



# SWITCH TO SOLAR POWER

AND POWER YOUR FUTURE

Introducing

**SUNOSINK**  
SAVE THE SUN FOR TONIGHT

**VULCAN**  
ENERGY PTY LTD



# The Sun-Sink Energy Storage System unit ... time shifting the delivery of solar power generated.



## AFFORDABLE STORAGE

The Sun-Sink Energy Storage System unit is primarily designed to time shift the delivery of solar PV power generated in a day. Giving you the ability to store excess energy and make it available for use in the evening, means the household or business can be 'Virtually Off-Grid'. An advantage of the Sun-Sink system is the ability to still import or export from/to the grid at infrequent intervals if required.

The Sun-Sink unit is available in 2 sizes – 5 or 10kWh. Both units are retro-fittable to most existing Grid Connected PV systems. The Sun-Sink unit is suitable for domestic and commercial loads, with the ability of adding multiple units to provide additional power if required. It can also be used as an aid in reducing peak demand charges when they occur.

This System has been designed to make life simple; with no AC connection it monitors current flow through the AC mains feeding the property via a clip-on current transformer. In conjunction with our sophisticated DC/DC conversion and firmware based control system it precisely apportions power to the loads in the house and/or the storage core to achieve the maximum use of the delivered energy.

Our Grid-Demand version has been designed for owners with or without solar, and allows people to charge the storage core off the Grid at cheaper times and then deploy that stored energy when electricity is more expensive (Time of Use).

Both the Sun-Sink and Grid-Demand systems will help flatten out the massive peaks for energy throughout the day. For network owners, the ability to deploy these units en-masse for grid stabilization and supply augmentation (with or without solar PV) opens many options for real cost savings over the medium term and improved reliability of existing infrastructure.

The AC charge version can also tackle morning peaks. Both devices are suitable for all inverter types having an operating voltage range of 200 - 600 VDC.

Our high voltage configuration dictates that these units are purchased on a serviced model basis whereby the core of the unit is owned and maintained by the supplier.

## CONTROL TARIFF USE

The Sun-Sink unit is designed to be installed adjacent to the solar inverter. The solar PV feed cables are first directed into the Sun-Sink unit and then a return cable is fed out to the inverter. There is also a screened data cable to which a clip on current transformer (supplied) is connected.

The Current transformer cable can be extended up to 20 meters should the installation require it. The Sun-Sink cabinet is made from powder-coated steel, with double side wall design to resist impact. The sealed cabinet resists water, dust and vermin ingress for reliable operation. Colour is gloss arctic white to reflect heat.

The internal storage core is made up of LiFePo4 cells, with 40 cells per cartridge. Every cell is individually monitored for charge/discharge state and performance.

Up to 8 cartridges are installed to each unit and are simply exchanged in the event of a faulty cell. The dual system BMS has two charging characteristics ensuring maximum operation and life cycle for each cell.

State-of-the-Art DC/DC conversion at high voltages with low currents ensure maximum efficiency for both charge and discharge cycles. Cell life is greatly extended by this process. Control parameters are fully programmable via embedded firmware with multiple triggers for charge and discharge depending on the owner or distributor's needs.

The potential for a 50% reduction in poles and wires as well as a steep reduction in traditional, centralized generation facilities bodes well for a better future for all the world.

### Operational Characteristics

#### Input Modes and Operations

Both Sun-Sink and Grid Demand devices have the same firmware configurable input parameters, with the additional ability of the Grid Demand unit to import from the grid. Each device can be programmed to operate under one or a combination of the following settings.



## EASY INSTALLATION

### Mains Current sensing

Current flow in the grid supply is monitored via a clip-on current transformer. The unit is programmed to prevent any flow in this supply cable. The firmware will apportion solar PV output to deliver in precise proportions, enough energy to the installed inverter to meet only the instantaneous supply requirements of the household. The remaining energy is channelled to the storage batteries. The unit can be programmed to export electricity to the grid once the batteries are at capacity, or either throttle the PV output OR switch on a domestic load such as a pump to absorb the spare energy.

Once the householder begins to consume power, such as arriving home from work and starting dinner, the unit will deliver power in precise quantities to the inverter in order to prevent current flow in the grid supply, up to the maximum rating of the installed inverter. In the event that demand exceeds the rating of the inverter, grid supply will be drawn, only whilst the demand exists. The unit will continue to supply power via the inverter until the batteries reach the preset shutdown point.

