



Gateway PV Pod Specification

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About Reece Innovation

The Reece Group is one of the largest engineering and manufacturing businesses in the North East of England, with a rich heritage in Oil & Gas and Offshore Engineering. The business has its origins with Soil Machine Dynamics (SMD), set up by the late Dr Alan Reece. Building on substantial success in various sectors, the group now comprises a number of innovative engineering and manufacturing companies, including Pearson Engineering (a defence products manufacturer) and Responsive Engineering (an extensively resourced, high quality contract manufacturing business).

Complementing the group is that of Reece Innovation, a multi-disciplinary team whose core competencies span mechanical engineering, electronic engineering, materials science, sensor technology and signal processing. Our activity is diverse and ranges from the design and manufacture of bespoke equipment for manufacturing businesses, through to the development of novel sensors and systems for remote monitoring or process monitoring applications

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Figure 1: Solar Powered Gateway installed on-site

The Gateway PV Pod solution is a robust, efficient structure made from high grade galvanized steel and designed to hold and operate low power communications gateways such as LoRa and Sigfox powered from solar energy.

1.1 Features

- 100W high efficiency monocrystalline solar panels
- Low temperature tolerant, deep cycle, 12V 50Ah (Pb) battery storage for long term operation in the dark
- Holds gateway at height of 3.5m for excellent radio coverage
- Compatible with most Power over Ethernet (PoE) capable gateways, e.g. LoRa or Sigfox
- Structure designed to withstand 135 Km/h (85 mph) wind speeds
- IP67 rated cabinet holding battery and electronics

2 Description of PV Pod



Figure 2: Solar Powered Gateway Front

The PV Pod consists of a main structural pole where a gateway can be attached at a height of up to 3.5 meters. Four large legs, outriggers and panel support provide stability under very strong wind conditions.

One 100W solar panel provides ample power to operate the LGW01 LoRaWAN gateway as well as most others on the market. Excess energy is stored into a 12V 50Ah battery for operation in periods of darkness.

The gateway itself is powered from either solar or this 12V battery through a DC/DC converter depending on available solar output. The DC/DC converter raises the voltage and adds signalling necessary for the correct functioning of any IEEE 802.3af compliant PoE gateway. Optionally we can provide a different convert to operate a passive unit at 24V (please specify when ordering)

The solar panel can be rotated around the central pole and tilted to achieve an optimal position for sunlight. The structure can be disassembled for transport and assembled on-site.

