
  • Motion sensor
  • Security cameras
	• Drill and drop – no cabling/trenching cost
	• No technical training required
	• 14 Smart Meters on phone to validate install
	• Built in communications for Smart Off-Grid
	• Proven, tested to meet lighting standards
		• Smart Off-Grid means 7x24x365 remote monitoring, control and servicing
		• 80% reduction in maintenance costs
		• Proactive maintenance, service calls eliminated
		• Public website generated to promote green energy savings
		• Partnership approach – Illumient is there after the sale too!

A technology to ***manage, control and maintain*** off-grid systems over the Internet

Smart Off-Grid, what is it?

A technology to proactively manage, control and supply off-grid systems via the Internet





Why Does Smart Off-Grid Matter?

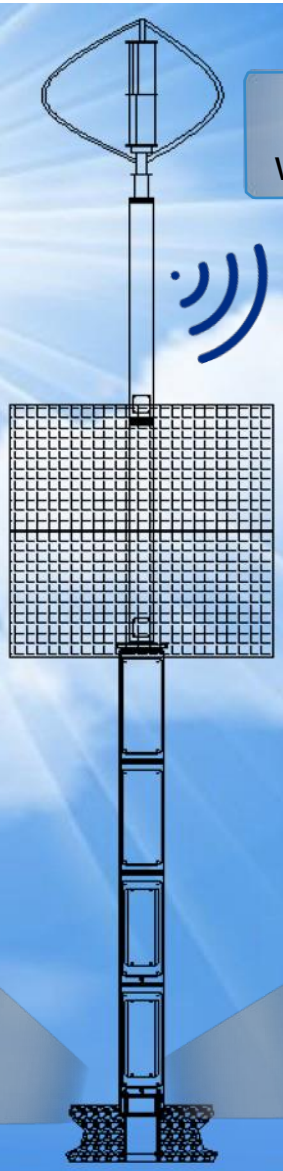
Smartphone App to Verify Installation

Brighter Lights w/ Configurable Profiles

Remote Visibility & Control - Increases Reliability and Reduces Installation & Maintenance

Modular engineered pole

SMART Controller Integrated Connectivity



Lead acid or Lithium batteries

Most Cost Effective & Reliable System in the Market!!

Peculiarities of the Smart off-grid Standard controller

- System that works in the absence of electricity to power 24V voltage loads, controller consumption reduced to a few watts/day.
- Single controller able to manage the photovoltaic source (with two inputs for PV panels with maximum production of 10A each), the wind source (with an input for a turbine of maximum 500W power), the Lithium batteries (with a 24V input and relative protections), the loads (with 2 outputs of 10A each).
- Remote monitoring system with sim chip, inside the controller, able to manage all the production data of the sources, the consumption of the loads, the alarms relating to the minimum-maximum voltage thresholds of the batteries, short circuit and other specific events.
- A dedicated web dashboard from which you can control every single controller and all connected devices.

Peculiarities of the Optimus off-grid Smart Controller

- System that works in the absence of electricity to power 24V voltage loads, controller consumption reduced to a few watts / day.
- Single controller able to manage the photovoltaic source (with two inputs for PV panels with a maximum production of 15A each), the wind source (with an input for a turbine of maximum current 30A and 42V voltage), the Lithium batteries (with a 24V input and relative protections), the loads (with 2 outputs of 20A each or 30A if combined), 1 auxiliary output, RS485 connection.
- Remote monitoring system with sim chip, inside the controller, able to manage all the production data of the sources, the consumption of the loads, the alarms relating to the minimum-maximum voltage thresholds of the batteries, short circuit and other specific events.
- A dedicated web dashboard from which you can control every single controller and all connected devices.

