



Description

The Navitas Systems Ultanium™ 6T battery⁽¹⁾ is a lithium ion drop-in upgrade to lead batteries in 24V vehicle electrical systems. It is intended for engine start and silent watch applications in extreme environments, and offers significantly higher runtime and voltage quality for powering electronics-intensive vehicle and weapons systems. The Li-Ion cells are monitored by an advanced integrated Battery Management System (BMS) which protects the cells from electrical overstress by disconnecting the terminals. The BMS also reports battery performance and diagnostic information over CAN which can be interpreted by the vehicle system or a diagnostic tool. A communication interface on the top of the battery offers a galvanically isolated interface including two CANbus channels and digital inputs.

Electrical Performance Characteristics

@ 25°C unless otherwise stated

Energy		
	@ 28.5 V	@ 29.4 V
	2.5 kWh	2.8 kWh
Capacity		
	@ 28.5 V	@ 29.4 V
C ₁₀	102 Ah	113 Ah
C ₅	101 Ah	112 Ah
C ₁	96 Ah	106 Ah
C _{0.1}	89 Ah	98 Ah
Voltage		
Minimum ⁽²⁾		24.5 V
Maximum		29.4 V
Impedance		
		0.002 Ω
Maximum Discharge Current		
Pulse 0.0005 s		2400 A
Pulse 0.10 s		2000 A
Pulse 30 s @ 50°C		1100 A
Pulse 30 s @ -18°C		1100 A
Pulse 30 s @ -32°C		600 A
Pulse 30 s @ -40°C		400 A
Continuous		500 A
Maximum Charge Current		
Pulse 30s		500 A
Continuous		300 A
Continuous @ 10°C		100 A
Continuous @ 0°C ⁽³⁾		50 A
Continuous @ -20°C ⁽³⁾		10 A
Continuous @ -30°C ⁽³⁾		0 A

Mechanical Characteristics

Weight	28 kg
Length	286 mm
Width	269 mm
Height	230 mm
Specific Energy	100 W·hr/kg
Energy Density	200 W·hr/L
Housing	Aluminum
Color	Desert Tan

Environmental Characteristics

Temperature Range ⁽⁴⁾	
Operational	-46°C to +71°C
Survival	-54°C to +88°C
Long Term Storage	-40°C to +45°C
Ingress Protection	IP67

Battery Life

Service Life	5 years
Shelf Storage Life	2 years
Vehicle Storage Life	3 months
Self-Discharge	2% / month
Cycle Life @ 100% DoD to 70% of original capacity @ 38°C	1000 cycles

Note 1: 6T Battery is currently undergoing design validation testing with US Army; expected product availability date pending.

Note 2: No load minimum voltage which corresponds to 0% SOC. Protection for over discharge allows for lower battery voltages based on discharge rate.

Note 3: Internal heater enabled below 10°C to allow for higher charge and discharge rates while operating in cold environments.

Note 4: Extended exposure to temperatures above 45°C reduces life of battery.

Contents subject to change without notice. Performance may vary depending on use conditions and application.

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Advantages compared to 12 Volt 6T Pb-Acid

- CAPACITY RETENTION: Amp Hour capacity isn't degraded by fast discharge rates; runtime isn't affected by partial state-of-charge (no "sulfation").
- LONGER LIFE: >2x deep discharge life.
- GREATER CHARGE ACCEPTANCE: Low internal resistance enables more energy to be captured/stored.
- CONSISTENT PERFORMANCE: "Stiffer" voltage doesn't fade as discharge proceeds; easier on electronic systems.
- SMARTER: Internal BMS + communications interface provides automated cell balancing and performance/diagnostics information.
- MORE ENERGY/LIGHTER IN SAME 6T FOOTPRINT: > 2x the Wh/kg means adding more energy into existing battery locations, or using same energy with freed-up space for other purposes.
- MORE RESILIENT: Failure of 1 battery still results in maintaining 24 V power to the vehicle.

Features

- CANbus communication with configurable baud rate of 250Kb/s, 500Kb/s, or 1Mb/s.
- Communication interface isolated from battery terminals and case up to 500 V RMS.
- Ability to parallel up to 12 batteries.
- Solid-state integrated contactor for fast response to fault conditions and unlimited state changes.
- Over-charge and over-discharge protection.
- Dynamic charge and discharge protection limits based on cell temperature.
- Fast acting short circuit protection.
- Reverse battery clamping diodes clamp reverse voltage until reverse source deactivates.
- Active Balancing to achieve 2% equalization per hour for rapid deployment after storage.
- Sleep and shut-down modes to preserve life during storage.
- Burst disc for management of gasses in case of projectile penetration event.
- Integrated heater for successful charging and engine cranking in the coldest environments.
- Communications interface providing critical performance and diagnostic information.

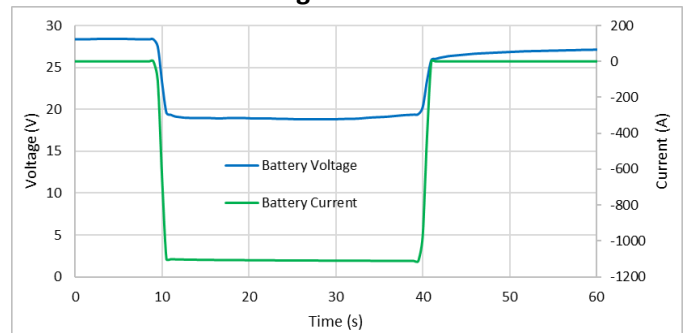
Features (Cont'd)

- Maintenance-free battery.
- Designed and assembled in the USA.

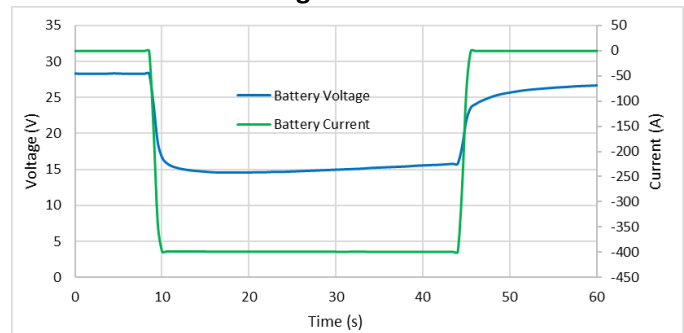
Applicable Standards

- Designed to MIL-PRF-32565B performance specification for 6T Li-Ion battery.
- Designed to meet MIL-STD-461F for electromagnetic compatibility.
- Designed to meet MIL-STD-810G for shock, vibration, and immersion.
- Compatible with MIL-STD-1275E compliant electronic sub-assemblies.
- UN 38.3 transportation classification pending.

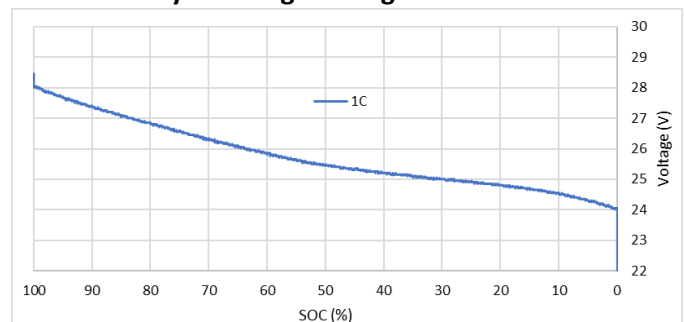
Cold Crank Voltage Performance at -18°C



Cold Crank Voltage Performance at -40°C



Battery Discharge Voltage vs SOC at 25°C



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