

Rennicks Off Grid Power Solution(ROGPS) Frequently Asked Questions

Wind Turbine & Solar Performance

Q: What size are the panels?

A: The ROGPS1 PV Panels are REC 265PE and is 1665 x 991 mm. The ROGPS2 Panels is SunPower 470 and is 2067 x 1046 mm.

Q: What size is the wind turbine?

A: Outer diameter of turbine shroud is 1788 mm. Diameter of the rotor is 1220 mm.

Q: Is the wind turbine multi-directional?

A: Yes. The turbine is multidirectional on a passive yaw bearing with the tail for orientation into the wind.

Q: What is the turbine cut-in speed, maximum wind speed and wind speed to produce output?

A: Rated power is 400 W @ 10.5 m/s, cut-in 2.5 m/s, max windspeed 15 m/s approx. The overall design is built to withstand 42 m/s gusts.

Q: What are the safety features of the turbine?

A: Overspeed protection, overvoltage protection; electrical design is to UL standards including V0 fire protection for batteries. The hybrid controller is our own design with remote monitoring, alarms, and user access control.

Batteries

Q: What is the battery endurance?

A: This depends on the application load, operational runtime, and site energy available.

Q: How do you ensure the batteries perform in low temperature environments?

A: **Rennicks** can provide bespoke solutions to the challenges of extreme climates to ensure uninterrupted supply of power. These solutions can be active or passive depending on requirements.

Q: What is the technology of the batteries, and what is their capacity?

A: The ROGPS1 uses 2 AGM 12V 250 AHr in series. The ROGPS2 uses 2 LiFePo4 12V 300 AHr in series.

*Q: Why **does Rennicks** use lead-acid batteries?*

A: The lead-acid batteries were selected to keep unit costs as low as possible. The AGM technology was selected as being the safest and most reliable type of lead-acid battery, as opposed to flooded lead-acid (which can spill and also require maintenance) or gel-cell lead-acid (which are more expensive, lower capacity and sensitive to voltage regulation). Thirdly, the Leoch AGM was selected because the battery is UL listed and carries the UL94 V-0 battery case flame rating.

*Q: Why **does Rennicks** use lithium iron phosphate batteries?*

A: The lithium iron phosphate batteries were selected to improve capacity and efficiency. The Relion brand was selected because the battery cells are UL certified.

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ROGPS Structure

- Q: What are the pole specs - height, material, thickness of material?*
A: The main pole is 7 m tall and is a two part design. The material is S235 structural steel, 3 – 6 mm wall thickness. The total height of the ROGPS is 9024 mm.
- Q: Does the pole come in different heights?*
A: No. Standard height of the ROGPS is 9024 mm.
- Q: Is the pole supplied galvanised or powder coated?*
A: The pole is galvanised and then supplied with a powder coating finish in Traffic White (RAL 9016) as standard.
- Q: What is the protection rating?*
A: The enclosure including the pole has been designed, tested and certified by UL as a NEMA rated 3R enclosure.

Installation

- Q: Do you also supply the connected CCTV, weather sensors, and WIFI?*
A: We use certified security CCTV installers for the cameras (this is a legal requirement in some countries including Ireland). Weather sensors and Wifi installed by **Rennicks**.
- Q: How long does an installation take?*
A: Approximately half a working day for each ROGPS
- Q: How is the machine installed?*
A: Pole installation is by way of a battery-powered hydraulic lifting mechanism, or can also be installed by use of a teleporter or small crane using a hinge plate at the base of the pole.
- Q: What type of concrete do you use?*
A: Grade C30/35 concrete is the minimum strength required.
- Q: What type of foundation do you use?*
A: Foundation is below-ground reinforced concrete pad 2650 x 2650 x 700 mm depth. Reinforcement is by way of A393 mesh and rebar.
- Q: How long do you leave the concrete to cure?*
A: Three weeks is the minimum interval between concrete pour and ROGPS installation. Customers who lay the foundation themselves sometimes use higher strength concrete to speed up the curing time to reach the required strength when needed.

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Operator & Maintenance

Q: What is the product design life/ end of life?

A: 20 years.