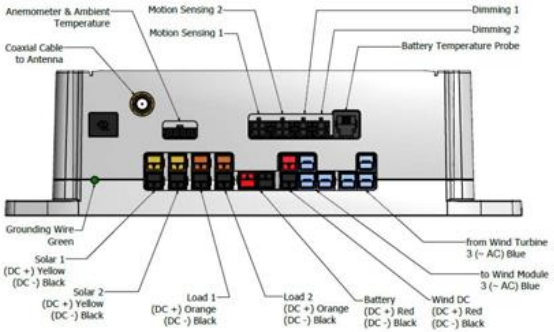
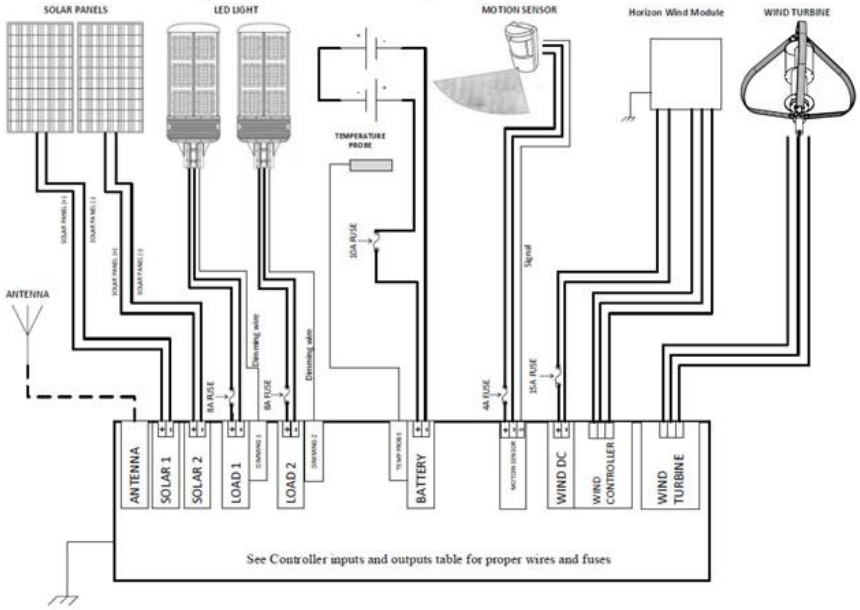
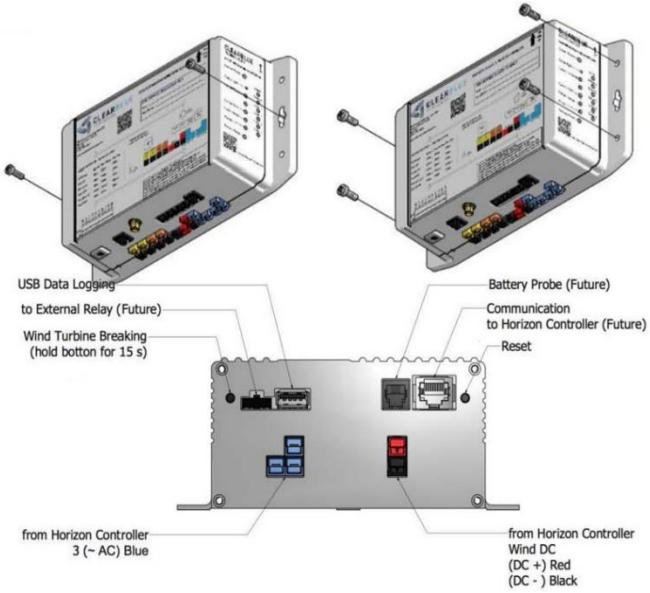


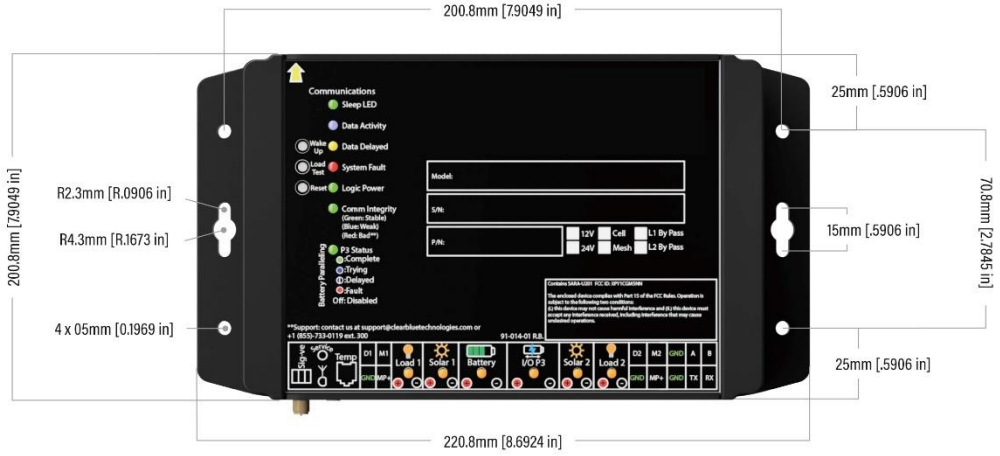
Diagram (2): a schematic diagram of a generic installation





