

E-GEAR™

Battery Energy Storage System

powered by
bi-direx™



The E-Gear Battery Energy Storage System (BESS) is an all-in-one-design including battery modules, battery management system (BMS), grid ready power controls and Energy Management Controller (EMC).

Provides superior performance in utility grid applications including:

- On-site emergency backup
- PV Self Consumption
- Smart Export
- Frequency Regulation
- Demand Response
- Feeder Voltage Support
- Ability to accept dispatch commands from any control network using open communication protocols.
- Reliable high quality back-up power when you need it via an integrated transfer circuit for critical load operation.
- LG Chem Li-ion battery-ready with fully integrated battery management system provides reliable long term performance.
- Flexible battery capacities from two to six LG Chem battery modules.



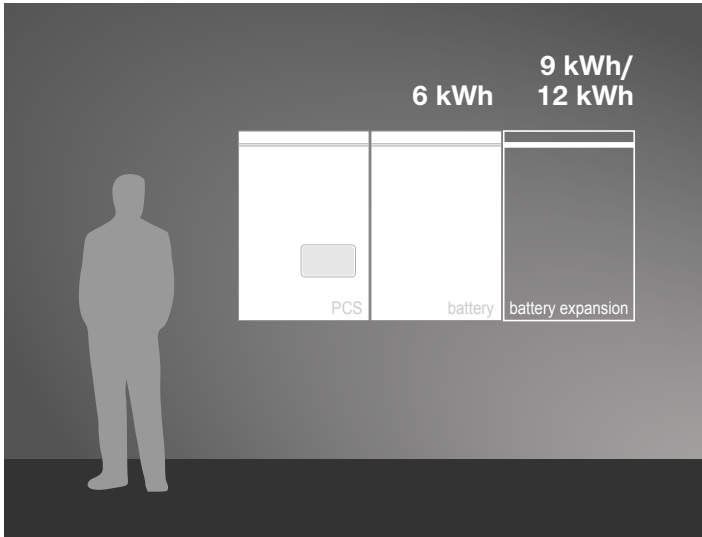
Battery capacity shown is AC rated, LG Chem M4860P2S DC capacity is 3.2kW per module



 **LG Chem**
Advanced Lithium-ion
Battery Technology

W e-gear.us
T 844.443.4327
E info@e-gear.us

 US LISTED



E-GEAR™ ENERGY MANAGEMENT CONTROLLER (EMC)

The E-GEAR™ Energy Management Controller (EMC) does it all—optimizing PV energy production, usage and export. On-board capabilities include PV production and home usage monitoring, Time-of-Use load control, Time-of-Export optimization and grid support capabilities. Intuitive cloud-based user tools simplify the set of intelligent system controls and monitoring.



EMC + PV + Storage

A breakthrough in distributed energy resource management—our Battery Energy Storage System (BESS) option enhances a PV system’s abilities and allows you to store your own PV energy. The modular design allows for easy upgrade and incremental expansion. The automatic emergency backup power feature provides for critical loads such as lighting, medical equipment, refrigerators, phone chargers, etc. during an outage. Smart Storage can also buffer, smooth out and stabilize the energy you want transferred back to the grid.

Utilities are rapidly moving away from simple electrical generation and distribution models to more intelligent and dynamic energy management systems. As technologies evolve so will the relationship between rooftop PV owners and their utility. Grid connected energy producers will become essential partners able to share the benefits of a smarter interactive grid.

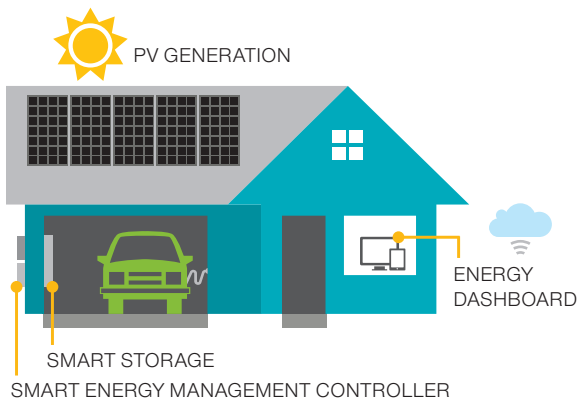
Smart energy management has the ability to leverage a PV system’s production to your advantage by automatically optimizing energy generation, usage and smart export. A secure cloud-based dashboard and toolset provide real-time PV energy generation and home usage visibility, putting easy

home load monitoring and control at your finger-tips. Simple and automated control of your energy means you can take advantage of all utility and grid support benefits.