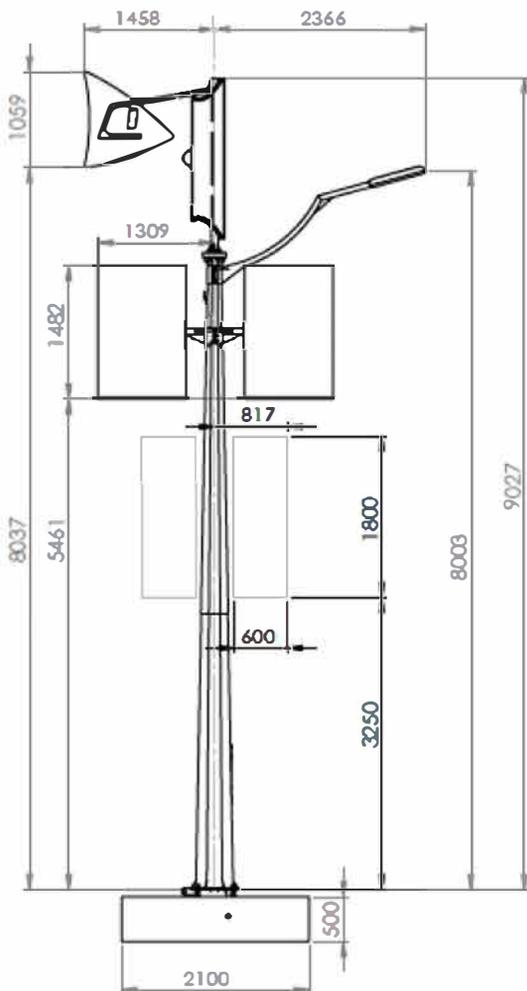
Q: How much maintenance is required?

A: Annual preventative maintenance is a straightforward check on bolted fasteners, with visual inspection for damage to plastics, panels, and mechanical parts.

Q: How do you ensure reliability of the machine if there is no wind or solar energy?

A: The ROGPS is purposely over-engineered to provide sufficient battery endurance when wind and solar generation is low. Battery performance can be remotely monitored via the hybrid controller. In the unlikely event that batteries become excessively discharged, an alert can be sent and a remote intervention can be performed.

Logistics



Q: What is the overall weight and size of the ISP?

A: The ROGPS weight (excluding foundation, applications and banners) is 710 Kg. The hub-height is 8132 mm and the overall dimensions are shown below.

Q: What is the quantity of units in a 40' container?

A: Volume in a 40' container is approximately 18 units. We normally ship 30 sets of steel work in a single 40' container and 30 sets of electrical & mechanical parts in a 20' container.

Q: What are the weights of the various Assemblies

A: The overall weight is approx. 710 Kg / 1565 lbs.

Assembly Name	ISP Mass (Kg)	ISP Mass (lbs)
Main Pole Assembly	322	710
Enhancement Unit Assembly	124	273
Cradle (Fully Loaded)	160	352
Dual Solar Assembly	104	229
Complete ROGPS (Unloaded)	710	1565

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Communications

- Q:** *Can ROGPS's communicate with each other and possesses command and control capabilities managed remotely from a NOC?*
- A:** The ROGPS can be communicated with via back to back connection with laptop, via 2G/3G/4G GSM, and between ROGPS's via Zigbee protocol. It is also possible to control via BMS through a digital input – for on/off control.
- Q:** *What type of remote access is there to the ROGPS?*
- A:** The Susie IV App is available to monitor all the major parameters of the system and provide access to update certain settings depending on user level access. Also we are developing our Off-Grid Power Webserver Application which will allow monitoring of ROGPS's globally – by region, customer, application etc. via web browser or smart phone app. A certain amount of control will also be possible via the web app.

General

- Q:** *What are the product certifications for the ISP?*
- A:** CE certification includes (Radio Equipment Directive [RED], Restriction of Hazardous Substances [RoHS] Directive, Waste Electrical and Electronic Equipment [WEEE] Directive) designed to IEC 61400-2 Class IV. UL certification includes (ISP - UL6142, Controller & Slip Ring - UL1741, Generator - UL1004, PV Panels - UL1703, Electric Safety Code NFPA 70 – NEC 2011 Edition). The enclosure was tested and certified to NEMA Type 3R rated enclosure.
- Q:** *What is the integrated product warranty?*
- A:** Warranty is 3 years parts and workmanship as standard (excluding battery which is 1 year). **Rennicks also** offer an extended warranty if the customer enters into a maintenance agreement.
- Q:** *Can the turbine and solar panels be retrofitted onto existing street poles?*
- A:** No. The ROGPS tower and foundation have been specifically designed to carry wind loadings due to the shroud, panels, etc. Bending strength and foundation capacity of a generic street pole are much reduced compared to the ROGPS tower. Also, the pole structure matches the mechanical parts of the turbine, such as the yaw bearing attachment, and cradle housing for the control system and battery units.
- Q:** *What is the efficiency/ rated power of the wind turbine compared to other units in the market of similar size?*
- A:** We do not have information available on the performance of our competitors. Our own research information on the benefits of the shroud technology which was developed for our small wind turbine were independently proven and verified. The benefits include reducing turbulence in wind and improved cut-it and rated wind speeds.