Components

Standard Controller



Mounting Option A

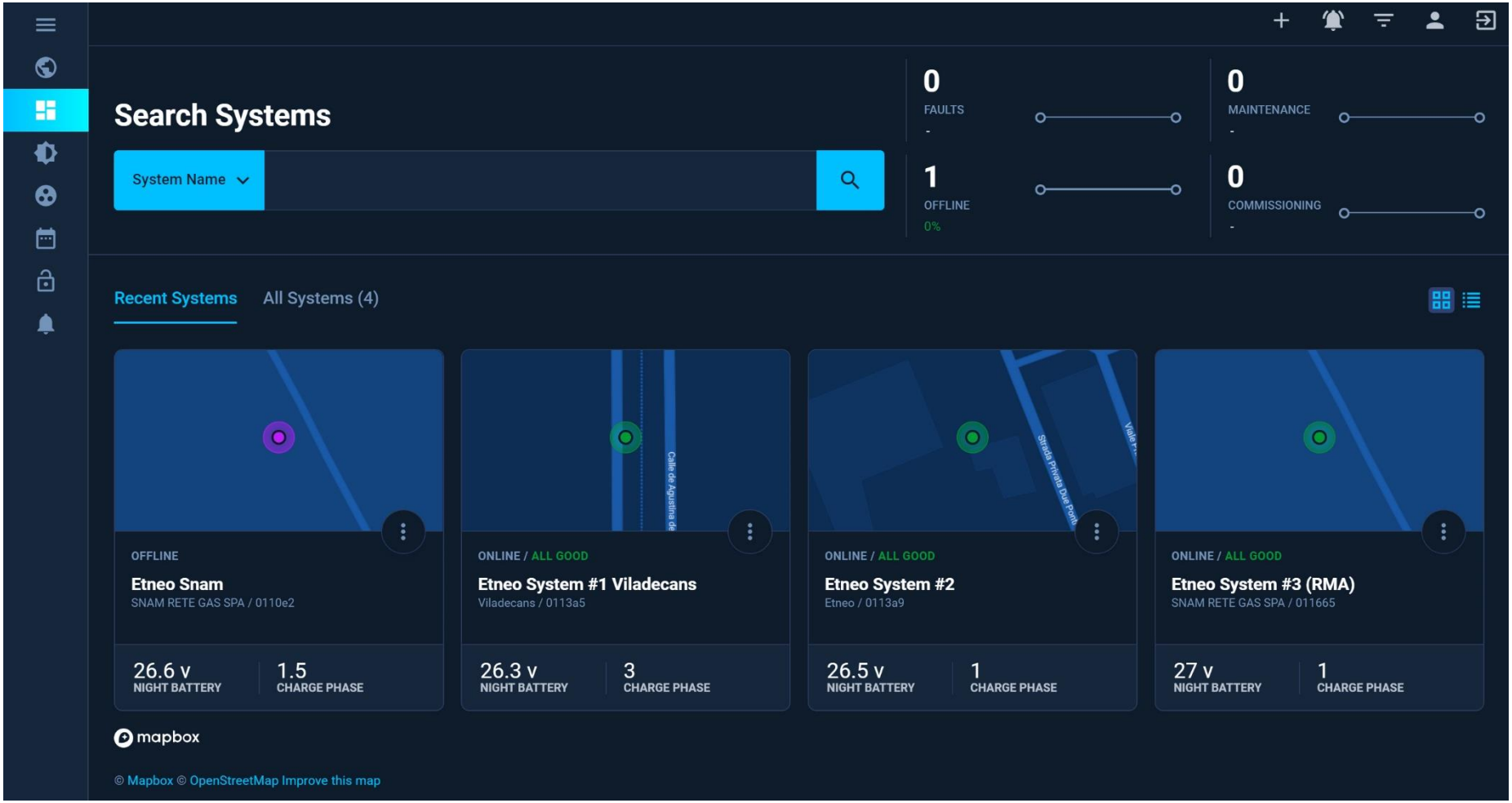
Mounting Option B

Components

Optimus Controller

Controller features:

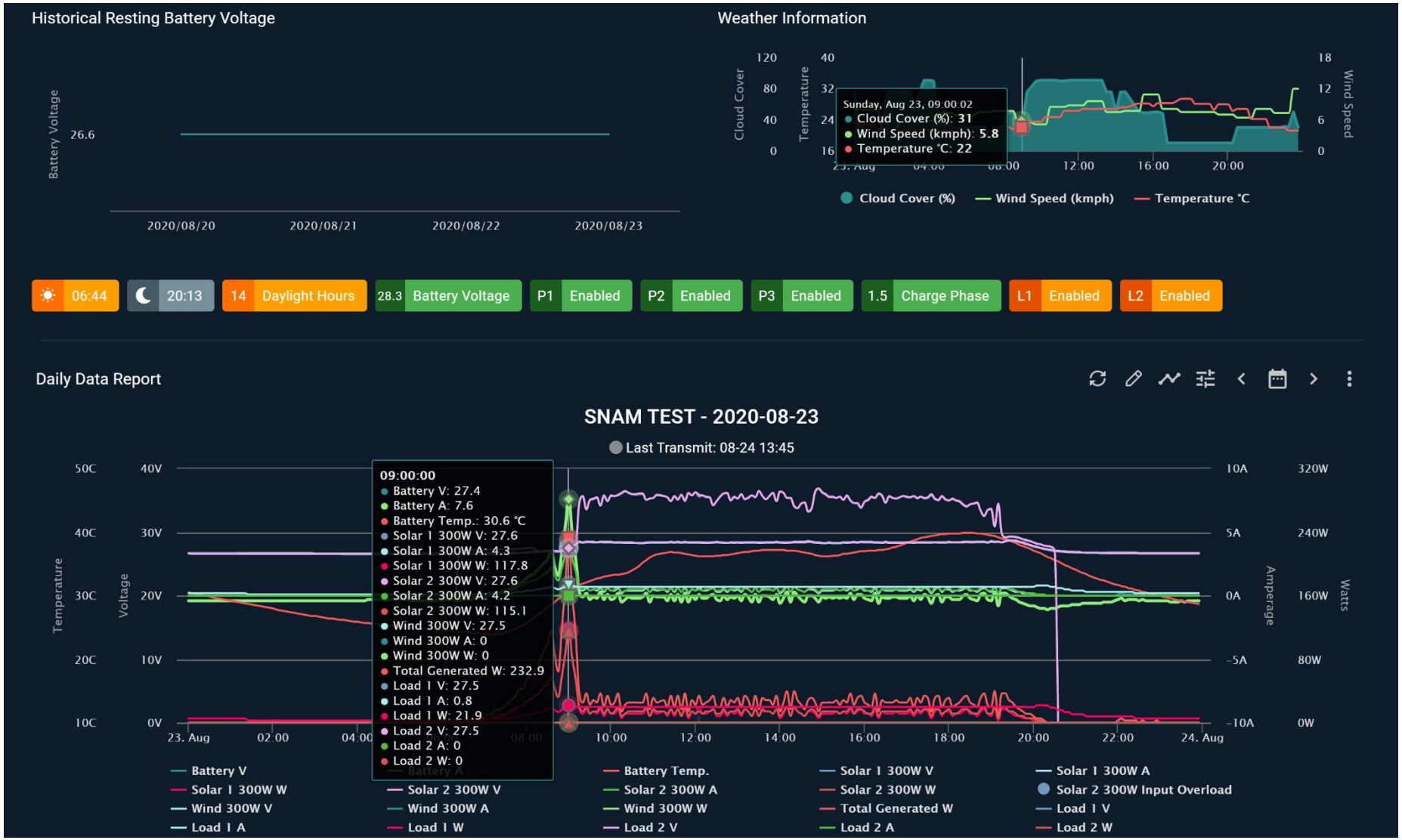
Feature	S1 (24V Model)	
Power I/O Rating	Voltage and Power	Current
Battery Input/Output	22-32V	Max 30A
Nominal PV Power	840W	Max 30A
Solar 1, Solar 2 Input	52V Maximum	Max 15A each
Hybrid P3 Port Input	42V	Max 30A
Hybrid P3 Port Output	22-32V	Max 30A
Load 1, Load 2 Output	22-32V	Max 20A Each Combined 30A



