

ECOSTORE 10KW AC COUPLED BATTERY INVERTER



The EcoStore is a highly efficient, flexible and user friendly 10kVA single phase battery inverter.

Its advanced features, flexibility and cutting edge power electronics design make it the perfect choice for a number of battery inverter applications.

It is an AC coupled battery inverter, making it easy to couple with a wide range of solar PV inverters.

It has full four quadrant power capability able to sink or source any combination of real and reactive power up to 10kVA.

ADVANCED GRID SUPPORT CAPABILITY

The EcoStore was conceived with grid support in mind. It has a full suite of grid support functionality including:

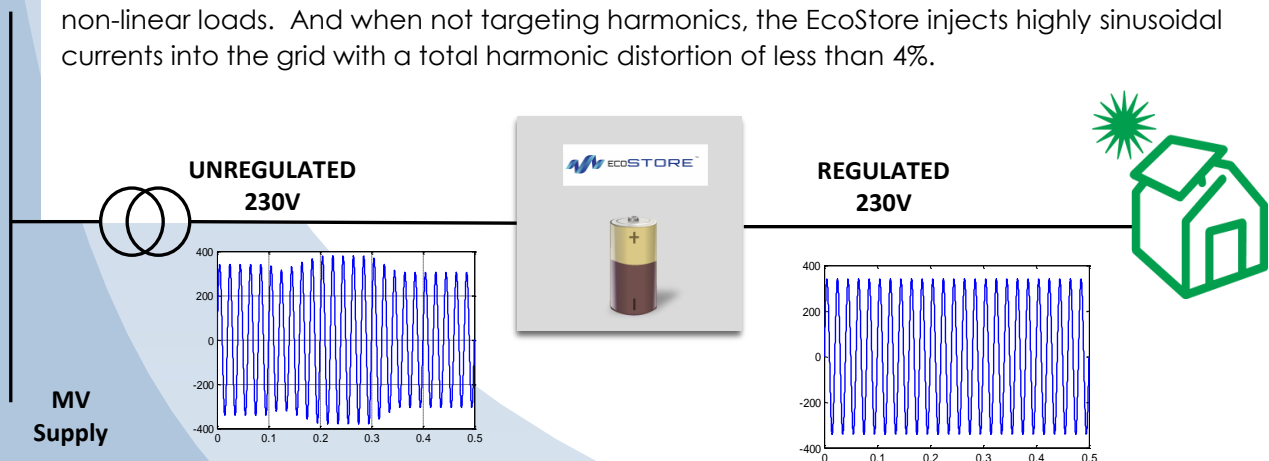
Consumer Voltage Control

Often consumers in fringe of grid areas experience poor power quality with their voltage often dropping below acceptable limits during high load periods. The EcoStore boost or buck consumers' voltage by up to 10% without using battery energy, thereby providing consumers with a regulated and stable supply.

Advanced Grid Support and Active Harmonic Filtering

The EcoStore performs grid voltage support and peak load reduction on constrained feeders by automatically sensing when the feeder is nearing constraint and performing the appropriate control action while at the same time controlling the battery state of charge.

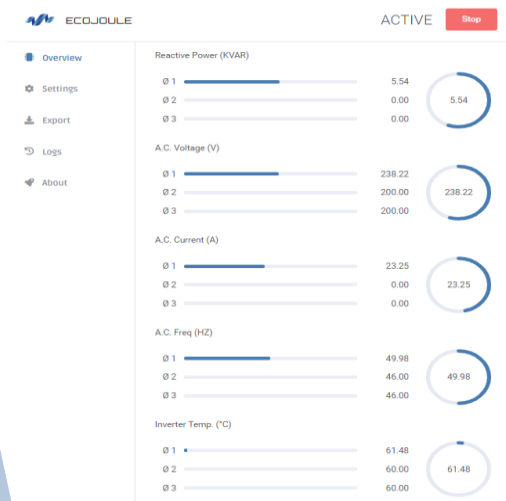
The EcoStore can attenuate troublesome harmonics found in areas with a high amount of non-linear loads. And when not targeting harmonics, the EcoStore injects highly sinusoidal currents into the grid with a total harmonic distortion of less than 4%.



Power outage back-up

The EcoStore senses grid power outages, isolates from the grid and supplies the consumer from the batteries thereby providing back up power during outages. The 10kVA rating means that generally the entire dwelling can be provided with back up power. Nonetheless programmable relays are provided to shed non-essential loads when running off batteries to extend the outage ride through period. If solar is available, then this is used to charge the batteries and extend the outage ride through period significantly.

POWERFUL, USER FRIENDLY



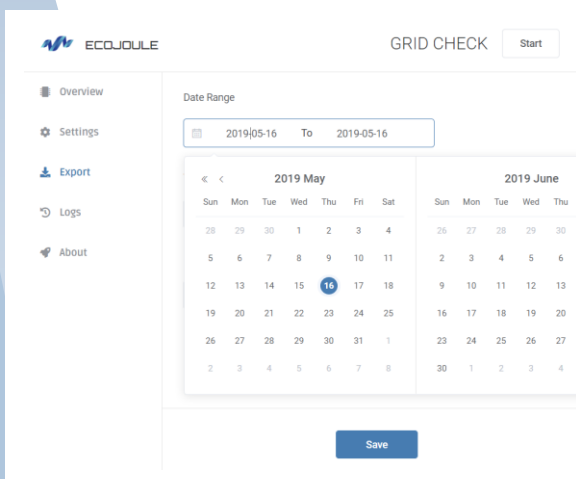
Setup and Monitoring from a Browser

The EcoStore runs a web server on the device, allowing setup and monitoring from any connected smart device capable of running a browser (tablet, laptop, smartphone).

