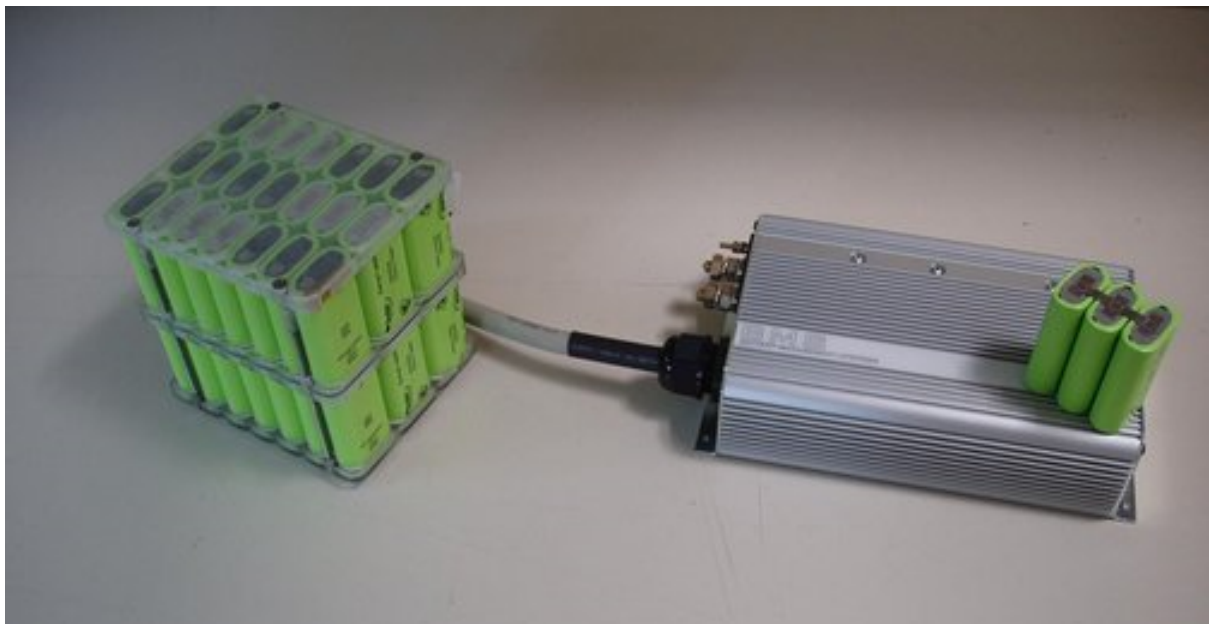


## GenIOL 14S3P Battery Pack

GEN Lithium-ion 14S3P is a rugged packs “Off the Shelf” designed to match long runtime requirements **small vehicles, electric bicycle, robot.**

It is based on *Boston Power Swing 4400 mAh Cell*, it has a minimum height and maximum energy density; ready to be embedded into the host equipment or supplied in an external housing it can operate in extreme environment temperature without loss of capacity.

The lithium cell based battery pack is managed with an external **Battery Management System.**



### Main features of GENIOL 14S3P:

- Battery pack: 14S3P
- Nominal Voltage : 51,8 V
- Maximum Charge Voltage : 58,0 V
- Discharge Cut-off Voltage : 38,5 V
- Typical Capacity : 13200 mAh
- Standard Charge : Constant current at 9300 mA (@ 0,7 C) with maximum voltage of 58,0 V; Constant voltage at 58,0 V until current is less than 150 mA
- Standard Discharge : Constant current at 13200 mA to 38,5 V

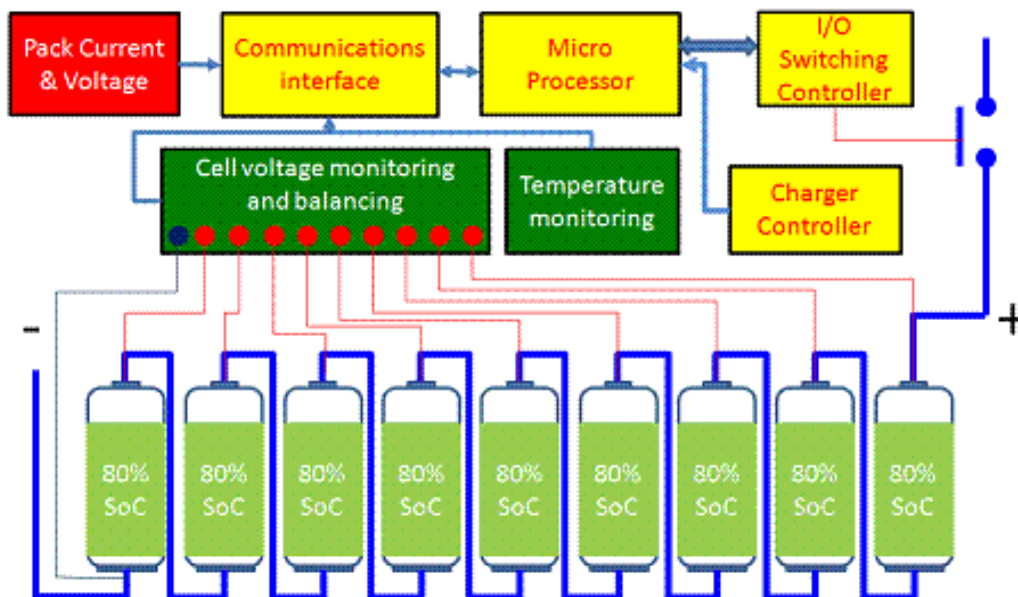
- Maximum charging current : 26400 mA
- Maximum discharging current : 33000 mA
- Operating Temperature : -10°C + 60°C (Charging) / -40°C +70°C (Discharging)
- Storage Temperature : -40°C + 60°C

## The Battery management

The Battery management provides the performance, safety and control feature of the complex 14S3P designed for small automotive applications.