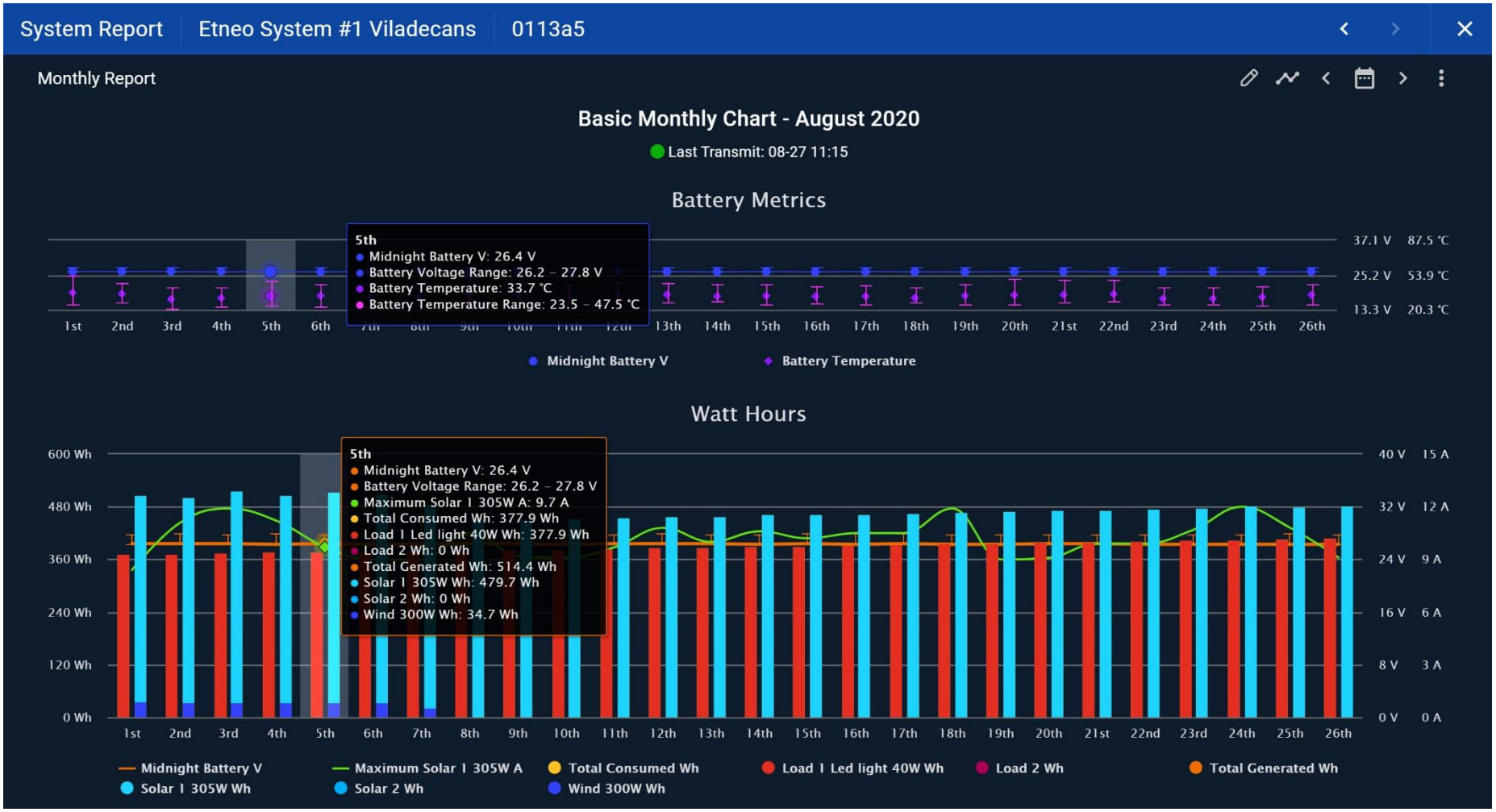
This is how the home of the remote control dashboard via web looks like:

- all controllers are visible on the home screen with the night battery voltage and charge stage values
- Geolocation
- ability to view the specific values of each device managed by the controllers

In the screen of each individual controller it is possible to view the weather conditions and the production of the individual renewable sources as well as the consumption of the connected loads. The example above shows controllers with single PV panel, wind turbine, only 1 connected load.



