

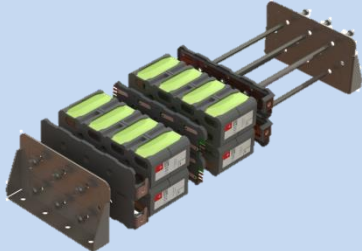




Boston-Power Ensemble[®] Module System

The highly configurable Ensemble Module System is a series of interconnected Li-ion Swing[®] cells in a robust mechanical enclosure that enables advanced module and battery pack designs. This solution combines the safety and performance advantage of Boston-Power's cell technology with the high capacity and ease of implementation required for large format energy systems such as EV and ESS platforms. Available in both 155Wh and 116Wh formats, the Ensemble system offers a high degree of electrical and mechanical design flexibility.

Ensemble Module System

PRODUCT PRIMARY BENEFITS	High Energy Density Cells	Cell Housings	Ensemble Battery Modules
			
	<p><i>Boston-Power's Swing cells offer the highest usable energy density combined with a longer cycle life at broad operating temperatures and unmatched safety features.</i></p>	<p><i>The first generation Ensemble cell housings are available in both 6P and 8P configurations to enable variable voltage and capacity configurations.</i></p>	<p><i>Highly scalable Ensemble Module System allows for ease of assembly, disassembly and mounting into battery modules and packs with no weld interconnects and low part count.</i></p>

The Ensemble Module System offers pack designers and manufacturers a flexible platform for every stage of their product development from design through final assembly. The core system benefits are:

VERSATILE DESIGN / PROTOTYPING / DEVELOPMENT

- Two sizes allow for optimized voltage and capacity as well as mechanical layout
- Simple assembly and disassembly system supports rapid prototyping and testing
- Standard connectors for temperature and voltage sensing
- Can be used with or without cooling

SIMPLIFIED ASSEMBLY

- Intuitive interconnect and hardware simplify assembly process
- Weld-free construction for improved performance and reliability
- Integrated mounting features allow for better structural rigidity as compared to batteries with only external restraints

ENHANCED SERVICABILITY

- Non-welded interface board and bus-bar allow for simple disassembly of module for replacement or end-of-life recycling

HIGH DENSITY SAFE ENERGY STORAGE FOR END USERS

- Increased battery capacity in less space
- Improved safety through more robust structure

Certifications

CELL HOUSING: UN 38.3, QC/T 743

CELL: UN 38.3, UL1642, IEC62133, RoHS

SPECIFICATIONS ¹		ENSEMBLE SYSTEM	
Name		Ensemble 155	Ensemble 116
Configuration (Parallel/Serial)		8p1s	6p1s
Capacity ²		42Ah	31Ah
Energy ²		155Wh	116Wh
Voltage ²		3.65V	
Energy density	Gravimetric ³	183Wh/kg	180Wh/kg
	Volumetric ³	325Wh/L	324Wh/L
Cycle life to 80% capacity (1C discharge @ 23C)	90% DOD	>2000 cycles	
	85% DOD	>3000 cycles	
	75% DOD	>5000 cycles	
Charging (CC/CV) ⁴		29.4A to 4.2V	22.3A to 4.2V
Operating voltage range		2.75V to 4.2V	
Maximum continuous discharge		84A	62A
Peak pulse discharge (10s) ⁵		210A	155A
Maximum Impedance (1kHz)		≤2.55 mΩ	≤3.40mΩ
Weight ³		0.85kg	0.65kg
Operating temperature ⁶	Charge	-20 to 60°C	
	Discharge	-40 to 70°C	
Storage temperature ⁶		-40 to 60°C	

¹ Testing performed at 25°C and C/5 discharge. Specification subject to change.

² Nameplate values also known as Nominal values.

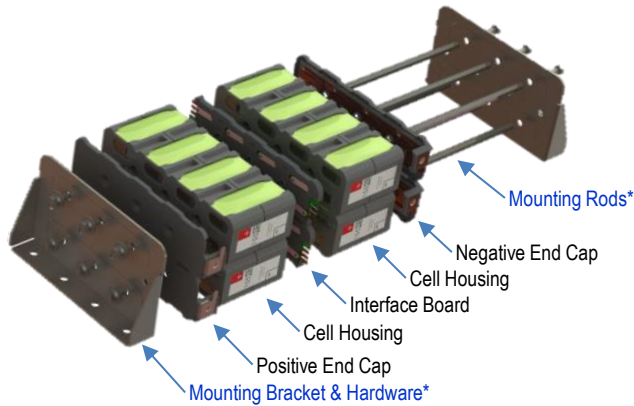
³ Measurements calculated for cell housing plus "Ensemble Interface Board" (EIB).

