

www.midacbatteries.com



MOTIVE POWER BATTERIES

Li-Ion

MIDAC LITHIUM TECHNOLOGY

The serious and distressing environmental problem has finally generated a widespread awareness attentive to environmental issues, such as to spur the process of new technologies that drastically reduce development the pollutants discharged into the environment, promote the use of renewable energy sources and a drastic reduction in fossil energy consumed. In this process the energy management has a fundamental role, therefore the development of a more efficient energy storage systems with less impact on the environment becomes mandatory.

Midac Spa believes that lithium-ion technologies are the first real answer to these new market requirements of the energy storage.









Lithium batteries are high performance technologies, the new frontier for batteries. They provide a better power to weight balance compared to any other existing market technology. Lithium technology allows incomparable cycling life under the old technology. Higher performance in terms of duration and efficiency is guaranteed, which makes more economically attractive to traditional technologies. By the term lithium batteries actually indicates a whole family of electrochemical couples all based on lithium-ion. To achieve the best performance for each application is fundamental select the most appropriate lithium chemistry. The long experience of Midac in battery application allows it to offer customized lithium solutions for each your specific need.

MIDAC THREE MAIN LITHIUM TECHNOLOGY

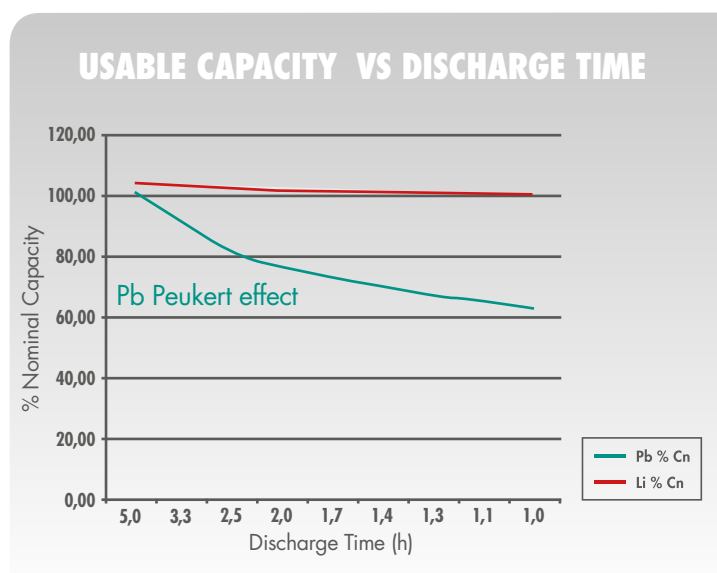
LFP	LITHIUM IRON PHOSPHATE	<ul style="list-style-type: none">• Safe• long life• High power• Cost-effective	<i>Midac Standard for motive power applications</i>
LTO	LITHIUM TITAN OXIDE	<ul style="list-style-type: none">• Longer life• Ultra fast Charging• Ultra High power	<i>Midac Standard for Fast charging & Hybrid applications</i>
NMC	LITHIUM NICKEL MANGANESE COBALT	<ul style="list-style-type: none">• Higher Energy density• long life• High Power	<i>Midac Standard for Automotive</i>

MIDAC Spa today offers a wide range of standard and customized lithium battery systems, and continues to develop its range of lithium-ion batteries in the markets (AUTOMOTIVE, MOTIVE POWER & STAND-BY) offering:

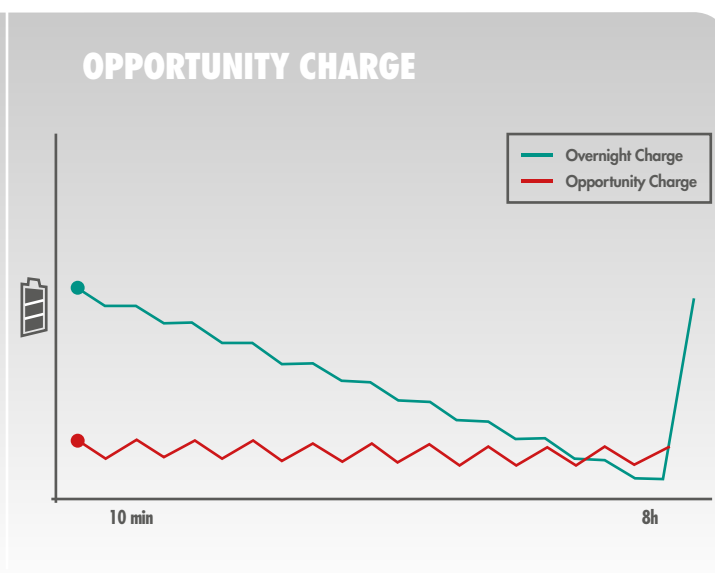
- a wide range of always available high-quality lithium cells and can be supplied with different shapes, capacity and performance;
- a development team made up of highly qualified engineers with decades of experience in the industry;
- its own BMS range to cover every application;
- an extensive qualified after sales network to support its customers even with lithium batteries.