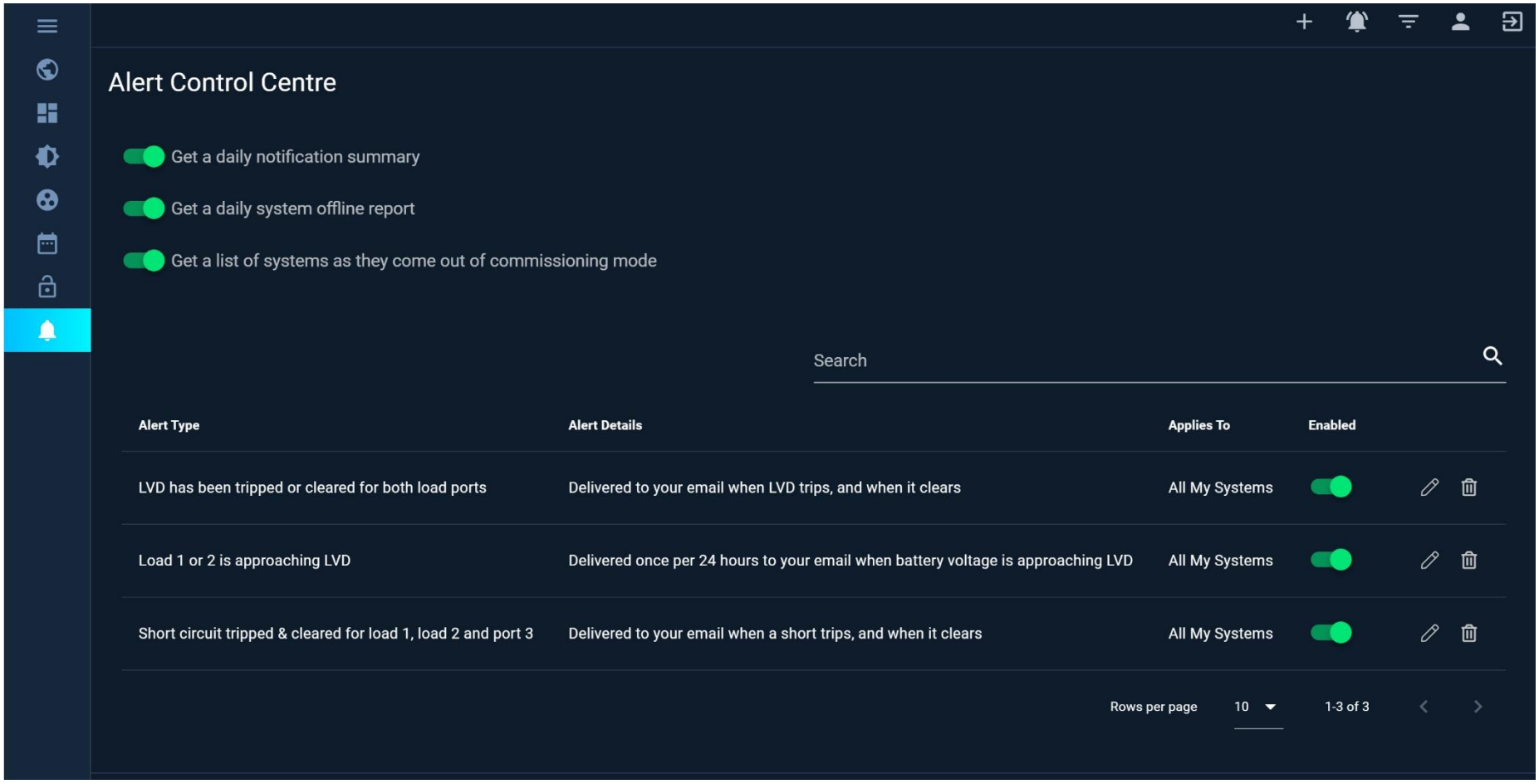
In the screen of each individual controller it is possible to view the weather conditions and the production of the individual renewable sources as well as the consumption of the connected loads. The example above shows controllers with double PV panel, wind turbine, 2 connected loads.