Parameter settings are clear and easy to understand.

Users are able to monitor (and even graph) real time quantities such as real or reactive power, state of charge, current, voltage and so on in real time.

The EcoStore has a rich datalogging capability, able to log up to 64GB of historical recorded data. Users can access this data via an intuitive tool allowing fine or coarse data to be downloaded depending on the time period of interest and the bandwidth of communications connection.



Data Download Tool

The EcoStore has incredible processing power on board, allowing it to be used as an energy management platform and easily integrate 3rd party applications such as peer to peer energy trading apps, cloud based visualisation systems and so on. Contact Ecojoule Energy for more information.

UNMATCHED FLEXIBILITY

The EcoStore has a separate built-in Linux based processor available for custom applications. This allows custom applications to be developed without fear of breaking any of the standard software functions. This, together with a huge amount of on board storage, multiple controllable relays and the support of multiple communications channels (Ethernet, WiFi, RS485, CAN) opens up a wide range of potential applications. Contact EcoJoule Energy if you have a specific requirement.

```

22 |
23 | -- delta power limit on power ramp up
24 | local dp_limit_up = p_max * t_s / t_ramp_up
25 | -- delta power limit on power ramp down
26 | local dp_limit_down = -p_max * t_s / t_ramp_down
27 |
28 | if smoothing_method == 'filter' then
29 |     -- filter measured PV output power with 1st order filter
30 |     p_pv_filt = p_pv_filt_1 * (1 - t_s / t_filt) + p_pv * t_s / t_filt
31 |
32 |     -- update (k-1) filter values
33 |     p_pv_filt_1 = p_pv_filt
34 |
35 | elseif smoothing_method == 'ramp' then
36 |
37 |     local delta_p_in = (p_pv - p_pv_filt_1) / t_s
38 |
39 |     if delta_p_in > dp_limit_up then
40 |         p_pv_filt = p_pv_filt_1 + dp_limit_up
41 |     elseif delta_p_in < dp_limit_down then

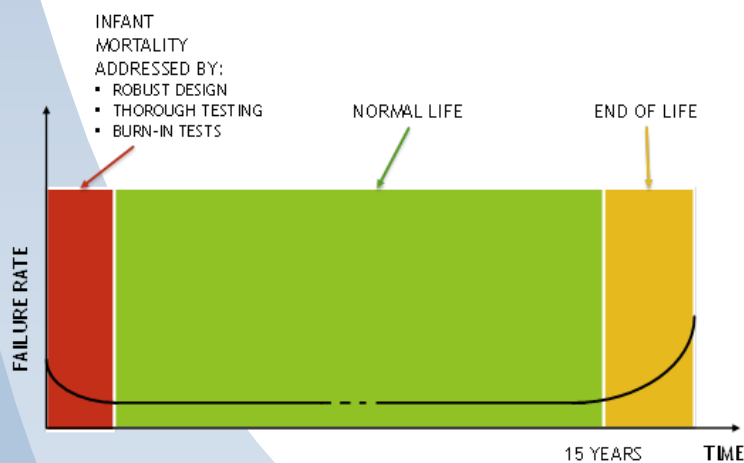
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Sample Scripting Code Snippet

BATTERY FLEXIBLE AND AGNOSTIC

EcoJoule Energy supplies the EcoSTORE as a turnkey Battery Energy Storage System with integrated batteries. Nevertheless the type and capacity of the batteries is flexible, depending on the application and operating environment. Both Lithium-Ion and Lead Acid Batteries are supported and the amount of connected storage is flexible, typically in the range of 10kWh to 60kWh.

RELIABILITY IN PRODUCT DNA



- Reliability designed in from start.
- No fans or moving parts.
- 15 year design life
- Top quality componentry.
- Thorough testing.
- Production control.
- Burn-in tests.

TECHNICAL SPECIFICATIONS

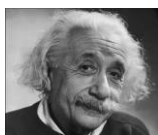
Specification	Value
Continuous Rating (series)	flexible: typically 20kVA
Continuous Rating (parallel)	10kVA
Reactive Power Capability	-10kVAr to 10kVAr
Grid Connected & Standalone capability	Yes
Ambient Temperature	-10°C to 50°C
Operating AC Voltage Range	180 - 260 V
Battery Nominal Voltage	200 - 300 Vdc
Battery type	Lithium-ion / Lead acid
Battery Communications	CAN, RS485
Battery Capacity	flexible: 10- 40kWh (typical)
Cooling	Natural Convection
Efficiency	98% at full load
Harmonics (THD)	<4% at full load
Effective Output Switching Frequency	48kHz
External Communications	Ethernet, WiFi, Modbus, Sunspec
Anti-islanding	Passive and Active as per AS/NZS 4777
On-Grid / Off-Grid	Yes
Mechanical Protection	IP65
Typical Cabinet Dimensions (H x W x D)	1.2m x 2.4m x 0.6m (for a 40kWh system)

INDUSTRY LEADING DESIGN

EcoJoule Energy Pty Ltd was established to provide high quality, reliable and cost effective power electronics solutions to the electricity utility industry. Its founders bring together industry leading expertise and experience in power electronics, software and power systems design having spent many years in senior R&D positions for major multinational companies. We merge the design quality and discipline of a multinational with the flexibility and agility of a technology company.

We believe that power electronics based devices will help to transform the electricity grid into a flexible, intelligent and sustainable system able to provide lower cost, more environmentally friendly power services to consumers.

EcoJoule Energy Pty Ltd is based in Brisbane, Australia and is 100% privately held. Our motto of "Simply Smart Power Solutions" derives from our aim to merge smart design with simplicity.



"Everything should be made as simple as possible, but no simpler" Albert Einstein