MOTIVE POWER	
CLEANING	
AGV & ROBOTICS	
AGRICULTURE	
INDUSTRIAL MACHINERY	
MARINE	
SMALL MOBILITY	
BUS	

REDUCE BATTERY COSTS BY CAPACITY DOWN SIZE



The lead-acid batteries suffer of the Peukert effect that determines a really usable energy reduction if discharged more rapidly than is provided in the process of determination of the nominal capacity (for traction batteries 5 hours). The lithium batteries not suffer this effect therefore can return the same energy also if quickly discharged. Therefore, in applications with swifter discharge than five hours, lithium batteries can be sized with a lower capacity than used with lead-acid batteries. (see chart above)



Lithium batteries do not suffer from the memory effect so they may be charged even with state of partial charge. The capacity of a traditional battery must be calibrated so that a charge is sufficient to cover a work shift. A lithium battery for the opportunity charge will have a capacity calibrated on the maximum consumption range up between two subsequent charges taking into account also the length of the pause minimal charge. The high power density of LFP batteries allow the charge and discharge in a few minutes with high power levels thus allowing a down-sizing of the battery and a consequential costs saving.

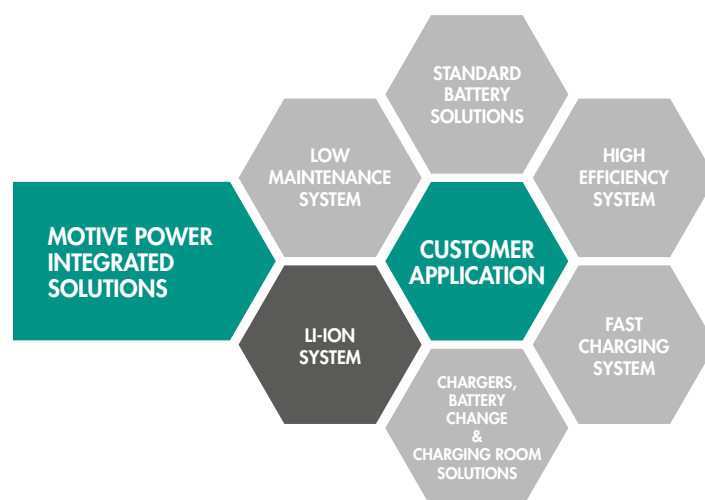
LFP MOTIVE POWER BATTERY



PRODUCT SOLUTION	Li-ion
APPLICATION	High Efficiency, Fast Charge Heavy Duty, Long Range, Opportunity Charge
TECHNOLOGY	Li-ion / Li-Poly (LFP / NMC / LTO)
MAINTENANCE	Yearly
VOLTAGE	12V - 144V
CAPACITY	Up to 2500Ah
SIZE STANDARD	DIN, BS, CUSTOMIZED
DESIGN LIFE (CYCLES DOD 80%)	3750+
OPERATING TEMPERATURE	-10°C / +55°C (-40°C / +65°C with active TMC)
PROTECTION INDEX	IP 54 (IP67 optional)
STATE OF CHARGE INDICATOR	3 colour LED; M ³ module (optional)
MIN DISCH. / CHARGE TIME	20min / 60min (HE Version) 2 min / 6 min (HP Version)
ENERGY PACK CHARGER	MIDATRON HE-Lion
BATTERY MANAGEMENT SYSTEM	Integrated MBM
COMMUNICATION	CANBus (CANOpen) RS485, RS232, Customized

The mindful approach to new technologies, once again demonstrate the DNA-insight attitude of MIDAC to follow the path of continuous development.