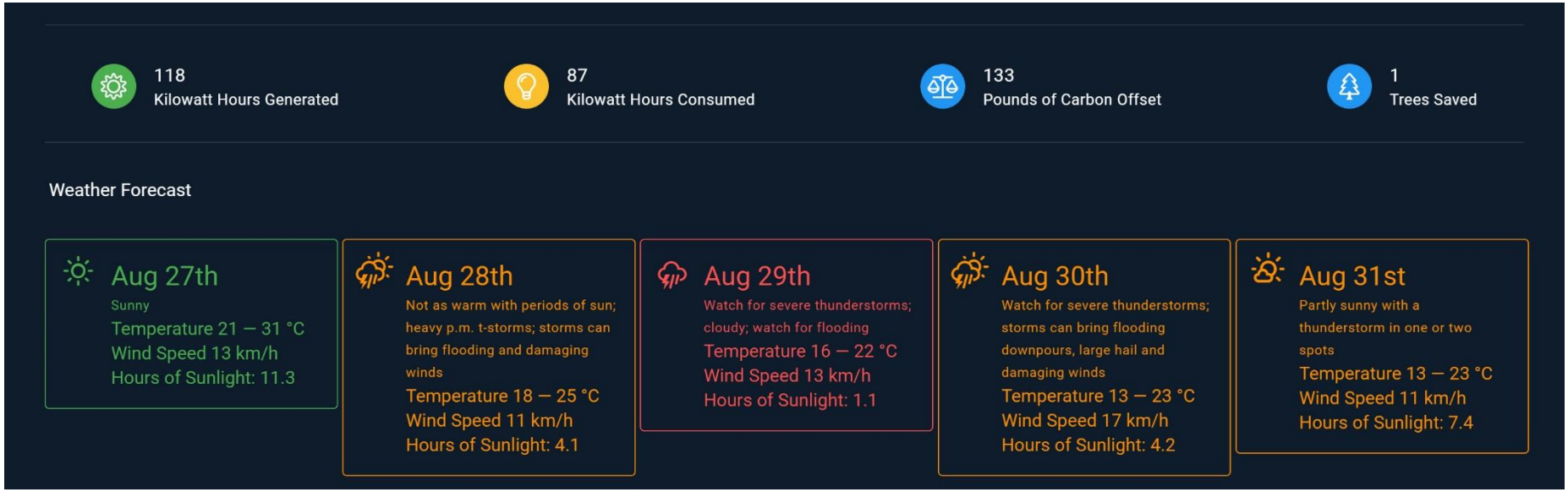
Real-time (and historical) monitoring, in addition to the daily data every 5 minutes, it is possible to view the monthly and annual reports to have a clear view of the continuous operation of the controllers.

Components

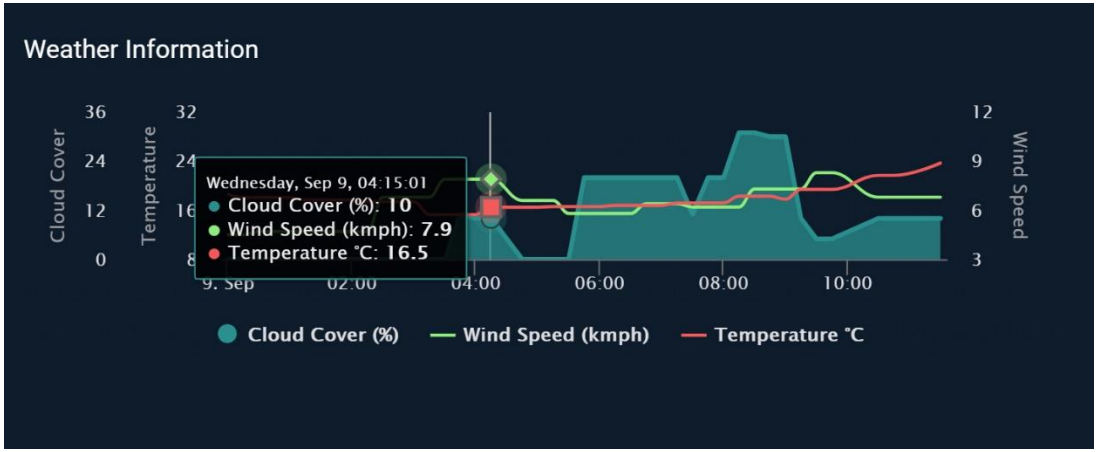
Cloud monitoring system



It is possible for each controller to set battery voltage thresholds for which the system closes the power supply to the loads (considered expendable if present on board) and to set alarms to always stay informed about the operation of the connected equipment.

