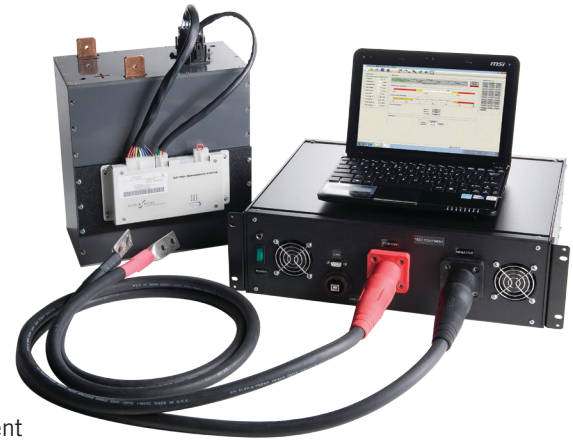
altairnano

Advanced Lithium-Ion Battery Application Kit



The Application Kit is designed as an open platform to support Original Equipment Manufacturer (OEM) design and system engineering initiatives, providing an inclusive test bed for the evaluation of Altairnano's advanced lithium-ion battery technology for use in prototype development, new technology design and improving application performance and cost of ownership.

FEATURES

- A comprehensive suite of components for easy installation and rapid deployment
- Nano lithium-titanate (nLTO) advanced lithium-ion cell technology
- Ability to measure relevant technical and operational parameters: charge cycles, cell balancing, charging rates, temperature and other features
- Service tool software preloaded on a Netbook for Battery Management System (BMS) communication, service, reprogramming and diagnostics
- Charge and protection circuit protects battery system from potentially damaging electrical conditions

BASE KIT INCLUDES

- Altairnano Advanced Lithium-Ion 24V 60Ah Battery Module with integrated heat sink designed to maximize efficiency of external cooling infrastructure for demanding and repetitive duty cycles
- Connection and Control Unit – Contains BMS and Charge and Protection Circuit
- Netbook (preloaded with BMS Service Tool Software)
- User guide, installation diagrams and battery material safety data sheets (MSDS)

APPLICATIONS

Electric Grid

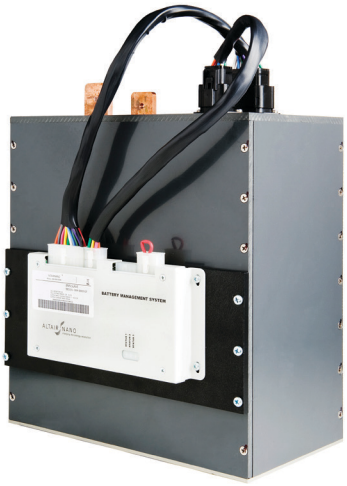
- Microgrids
- Remote telecommunications stations
- Power generation transient control systems
- UPS: Critical mission and load
- Renewable integration: System stability
- Offshore oil and gas installations
- Electric substation switching control

Transportation and OEM

- Commercial plug-in hybrid electric vehicles (PHEV)
- Hybrid electric vehicles (HEV)
- Electric vehicles (EV)
- Material handling equipment
- Rail
- Marine: Onboard auxiliary services
- Regenerative energy applications

In addition to the examples above, there are many other applications that may benefit from a high-power battery solution.

Advanced Lithium-Ion Battery Application Kit CONTINUED



24V 60Ah Module shown with LMU

* Voltage range is controlled by the voltage at the cell level

24V 60Ah Battery Module (Standard)	
Voltage Range*	17 V – 27.5 V
Nominal capacity (1C charge/1C discharge)	60 Ah
Typical energy, at 1C at 25°C	1,400 Wh
Peak power (10 sec pulse 50% SOC, at 25°C)	21.9 kW
Gravimetric energy density	51.9 Wh/kg
Gravimetric power density	799 W/kg
Standard charge/discharge	60 A using constant current
Max continuous charge or discharge	360 A
Pulse charge/discharge rate (10 sec pulse)	Up to 600 A max
Operating temperature range with LMU	-40°C to 50°C
Calendar life at 25°C	25 Years
Module dimensions (L x W x H)	279 mm x 158 mm x 303 mm
Weight	27.4 kg
Cell chemistry	Nano lithium-titanate

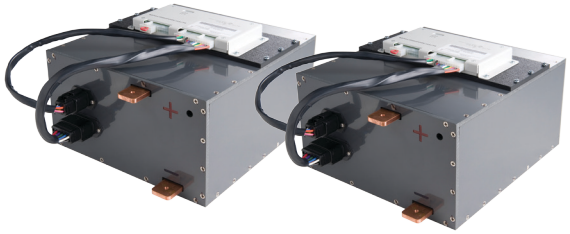
LMU – Reads voltages and temperature in battery module and transmits back to Battery Management Unit (BMU)

Connection and Control Unit (CCU) (Standard)	
Max Rated DC Voltage	420 V
Maximum DC Current	300 A continuous/600 A for 10s pulse
Operating Temperature	0°C to 50°C
Unit Dimensions (L x W x H)	330.4 mm x 482.6 mm x 177.5 mm
Weight	22.6 kg
AC Input Ratings	120/240 Vac, 60/50Hz, 100 W max

The Connection and Control Unit houses a BMS, Charge and Protection Circuit, CAN to USB for PC BMS tool monitoring, +/- test terminals for connection to cycling equipment, load bank or power supply for charge and discharge of module, etc.

Netbook (Standard)

Factory verified communication and pre-loaded BMS Service Tool



Available Kit Options

- Additional 24V 60Ah Modules
- 3 foot Harness Kit to connect multiple modules in series
- Advisement on recommended cyclers

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