Li-ion represent the state-of-the-art in battery technology, where all the functions are closely monitored and controlled by the MBM (Midac Battery Management), to get best performance and ensure absolute safety Suitable for fast charging, opportunity charge and high efficiency applications, it ensures 3750+ cycles at 80%DoD with maintenance-free operation and can definitely be defined as option for all the applications where other technologies does not satisfy the requirements.



MIDAC LFP BATTERY VS TRADITIONAL LEAD

SAFE

- The lithium batteries are SAFE as much as the lead-acid batteries
- No Fire, no explosion in case of crash, perforation and short circuit

MORE EFFICIENT

- Midac LFP battery have 98% of efficiency than 80% of lead battery and no suffer by Puerket effect =
- +40% average energy available using LFP same lead battery capacity

LONG LASTING

- LFP lithium battery have an expected life of over 3750 cycles, mins over 2 time longer than standard LA battery and over 6 time more than Gel/AGM motive power battery

4 TIME MORE ENERGISEN

- LFP have 3 time higher energy density than lead = smaller battery / longer range.

FASTER CHARGING

- Standard charging time: LFP = 2hours / Lead = 6 hours
- Fast charging time: LFP = 20min / Lead = 4 hours

NO MANTENACE

- No water refill, do dust, no corrosion, no mantenance cost!

ECOLOGICAL

- No gas emission, no dedicated expensive charging room, recyclable, enviroment friendly

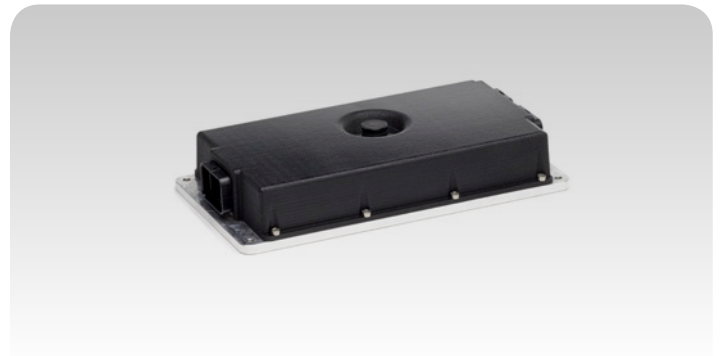
MIDAC MOTIVE POWER STANDARD BATTERY

BATTERY MODEL	VOLTAGE	CAPACITY	ENERGY	CYCLES LIFE	CHARGING TIME	MIN. DIMENSION	WEIGHT	PROTECITON INDEX
	[V]	[AH]	[KWH]	[DOD 70%]	STD / MIN [HOUR]	AXBXH [MM]	[KG]	
LFP.024.060.ND	25,60	60	1,54	3000	2/1	290x230x150	16	IP66
LFP.024.100.ON	25,60	100	2,56	4200	2/1	624x138x500	33	IP 55 (optional IP66)
LFP.024.150.ON	25,60	150	3,84	4200	2/1	624x138x627	44	IP 55 (optional IP66)
LFP.024.200.ON	25,60	200	5,12	4200	2/1	624x138x627	60	IP 55 (optional IP66)
LFP.024.250.ON	25,60	250	6,40	4200	2/1	624x212x627	72	IP 55 (optional IP66)
LFP.024.300.ON	25,60	300	7,68	4200	2/1	624x284x627	88	IP 55 (optional IP66)
LFP.024.400.ON	25,60	450	11,52	4200	2/1	624x284x627	120	IP 55 (optional IP66)
LFP.024.600.ON	25,60	600	15,36	4200	2/1	624x428x627	175	IP 55 (optional IP66)
LFP.048.300.ON	51,20	300	15,36	4200	2/1	830x522x627	215	IP 55 (optional IP66)
LFP.048.450.ON	51,20	450	23,04	4200	2/1	830x630x627	310	IP 55 (optional IP66)
LFP.048.600.ON	51,20	600	30,72	4200	2/1	830x630x627	400	IP 55 (optional IP66)
LFP.080.450.ON	76,80	450	34,56	4200	2/1	1028x855x784	440	IP 55 (optional IP66)
LFP.080.600.ON	76,80	600	46,08	4200	2/1	1028x855x784	585	IP 55 (optional IP66)

Midac is also available to produce any kind of customized battery

MIDAC BATTERY MANAGEMENT (MBM)

MBM is the bright brain of each Midac lithium battery. It was developed using automotive technology to ensure maximum performance and reliability. The MBM controls the correct operation, keeping the battery in a range of optimal and safe operation, thus avoiding any possible cause of failure.