2.1 Power supply and control cabinet

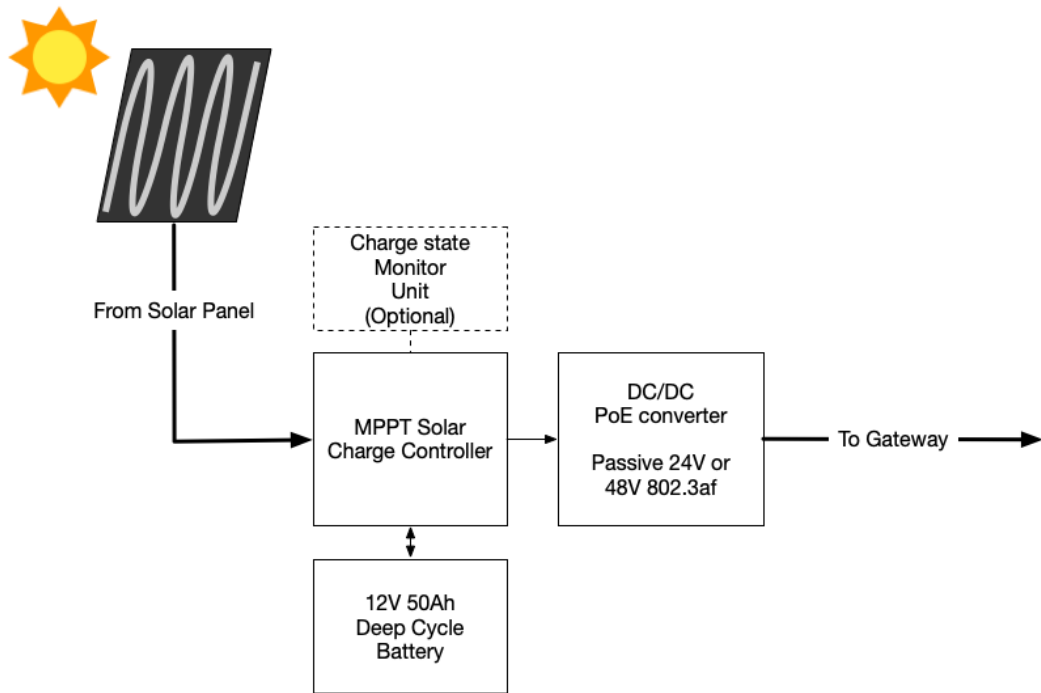


Figure 3: Solar power path and control system

As illustrated in Figure 3 the solar panel feeds into the electrical cabinet where a highly efficient true MPPT charge controller adjusts the load to optimize the panel operation and meet power requirements. Excess energy not immediately required to run the gateway is stored into a 12V deep cycle rated battery with a capacity of 50Ah. Switching between battery and solar power is automatic.

The charge controller also guarantees that the gateway does not dangerously drain the battery to a point beyond recovery. Should the battery voltage drop too low power to the gateway is immediately cut and later restored when sufficient power is again available.

Finally a DC/DC converter adjusts the energy from the panel and battery to correctly supply a 802.3af specification PoE gateway - or optionally a passive gateway - through the Ethernet cable.

There is also an Ethernet port available inside the cabinet should the user wish to connect the gateway directly over Ethernet instead of using cellular data.

3 Specifications

Frame

Height	3660mm
Foot Span	2000mm
Weight	77.5kg
Pole Material	Galvanised Steel

Solar Panel

Length	1000mm
Width	670mm
Weight	12kg
Angle Range	15-65°

Electrical

Rated Solar Panel Power	100W
Battery Voltage	12V
Rated Battery Capacity	50Ah
Power over Ethernet port	Passive 24V or 802.3af/at capable (as ordered)

Environmental Conditions

Protection	IP67
Operating temperature range	-15°C to +40°C
Storage temperature range	-20°C to +50°C

Warranty

Structure and electricals	12 months parts and labour
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4 General Assembly