### Frequency monitoring

Frequency of the mains supply can be monitored via the CT. This is suited to remote area supplies where the effects of intermittent sunshine can cause havoc with generator or S.W.E.R. supplies. Parameters can be set to charge from the PV, (or mains for GD unit), but deliver only when the grid frequency falls. The output can be directly proportional to the frequency drop.

### Voltage level monitoring

An AC/AC transformer directly inputs to the control board, the function is identical to that of the frequency detection but looks at voltage. This can be used in combination with frequency to provide great accuracy.

### Real Time Clock

Parameters can be set for time of day operation. As the controls are infinitely variable, different levels of charge and discharge can be set over any time increments and include a calendar for time of year, weekends etc.

## DOMESTIC & COMMERCIAL

### S.C.A.D.A.

External control and monitoring can be achieved via a primary RS-232 interface, or daughter boards for CDMA/GSM Ethernet (wired or wireless).

Due to the state-of-the-art battery management system incorporated in the product, partial and full discharge cycles are managed in a way that ensures the absolute maximum performance and life from the battery cells. The internal circuitry also includes a total of four firmware based safety regulation and shut off features, combined with physical safety shut down/disconnection devices. The high operational voltages means that the units run at low currents, therefore internal heat dissipation is minimal. This allows us to completely seal the unit from water, dust and vermin. The robust, double skinned housing resists practically all impacts likely over the service life.

Sun Sink and Grid Demand units are supplied under a managed deployment model, which dictates a full service over the life of the unit, and includes periodic battery cell replacement. The cells and electronic systems are leased, so maintenance and warranty issues are not applicable. All parts are modular, interchangeable and standard. This means that a ready supply of spares is always available should there be any service issues.

The Process and Design of the Sun-Sink and Grid Demand systems are cutting edge and are subject to Pending Patents on process and constructions.

**COME AND SEE  
A SUN-SINK  
ENERGY STORAGE  
SYSTEM ON  
DISPLAY TODAY.**

## SUN-SINK 5 & 10 kWh SPECIFICATIONS

Model	S5	S10	Input/Output Control Parameters
Storage Media	LiFePo4	LiFePo4	Current flow detection via Current Transformer - Variable Frequency Detection via Current transformer - 48-52 Hz Voltage detection via approved AC/AC adaptor 200-300/48 Vac (Optional) WCDMA, Ethernet, VHF UHF telemetry via (RS-232). Cell Life span to 80% capacity @ 95% D.O.D./day > 6 years
No. of cells	160	320	
Nom. cell voltage	3.2	3.2	
Nom. cell capacity	10 AH	10AH	
Nominal Capacity	5 KWH	10 KWH	
Actual Capacity	5.5 KWH	11 KWH	Operating Conditions
Storage Voltage (Nom.)	520 Vdc	520 Vdc	
Storage Voltage (Max.)	560 Vdc	560 Vdc	Ambient temperature 0-60°C, 95% Humidity Size: 5KWH 800x500x350, 10KWH 800x800x350mm Weight: 5KWH 93kg 10KWH 144kg (fully loaded) Ingress Protection IP66.
Input Voltage Range	200-550 Vdc	200-550 Vdc	
Input Voltage (Max.)	600 Vdc	600 Vdc	
Input Current Range	0-12 Adc	0-12 Adc	
Input Current (Max.)	15 Adc	15 Adc	
Output Voltage Range	150-450 Vdc	150-450Vdc	Applicable Standards
Output Voltage (Max.)	500 Vdc	500 Vdc	
Output Current Range	0-6 Adc	0-12 Adc	
Output Current (Max.)	12 Adc	12 Adc	

*This device is subject to Patent protection under Application No: 2013201284*

## BATTERY SPECIFICATIONS

Nominal Capacity	10000mAh	Max.pulse discharging current	10C (100A)
Rated voltage	3.2V	Standard discharging current	1C (10A)
Energy density (Wh/kg)	105	Terminal discharged voltage	2.5-2.0V
Internal Resistance	≤6mΩ	Self discharge rate (monthly)	5%
Charge (CC-CV)	Charged with constant current to 3.65v and then charged with constant voltage to 0.1-0.2A	Dimensions	
		D 38±1mm, H 146±1mm, Weight Approx. 330g	
		Working temperatures	
Charge (float)	≤3.6V	Charging	0~60°C
Max. charging current	2C (20A)	Discharging	-20~65°C
Max. charging voltage	3.65±0.05V	Storage temperature	-20~65°C
Standard charging current	0.5C, 5A × 2hours	In six months	-20~45°C
Max. continuous discharging current	3C (30A)	Note: The battery has a voltage of 3.2~3.3V during storage and transportation.	

## Sun-Sink / Grid Demand Process Schematic