⁴ Constant Current / Constant Voltage.

⁵ May require active thermal management depending on customer application.

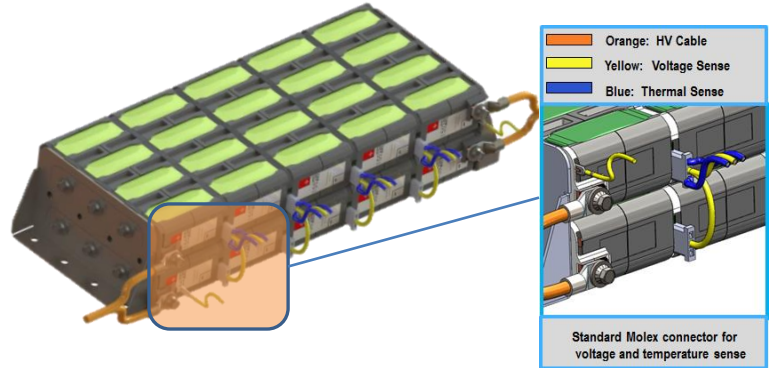
⁶ Contact Boston-Power for specifics on operation and storage at temperature extremes.

Ensemble Module Assembly Expanded View



*Customer Supplied

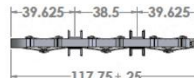
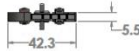
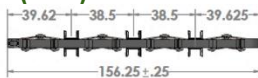
Ensemble Module Assembly 1.55kWh / 16P5S Example*



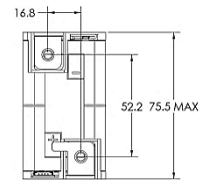
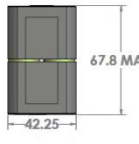
* 2P at the cell housing level. 16P in terms of Swing 5300 cells.

Dimensions (mm) for 155Wh and 116Wh Ensemble

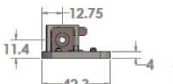
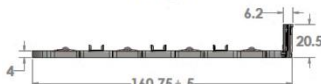
Interface Board



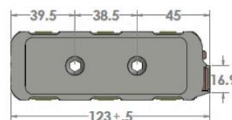
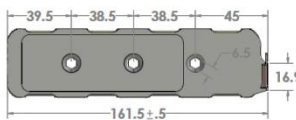
Cell Housing



End Cap (Side/Top View)

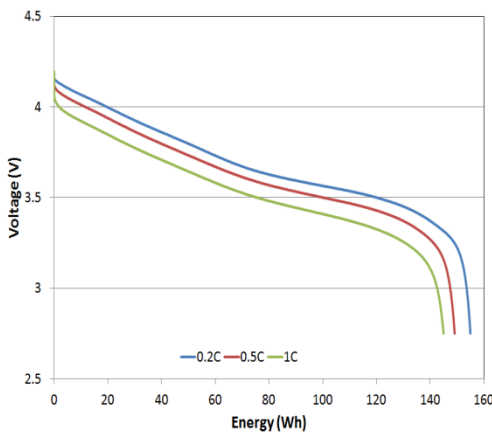


End Cap (Front View)

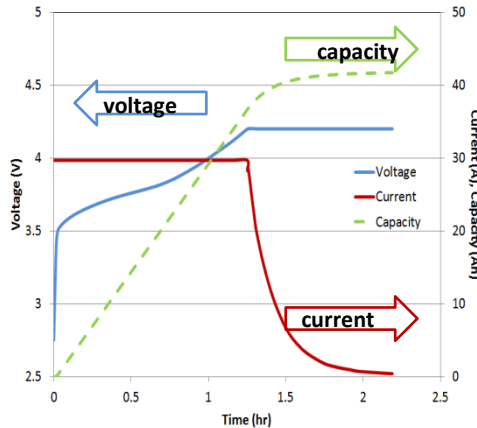


Terminal Connections / Endcap side view (single unit shown)

Discharge curve (155Wh)



Charge Curve



Applications:

- Battery Electric Vehicles
- Plug-In Hybrid Electric Vehicles
- Neighborhood Electric Vehicles
- Small Task Oriented Vehicles (STOV)
- Technology evaluation module
- Military power systems
- Stationary energy storage systems

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