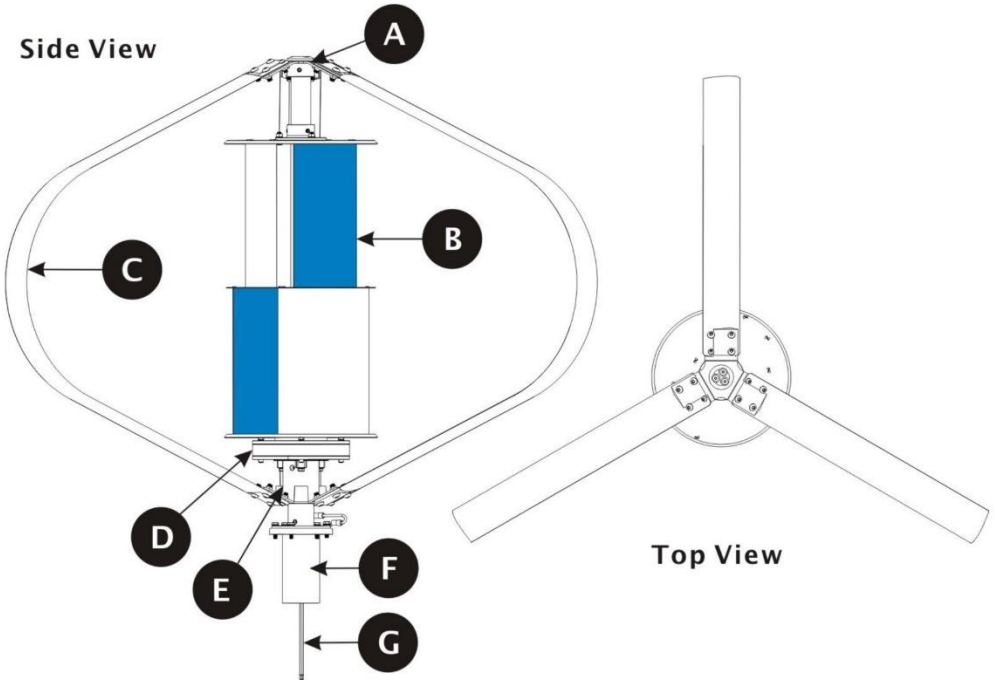


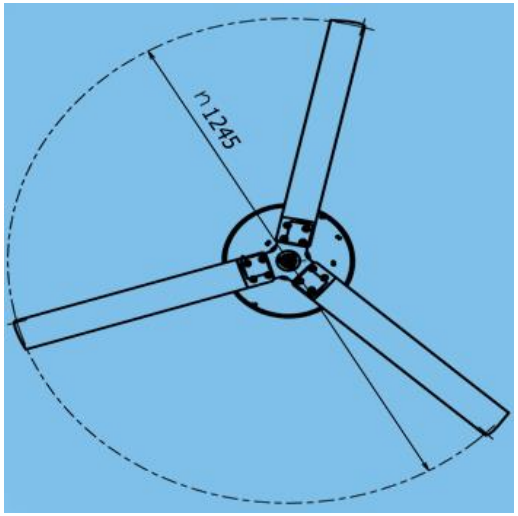
Thanks to the cellular connection with the weather forecasting, it is possible to know the weather forecast for the following week in order to, if necessary, interact with the system to increase the autonomy of the batteries and ensure 24-hour operation of the installed systems.

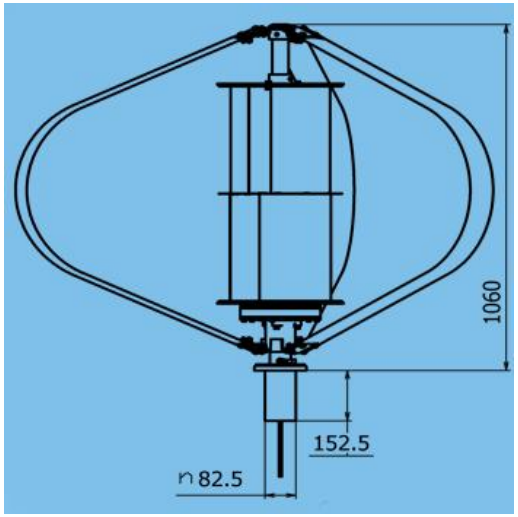


Components

Cloud monitoring system







Parts	Description
A	Upper Darrieus Blades Connector.
B	S-Type Savonius.
C	3 Darrieus blades with built-in airfoil.
D	3-Phase, Direct Drive, Weather Sealed, Mechanically Integrated Permanent Magnet Generator.
E	Lower Darrieus Blades Connector.
F	Damper.
G	3-Phase R-S-T Generator Wires.

Components

Vertical axis wind turbine

335 Watt

MONO HALF CELL SOLAR MODULE

Features

High power output
Compared to normal module, the power output can increase 5W-10W

High PID resistant
Advanced cell technology and qualified materials lead to high resistance to PID

Excellent weak light performance
More power output in weak light condition, such as haze, cloudy, and morning

Lower hot spots
Reduce the hot spots and minimize panel degradation

Extended load tests
Module certified to withstand front side maximum static test load (5400 Pascal) and rear side maximum static test loads (3800 Pascal) *

Withstanding harsh environment
Reliable quality leads to a better sustainability even in harsh environment like desert, farm and coastline

Certifications and standards:
IEC 61215, IEC 61730, conformity to CE

The manageable photovoltaic panel is of the 330W monocrystalline type with half-cell technology to increase energy yield.