MAIN FUNCTIONS	DESCRIPTION
MONITORING	Cell Voltage, Cell temperature, Battery current 1Gb of data memory to record all battery parameter and important life event
CONTROL	Safety devices, fuse detect, contactor detect, Pre-Charge circuit, energy saving, stand-by mode, sleeping mode, Thermal Management System (cooling /heater to improve operative temperature range (-40°C / 65°C) Necessary integration with other systems (charger/load/inverter/VMU...)
BALANCING	Ultra fast and precision cells equalization via electronic circuits to manage also big capacity cells (up to 1000Ah) and improve performance and life battery
PROGNOSTICS	High precision state of charge (SOC) for real range estimator State of health (SOH) for a predictive maintenance service Remaining life cycle, Remaining Energy/Capacity, Cell resistance,...
PROTECTION	Over-Voltage, Under-Voltage, Over-Temperature, Over-current
COMMUNICATION	CANBus with CANOpen standard or custom protocol, RS485, RS232, Optional 4G communication module for teleservice

MIDAC MONITORING MODULE (M3)

The MIDAC Monitoring Module (M3) is an optional module to match the lithium battery and is designed to show the information circulating on the battery CANbus system to inform the user about the battery state of charge (SoC), the state of battery life (SoH), and information about any faults (warning “,” error “and” fault “).

It exists in the wired version and Bluetooth low energy / Wi-Fi / LTE. Wireless version allows to monitor the battery status remotely, save the data to a cloud database and analyse data by MIDAC SERVICE SOFTWARE (MSS) and eventually predict any maintenance.



MIDAC SERVICE SOFTWARE (MSS)

The battery monitoring and maintenance software displays the main electrical parameters in real time or stored by MBM, the programming of parameters or the firmware of

the MBM and analysis of operating receivables in order to optimize use of the same or locate.

MAIN FEATURES

Overview:

Show the battery status, the SoC level, the voltage and current of battery-pack and single cells. In addition you receive a "alive counter" counter that provides a real-time feedback on the status of the communication with MBM.

Temperature:

Shows the record of the temperatures measured by the MBM, including board and cells temperature.

Voltage:

Shows a series of luminous indicators that represent the state of balance of the individual cells that make up the battery-pack. Also are indicated the maximum, minimum and average voltage of each cells.

Warning/Error/Alarm:

Contains indicators that summarize the internal resistance of the cells in the battery. the minimum resistance, maximum and average are highlighted.

Resistance:

