

CASE STUDY: LITHIUM ION BATTERIES

Solution: CAN/CANopen communication
Country: The Netherlands
Company: Super B
Summary: Super B batteries use IXXAT USB-to-CAN and IXXAT protocol software to handle communication between lithium ion batteries and a battery management system.



The effects

- ✓ Possible to connect batteries to CANopen-based Battery Management system.
- ✓ Better control and more efficient battery usage.

Power up!

IXXAT CAN technology enables Super B in the Netherlands to get even more power out of their state-of-the art lithium ion batteries.

As the world is trying to get rid of fossil fuels and migrate to greener energy sources such as sun and wind, one of the key issues is where to store the generated power. Batteries have long been the weak link in the chain, but as the demand increases, so does the development of battery technology. One of the companies driving battery technology forward is Dutch battery innovators Super B.

About the technology

Lithium ion batteries is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging. These batteries have been used for some time in consumer electronics such as computers and mobile phones. However, in more demanding applications such as ships, cars and airplanes, safety is often an issue. Since traditional ion batteries contain lithium cobalt dioxide or lithium manganese oxide, they can be hazardous, especially when damaged.

Therefore, Super B has developed a new breed of lithium ion batteries which uses lithium iron phosphate. Lithium iron phosphate batteries have two important advantages over other lithium ion chemistries – thermal and chemical stability, both of which improve battery safety.

Electronics enhance the performance

Despite the fact that lithium iron phosphate has a slightly lower energy density, Super B batteries still offer state-of-the-art performance. One of the main reasons is the proprietary electronics built into the batteries. A Battery Management System (BMS) based on CAN and CANopen has been developed in-house by Super B. This enables increased power outtake as the batteries can be connected together in a chain. Another important feature is the possibility to connect the batteries to external systems.



“The support from Twincomm and HMS has been quick and efficient which has been important for us.”

M.H. Doornekamp
CEO, Super B

IXXAT technology enables communication

To create a connection to “the outside world,” Super B uses the IXXAT USB-to-CAN from HMS Industrial Networks. This product allows the batteries to be connected to PC-based applications. Super B has trusted Dutch industrial communication specialists Twincomm to design a monitoring system — a part of the Battery Management System that monitors electrical distribution within the battery pack and warns for over- or under- voltage conditions as well as excessive current or temperature.

Apart from the IXXAT USB-to-CAN interface, Twincomm also utilized IXXAT protocol software as the basis for the operating system of the CANopen-based monitoring system.

How it works

The Super B Battery Management System has the ground-breaking capability to be able to adapt the balancing according to the battery charge and discharge current, as well as balancing individual batteries if they are connected in series via CAN-bus.

The system is also used to monitor the batteries’ state, calculate and report secondary data, protect the battery, control its environment, and balance it. This is done by transmitting battery alarms and information to the CAN interface so it can be viewed on a PC. The system makes it possible to handle overvoltage, under voltage, deep discharge, over charge and temperature control as well as complete battery performance history. Furthermore, the IXXAT bootloader enables the remote update of the multi-processor firmware inside the battery.

“The IXXAT protocol software stacks were especially well-suited for this project as they enable very quick re-connect-times, “ says Kurt van Buul, Project Manager for the Super B project at Twincomm. “The batteries are always on, even if they are not



Solar installations is a major market for Super B batteries, as is hybrid marine and service vehicles.

discharging energy, but the CAN-bus can go up and down, and therefore it is important that the re-connecting does not take a long time.”

Access to CANopen expertise

Super B is quite satisfied with the support and help and support they have received from Twincomm and HMS, and as they are advanced electronics experts, they have high demands. “We have very skilled programmers in-house for our own electronics systems, but we needed help to implement the CANopen parts,” says M.H. Doornekamp, CEO at Super-B. “Twincomm did a really good job implementing the system and the IXXAT USB-to-CAN product works great with very few issues. We have had to work a bit with the stacks to get them working the way we want, but we’ve found that the support from Twincomm and HMS has been quick and efficient which has been important for us.”

With the Battery Management System in place, Super B is facing a wide market within, for example, solar installations, hybrid marine and service vehicles, and with a massive demand for battery-driven applications, Super B is ready to power up.



Twincomm
de Olieslager 44
5506 EV Veldhoven
the Netherlands

T +31-40-2301.922
F +31-40-2301.923
E welcome@twincomm.nl

Embedded Networking Solutions

Find our complete program at www.twincomm.nl