Components

Solar panel

Electrical Characteristics

STC	STP335S-A60/ Wfh	STP330S-A60/ Wfh	STP325S-A60/ Wfh
Maximum Power at STC (Pmax)	335 W	330 W	325 W
Optimum Operating Voltage (Vmp)	34.9 V	34.7 V	34.5 V
Optimum Operating Current (Imp)	9.60 A	9.52 A	9.43 A
Open Circuit Voltage (Voc)	40.9 V	40.7 V	40.5 V
Short Circuit Current (Isc)	10.21 A	10.13 A	10.04 A
Module Efficiency	19.9%	19.6%	19.3%
Operating Module Temperature	-40 °C to +85 °C		
Maximum System Voltage	1000/1500 V DC (IEC)		
Maximum Series Fuse Rating	20 A		
Power Tolerance	0/+5 W		

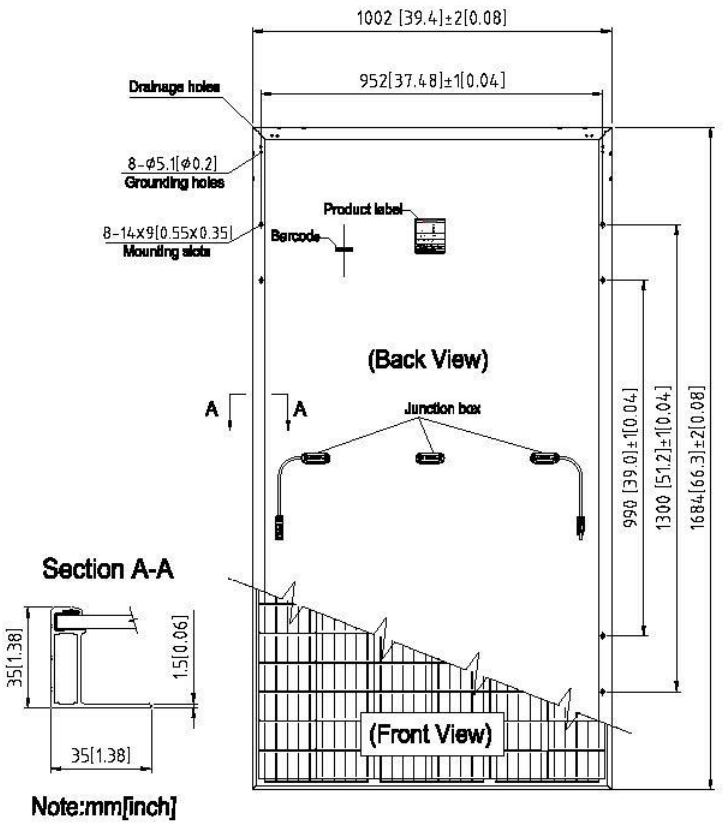
STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5;
Tolerance of Pmax is +/- 3% and tolerances of Voc and Isc are all within +/- 5%.

NMOT	STP335S-A60/ Wfh	STP330S-A60/ Wfh	STP325S-A60/ Wfh
Maximum Power at NMOT (Pmax)	252.1 W	248.6 W	244.9 W
Optimum Operating Voltage (Vmp)	32.1 V	31.9 V	31.7 V
Optimum Operating Current (Imp)	7.85 A	7.79 A	7.72 A
Open Circuit Voltage (Voc)	38.3 V	38.1 V	37.9 V
Short Circuit Current (Isc)	8.24 A	8.18 A	8.11 A

NMOT: Irradiance 800 W/m², ambient temperature 20 °C, AM=1.5, wind speed 1 m/s;

Temperature Characteristics

Nominal Module Operating Temperature (**NMOT**)	42 ± 2 °C
Temperature Coefficient of Pmax	-0.37%/°C
Temperature Coefficient of Voc	-0.304%/°C
Temperature Coefficient of Isc	0.050%/°C



Componenti

Pannello fotovoltaico

Peculiarities of the Lithium battery with BMS

- 24V LiFePO4 batteries that can be connected in series and parallel to increase storage capacity.
- Estimated duration of 10 years
- Resistant to temperature variations from -20 to + 60 ° C.
- Suitable for deep discharges up to 100%.
- Lighter, 50%, and smaller, 40%, compared to lead acid batteries.
- Internal BMS to increase battery life thanks to the active automatic balancing system.
- Completely safe thanks to the enclosure with IP66 protection.
- Constant power during discharge thanks to very low internal resistance.

Nominal Voltage	25,6V
Nominal Capacity	50Ah
Internal Resistance	≤ 50mΩ
Cycles	>2000 cycles
Self Discharge	<3% per month
Energy Efficiency	>96%
Charge Voltage	28,8 ±0,4V
Charge Mode	CC/CV: Costant Current/Constant Voltage
Contiunuous Charge Current /Maximum Charge Current	25A/50°
BMS Charge Cut-off Voltage	29,4±0,2V
Contunuous Discharge Current	75A (1,92kW)
Maximum Discharge Current (<30s)	115A (3,0kW)
BMS Discharge Cut-off Voltage	20V
Charge Temperature Range	0~45C° at 60±25% relative humidity
Discharge Temperature Range	-20~60C° at 60±25% relative humidity
Storage Temperature	0~40C° at 60±25% relative humidity
IP Protection Level / Casing Material	IP66 / ABS
Dimensions	L 260* W 168* H 212mm
Weight	13,6Kg
Terminal	M8
Certification	CE, RoHS, UN 38.3, UL and CB

The use of **LiFePO4** batteries offers significant advantages over lead technology: small size, higher energy density, possibility of deep discharge up to 100%, higher resistance to high temperatures, longer life. Integrated BMS with automatic cells balancing.

Components

LiFePO4 24V50Ah (*2)

THANKS FOR THE ATTENTION

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