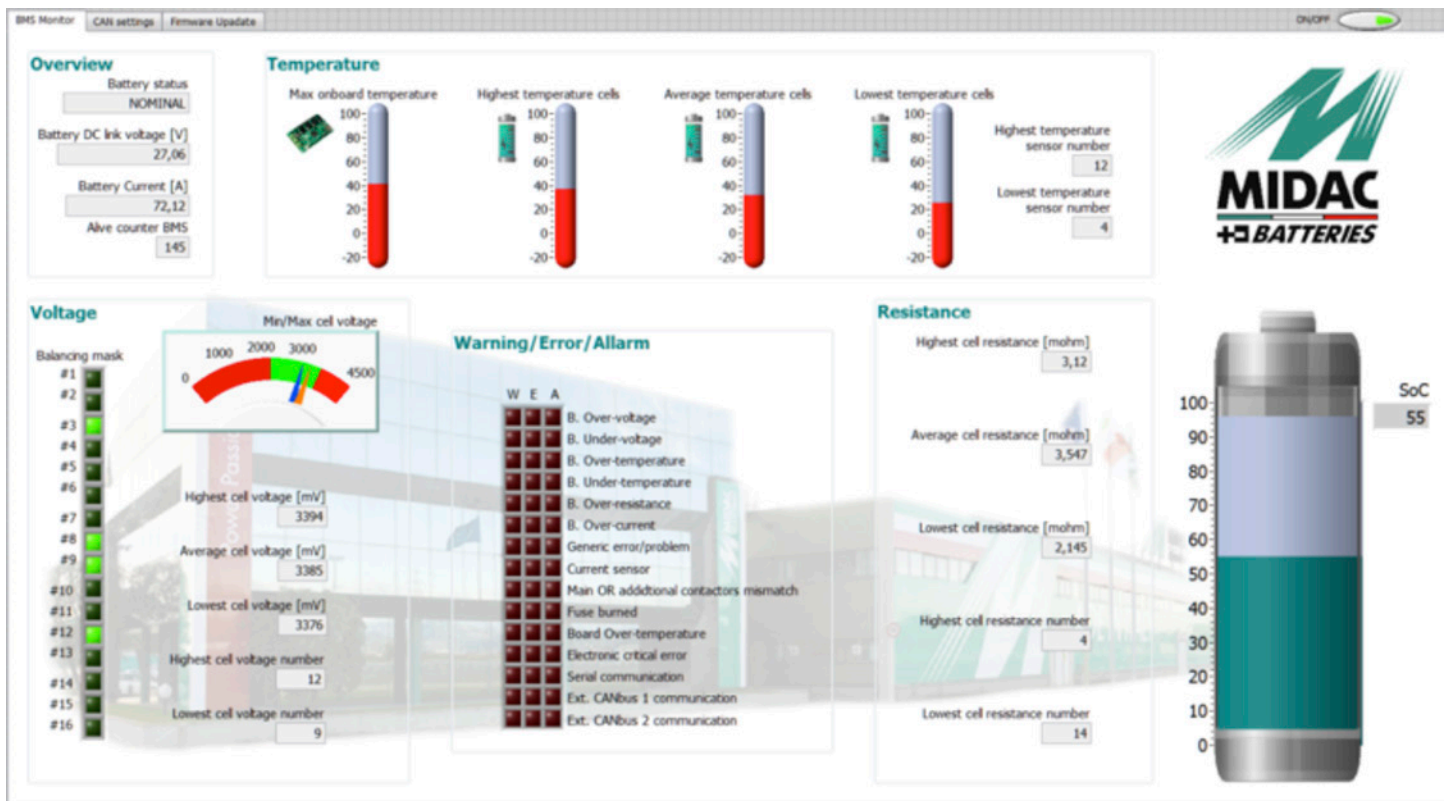
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Firmware Update:

The MBM can be updated via the CAN bus with the appropriate USB-CAN interface provided. It can be optionally selected the auto-start of the new firmware to a more rapid reprogramming.

Log:

This feature allows to record the activity of MBM and the measurements. This is useful for determining any of the battery abuse. Parameters such as the number of charge / discharge cycles performed, voltages, maximum current charge / discharge, temperatures, of the cell resistors, etc. They can be recorded for later evaluation and analysis.





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QUALITY AND FLEXIBILITY

MIDAC is very committed in providing the market with a wide range of products, ensuring premium quality and maximum flexibility to satisfy any requirement, also engineering customized solutions.

MIDAC'S management system is certified according to:

ISO 9001:2008, ISO/TS 16949:2009, ISO 14001:2004, BS OHSAS 18001:2007, SA 8000:2008



MIDAC SPA SPA HEADQUARTER, SOAVE, VERONA, ITALY

Unica realtà a produrre batterie avviamento, trazione e stazionarie in un singolo stabilimento produttivo, in 25 anni è diventata una delle aziende leader in Europa con prodotti distribuiti in tutto il mondo.

The only company that produces Automotive, Motive power and Stationary batteries in the same manufacturing plant, in less than 25 years it has become one of the leading companies in Europe and its products are sold worldwide.

MIDAC PRODUZIONE VERDE

Midac utilizza l'energia pulita prodotta dal proprio impianto fotovoltaico per la produzione di batterie e accumulatori, evitando l'emissione di 945 tonnellate di CO₂ ogni anno.

MIDAC GREEN PRODUCTION

Midac uses clean energy produced by your photovoltaic system for the production of batteries and accumulators, avoiding the emission of 945 tons of CO₂ each year.

