

PRODUCT SHEET 4.1 | v2024-08



nyobolt

HEAVY DUTY
OFF-HIGHWAY



A scalable battery module designed for high power and demanding EV applications such as commercial, off-highway, and marine. The module has a continuous fast charge & regen capability of 10C with greater than 25000 cycles at this rate. It has high continuous and peak discharge capability making it ideal for high power applications.



Key Features

The module has integrated cell voltage and temperature monitoring with passive balancing and isolated SPI communication allowing it to be daisy chained.

Up to 64 modules can be connected together in series and parallel to form a high power battery up to 1000V.

The module is liquid cooled via a coldplate that can be supplied as an integrated assembly.

Use in 48V to 1000V applications:



Able to charge from **10-90% in less than 6-minutes** subject to charger availability highway and mining applications





Capable of **high regen and power** delivery opening the possibility to downsize the battery



High power to weight ratio for off-highway and mining applications

Solving pain points across electrification challenges

Industry Problem	Nyobolt Solution	
<p data-bbox="105 292 264 316">Underground</p> <p data-bbox="105 337 233 356">LHDs&Trucks</p> 	<p data-bbox="443 292 951 378">Battery swapping is used to maintain uptime - requires purchase of at least 2X batteries and installation of a swap station that must move as the mine evolves.</p> <hr/> <p data-bbox="443 426 927 479">Charging queues at battery swap stations decrease operation uptime.</p> <hr/> <p data-bbox="443 493 927 613">Thermal runaway events associated with traditional lithium-ion technology are a major safety concern underground. There is zero acceptance for fire and explosion hazards in an underground mine.</p>	<p data-bbox="975 292 1469 412">Modular pack sizes deliver superfast recharge times, are long-lasting, which improves uptime, reduces battery CAPEX costs and lowers carbon footprint. Swap station is not necessary.</p> <hr/> <p data-bbox="975 426 1445 479">Charge times <6 minutes allow for coordination of charging schedule</p> <hr/> <p data-bbox="975 493 1461 580">Cell cycling above 1V eliminates lithium-dendrite formation. Cell temperature increase is minimal at high rates due to low cell resistance.</p>
<p data-bbox="105 695 204 720">Surface</p> <p data-bbox="105 740 264 759">Mine-Haul Trucks</p> 	<p data-bbox="443 695 935 815">Oversized batteries for range anxiety and power requirements lead to prohibitively high battery costs, compromise truck's structural integrity, and increase component wear i.e. tires.</p> <hr/> <p data-bbox="443 829 951 882">Large amounts of regenerative power are not captured in downhill portions of duty cycle.</p> <hr/> <p data-bbox="443 930 951 983">Battery upgrade occurs much more often than vehicle upgrade and refurbishment</p>	<p data-bbox="975 695 1485 781">Fast charge and higher power capability allow for compact and light pack designs, and cost, carbon footprint reduction, and decreased component wear.</p> <hr/> <p data-bbox="975 829 1461 916">Fast charge and higher power capacity allow higher capture of regenerative power and thus more efficient systems.</p> <hr/> <p data-bbox="975 930 1461 983">25,000+ cycle lifetime allows for battery upgrade to match equipment maintenance schedule.</p>

Specification

HPMOD-XTREME-500-18S2P

Cell Type	32Ah Pouch
Cell Dimensions	140mm x 145mm x 12.1mm
Cell Weight	606g
Module Configuration	18S2P
Rated Capacity / Energy	64 Ah / 2.5 kWh
Nominal Voltage	39.6 V
Max Voltage	54.0 V
Min Voltage	18.0 V
Peak 2 second charge / discharge power	35kW / 32kW
Peak 10 second charge / discharge power	32kW / 28kW
Continuous charge / discharge power	25kW / 20kW
Cycle Life	> 25000 fast charge cycles to 80% SOH
Weight (excluding coldplate)	28.0 kg
Dimensions	L500 x W165 x H155 mm
Cooling	Coldplate water-glycol (optionally integrated)
Operating Temperature	-10 to +50 °C
Protection	IP40
Certification	Certified and tested to ECE R100.2 and UN38.3

Example Applications

The XTREME module is scalable in series and parallel to support a range of batteries from 48V to 1000V. This supports application areas such as factory robots and forklift trucks through to electric vehicles for commercial, off-highway and marine.

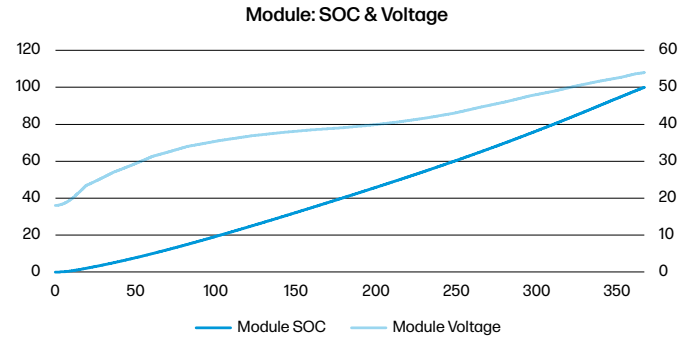
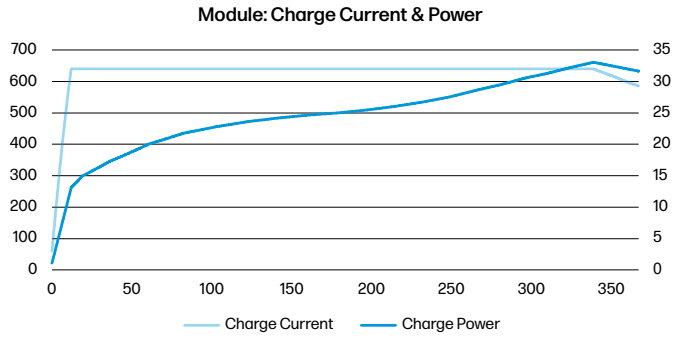
It can be used with the Nyobolt battery management system with its integrated cell monitor interface and power distribution unit. The battery management system has advanced monitoring and software algorithms for tracking the status and health of the battery through its life. The safety architecture comprises a main micro and safety micro to conform with requirements such as ISO 26262 to ASIL-C.

A maximum of 64 modules can be connected to each cell monitor interface which communicates with the battery management system over CAN. The battery management system can support connection of up to 2 cell monitor interfaces to give capability for monitoring up to a total of 768 series cells.

Example specifications for a 400V and 800V battery pack:

	400V System	800V System
Number of Series Modules	9	18
Number of Parallel Modules	3	3
Rated Capacity / Energy	192 Ah / 68 kWh	192 Ah / 135 kWh
Usable Energy	63 kWh	125 kWh
Nominal Voltage	356 V	712 V
Max Voltage	486 V	972 V
Min Voltage	162 V	324 V
Peak 2 second charge / discharge power	700kW / 650kW	1.5MW / 1.3MW
Peak 10 second charge / discharge power	650kW / 550kW	1.3MW / 1.1MW
Continuous charge / discharge power	600kW / 500kW	1.2MW / 1MW
10%-90% Charge time (subject to charger)	< 6-minutes	< 6-minutes

Module Charge profile:





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More power in less time

To find out more visit
www.nyobolt.com

Or contact us at
product@nyobolt.com

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