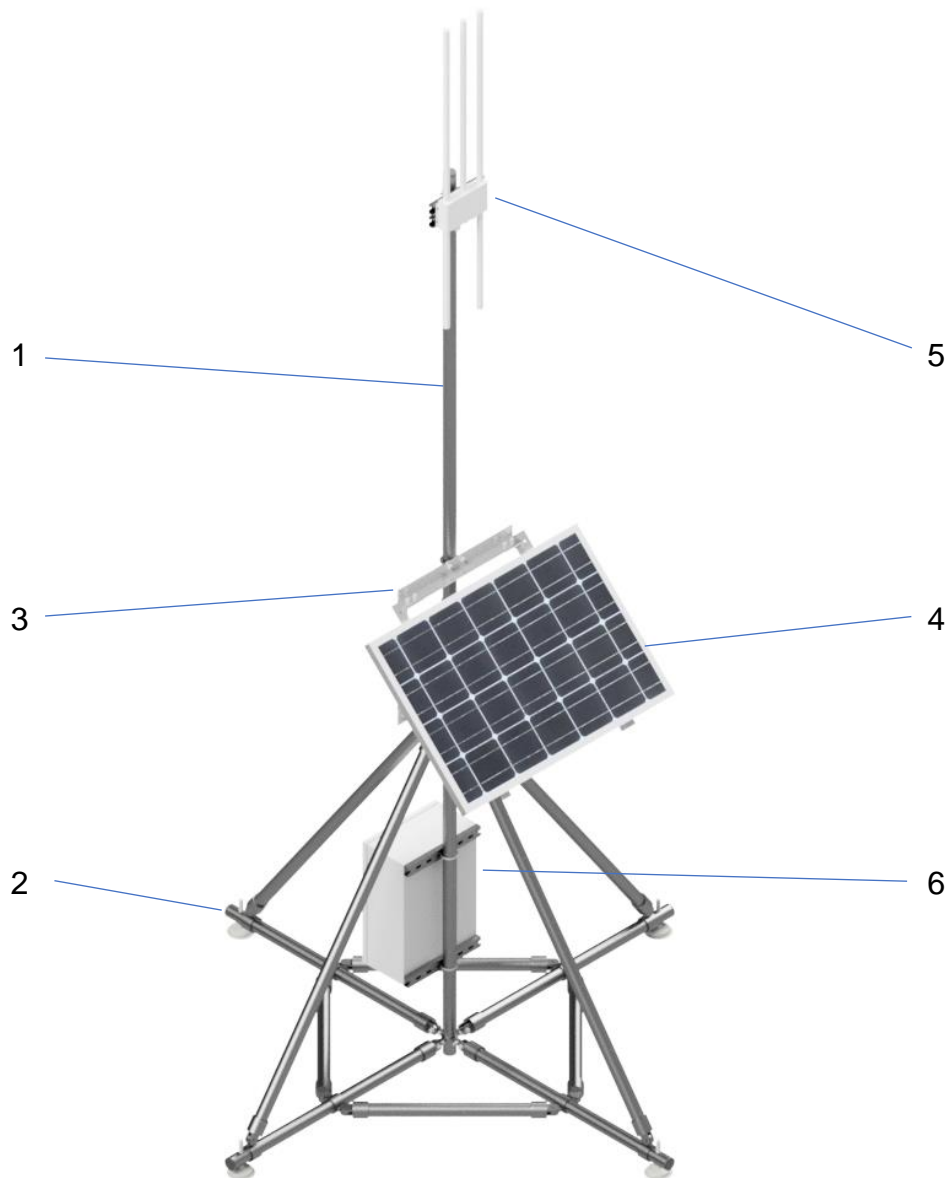


Figure 4: Solar Powered Gateway Assembly

1	Central Pole	4	Solar Panel
2	Outriggers	5	Gateway
3	Solar Panel Mount Frame	6	Electrical Cabinet

5 Assembly Kit

The Solar Powered Gateway can be disassembled for easy transport as shown below. The structure is made from standard steel tubing and tube clamps for simple onsite assembly, requiring only basic tools.