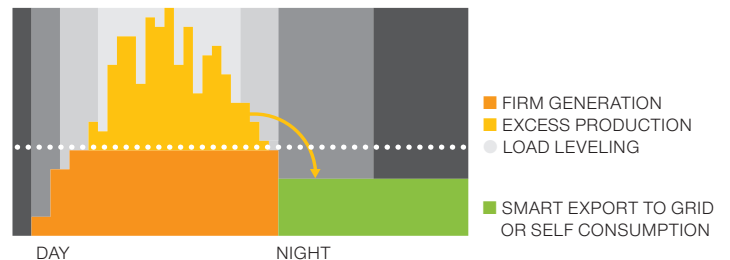
Modular in design, and scalable, optional Smart Storage increases your PV system’s effectiveness by allowing both smart energy export or non-export/self consumption between specific times each day. Additional benefits include emergency backup for important loads such as lighting, medical equipment and refrigeration when needed.

An intelligent system that will provide benefits now, adapting to changing needs, grid challenges, Utility benefits and evolving solar energy policy—essentially future-proofing your PV system.

Imagine a community of rooftop PV systems upgraded with Smart Energy Management technology. Each maximizing customer savings, improving our grid, providing greater renewable energy interconnection—reducing reliance on imported oil, liquefied gas from fracking and saving precious green space from massive solar farms.



SMOOTHING PV ENERGY



The average household consumes only 20-30% of PV energy generated within solar production hours. During peak solar production the excess energy sent to the grid by thousands of net-metered systems introduces instability and additional challenges to the grid. The E-GEAR™ EMC leverages a Battery Energy Storage System to capture the excess PV production

that is typically exported during the day. The stored energy can later be smoothly exported to the grid when most advantageous, or used directly in your home instead of drawing energy from the grid during peak demand hours. It can also be used as your emergency reserve for critical loads during a power outage.



Battery Energy Storage System

AC SPECIFICATIONS

Nominal AC Voltage / (Range)	240/120 V, split-phase / (211 to 264 VAC)				
Nominal AC Frequency / (Range)	60 Hz / (59.3 to 61.5 Hz)				
Rated AC Current	20.8 A				
Continuous Power (up to 45° C)	5000 VA				
Power Factor	Fixed, or adjustable: 0.8 lead to 0.8 lag				
Harmonic Distortion	< 5%				
Efficiency, peak (avg), %	96 (94.5)				
Galvanic Isolation	Integrated transformer				

BATTERY SPECIFICATIONS

	6.4 kWh	9.6 kWh	12.8 kWh	16.0 kWh	19.2 kWh
Manufacturer / Chemistry / Model	LG Chem / Lithium type / M4860P2S				
Rated AC Energy (1C) kWh	5.30	7.95	10.60	13.25	15.90
Maximum Capacity (1C) Ah	120	180	240	300	360
Charge / Discharge current	0.5C Max, 0.3C Nom.				
Nominal DC Voltage (Operating Range)	48 Vdc (42 to 58 Vdc)				
Cycle Life (90% DoD, 1C, 25° C)	4000				
Battery BMS	Built-in (self-diagnostic, control, and protection)				
Communication	Modbus RS-485				

GENERAL - FUNCTIONS / FEATURES

External Communication	Modbus RS-485
HMI / Display	Battery State LED, Operating state LED, Wake/Sleep mode
DC Protection	Circuit Breaker
Lightning Protection	IEEE 62.14.2, Location Category B, Low Exposure
Grid Monitoring	Active in all states
Ground Fault Monitoring	DC grounded system configuration
Configurable Grid mgmt Functions	Power reduction, reactive power control, voltage and frequency ride through control (CPUC Rule 21)
Auxiliary Dry Contacts, 2x	240V, 10A rated, programmable
Back up power critical load pass-through	240V, 60A rated (120V / 120A)
PV coupled method	AC

GENERAL - PERFORMANCE

Grid connect: Max power response rate	Zero to full scale (up/down) = 1 second max.
Grid connect: Step control resolution	5W (0.1% full scale)
Back-up Power surge rating	100% continuous, 120% (30 minute), 170% (3 seconds)
Transfer power interrupt time	Back-up to grid: no interrupt. Grid to back-up: 2 seconds
Self consumption (Watts), sleep / operating	3 Watts / 30 Watts

MECHANICAL SPECIFICATIONS

Operating temperature / humidity	-10 to 45° C / 95% (non-condensing)
Enclosure type	NEMA 3R, Wall-mount (Indoor/Outdoor)
Cooling	PCS: active cooling, Battery: convection
PCS dimension / weight	529 x 783 x 397 mm (20.8" x 30.8" x 15.6") / 65 kg (145 lbs)
Battery dimension / weight (per 6kWh)	572 x 783 x 397 mm (22.5" x 30.8" x 15.6") / 85 kg (188 lbs)

STANDARDS / CERTIFICATIONS

EMC	FCC, part 15-B
Utility interface and safety	UL 1741, IEEE 1547, UL 1973

for more information visit: e-gear.us