The battery management provides battery **monitoring** and battery **control**. The monitoring covers the management at cell level including **voltage and temperature measurement and cell balancing**. This represents the foundation of the battery management system.

## Generic BMS Elements



The battery controller provides the **higher level logic** taking care of the pack level parameters, calculated or derived cell parameters, switching, charger control and the more advanced algorithms.

## Main Features of the Battery Management System

PRODUCT SPECIFICATIONS
<b>Maximum system operating voltage:</b> 48V
<b>Dimensions:</b> 260 x 157 x 63.5mm; <b>Weight:</b> 2.6kg
<b>Measurement accuracy - Cell voltage:</b> <1%; <b>Battery voltage:</b> <1%; <b>Temperature:</b> ±5°C
<b>Charger control:</b> Analog voltage control of supported chargers
<b>Parameters logged by system counters:</b> Power-up time, No. of charge/discharge cycles, Amp hours summed
<b>Protection modes:</b> Short circuit; Overload, Deep discharge- including Crawl speed function; Communications error; Temperature and Low Temperature
<b>Data Buses:</b> RS232 PC diagnostics interface
TEST SPECIFICATIONS
EMC emissions and immunity according to EN55022/2006, Class B; Directive 2004/EC
<b>Temperature:</b> Operational with batteries connected -20° to 70°C
<b>IP class:</b> IP64; Vibration testing according to EN60068-2-6
Electro-static discharge according to EN61000-4-2

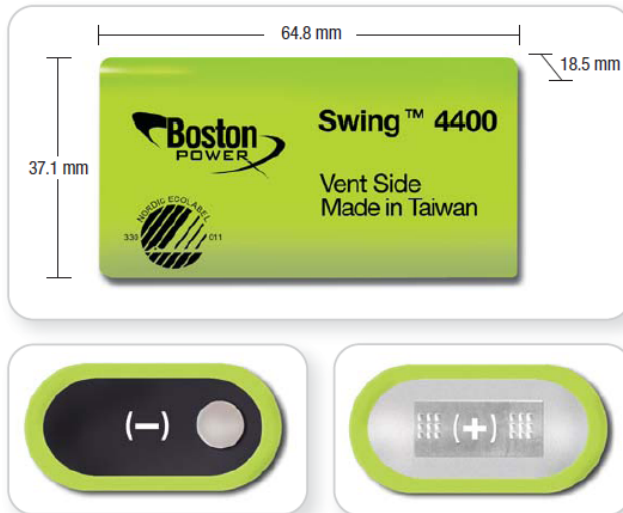
## The lithium battery cell

Based on our lithium-ion battery technology platform, **Swing 4400** has the highest energy density compared to other lithium-ion cells in the market today, while also delivering extended cycle life performance at temperature extremes. Higher energy directly equates to more runtime or more miles traveled per charge, and also helps reduce battery system weight and space requirements. Swing 4400 also provides the high constant and transient power required in many electric vehicle and stationary energy storage applications.

Key features of Swing 4400 include:

- High energy density
  - By volume: 420Wh/L
  - By weight: 180Wh/kg (162Wh/kg usable at 90% DOD)
- 10 year reliable calendar life
  - Over 1000 cycles at 100% DOD
  - Over 2000 cycles at 90% DOD
  - Over 3500 cycles at 75% DOD
- Industry-leading operating temperature range
  - Discharge -40°C to 70°C; charge -10°C to 60°C
- Effective thermal management
- High constant power: 440W/kg

- Pulse power: 1500W/kg (2s pulse)
- Multiple redundant safety features including: CIDs, redundant vents, aluminum can
- Nordic Ecolabel accreditation, UL, UN and RoHS certifications



#### Certifications

UL 1642, UN 38.3, ROHS 2002/95/EC directive, Nordic Ecolabel license 330 011

Nominal capacity		4400 mAh
Nominal voltage		3.7V
Energy density	Gravimetric	180 Wh/kg
	Volumetric	420 Wh/L
Power density		440 W/kg
Nominal cell impedance		17mΩ
Cycle life (0.5C discharge at 23°C)	100% DOD	>1000 cycles
	90% DOD	>2000 cycles
Max continuous discharge rate (0 -100% SOC)		12.0A
Allowable pulse capability (10s pulse)		1200 W/kg
Standard charging method (CC-CV)		3.1A (0.7C) to 4.2V
Max charge rate (continuous)		8.8A
10s pulse charge (>8A) and discharge (>20A) cutoff voltages		4.3V to 2.5V
Nominal cell weight		90g
Operating temperature*	Charge	-10 to 60°C
	Discharge	-40 to 70°C
Storage temperature*		-40 to 60°C

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