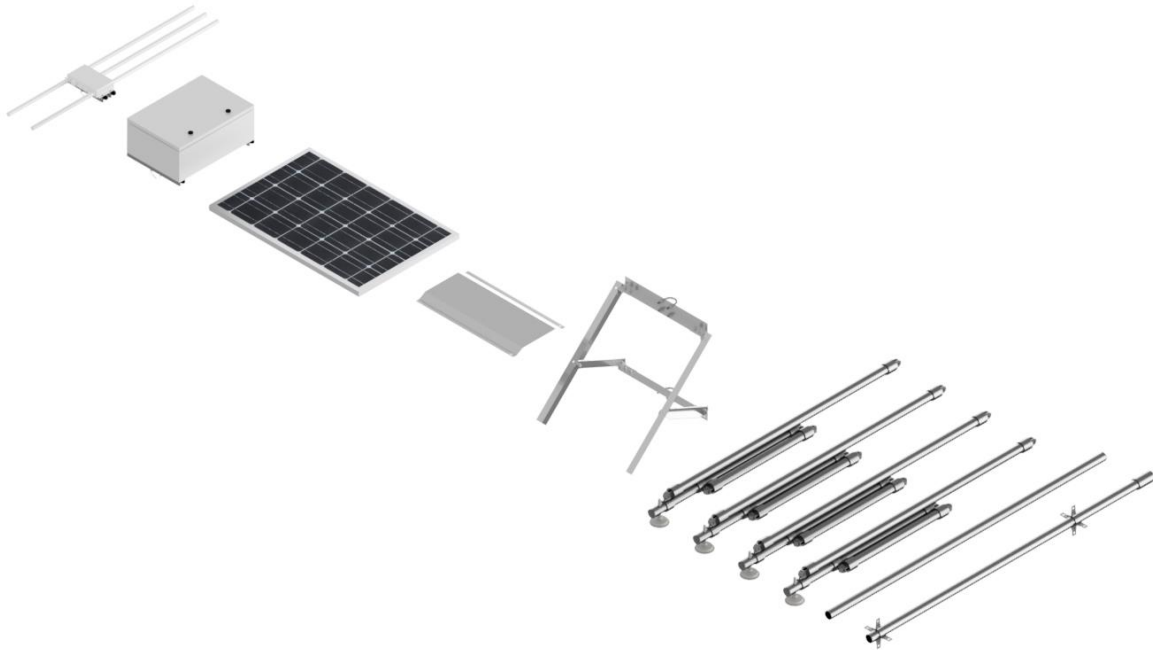


Figure 5: Assembly Kit

6 Additional Support

For wind speeds greater than 85mph, additional support is needed to prevent the frame from tipping. This can be achieved by adding extra weight to the outriggers or by replacing the standard outriggers with longer ones as shown below.

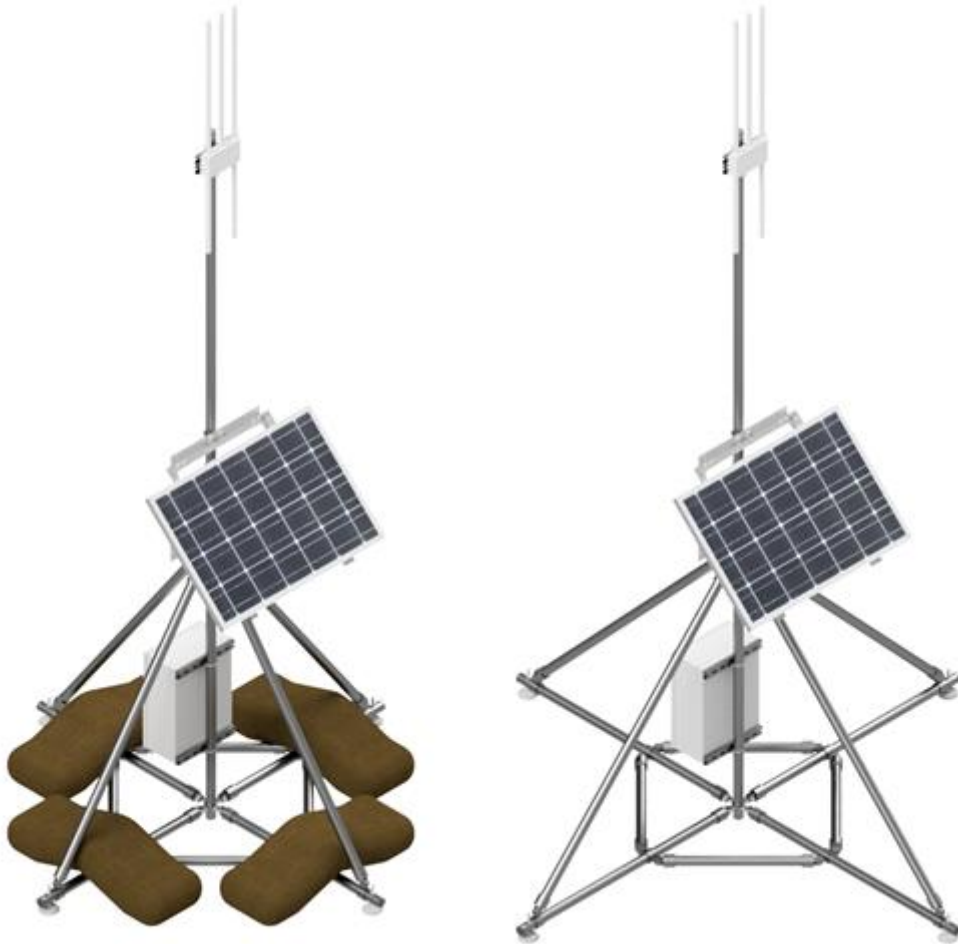


Figure 6: Additional Weight with Sandbags (Left) and Longer Outriggers (Right)