



Lithium-Ion

More Power

ENERGY. ANYTIME. ANYWHERE.



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For over 35 years Victron Energy has been developing advanced electrical installations for many different types of applications. Varying from small solutions for end users to large industrial applications. Due to our expertise we know how to find the solution that fits your needs best. As a trendsetter within our markets we constantly aim to innovate. A perfect example is our new lithium-ion battery with its advanced control system.

Welcome to Victron Energy! Anytime, anywhere.



The world, our marketplace

A modern society without electrical equipment is practically unthinkable. Victron Energy realised this many years ago, which is why we now maintain an extended, world-wide network of dealers, distributors and service agents. The advantage for you? Thanks to this network we are able to offer you the best local service. We like difficult questions and challenges. Our strength lies in coming up with solutions for problems of which others would say that they are impossible to solve. We do this with full commitment, efficiency and we aim for results. It might sound perky, but we practically always come up with a suitable solution. This is one of the reasons for us not being afraid to say that our new Lithium-ion battery is the safest in the world.

RELIABLE, EFFICIENT AND SAFE

The market for battery systems is developing rapidly. There is a growing demand for efficient batteries with a large energy density. Victron Energy has a suitable response for this demand: the Victron Lithium-ion battery system. This is comprised of a very modern battery with an advanced control- and security system; the so-called Battery Management System (BMS). The BMS controls the charging and discharging, immediately takes action when certain (critical) values are exceeded and safeguards an efficient energy-transfer.



The advantages of a Lithium-ion battery

- High energy density: more energy with less weight
- High charge currents (short charge period)
- High discharge currents (enabling e.g. electrical cooking)
- Long battery life (up to six times the battery life of a conventional battery)
- High efficiency between charging and discharging (very little energy loss due to heat development)
- Higher continual power available

The advantages of a Victron Lithium-ion battery system

The above advantages are also applicable for the Victron Lithium-ion battery system. We also differentiate ourselves in several other ways.

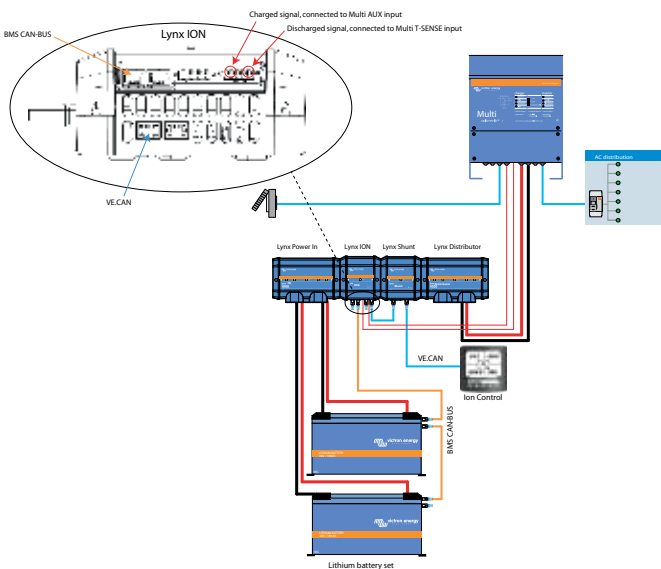
- For example, the Victron Lithium-ion battery system is a complete solution: a battery package with a smart control system included. Furthermore, the Victron Lithium-ion battery system is the safest Lithium-ion battery in the world. It is unique due to its two safety levels.
- The Victron Lithium-ion battery system is easy to install thanks to its modular build-up. No complicated wiring diagrams are required.
- Its possible to connect a display to the Victron Lithium-ion battery system. This makes detailed information about the battery status accessible.
- With the Victron Lithium-ion battery system you will survive the winter without any problems. A conventional lead battery discharges itself.



VICTRON LITHIUM-ION BATTERY SYSTEM

With the introduction of the Victron Lithium-ion battery system Victron Energy once again proves to be a trendsetter in its markets. The system is unique in several respects.

BLOCKDIAGRAM LITHIUM-ION BATTERY SYSTEM



Batteries with a Battery Management System

The base of the Victron Lithium-ion battery system is formed by individual 24V/180Ah Lithium-ion batteries. These are provided with a Battery Management System (BMS) which protects the battery on a cell level. The BMS collects crucial information about the battery state when the battery is in operation. This information is sent to a Lynx Ion module which monitors the system as a whole.

Energy distribution centre

The Lynx Ion is part of the energy distribution centre. This control centre forms the heart of the Victron Lithium-ion battery system. The control centre is comprised of four switched modules. Battery sets are connected to the Lynx Ion (up to four battery sets per module).

- The **Lynx Ion** has the most important role of the system. This module intervenes when certain values are exceeded.
- The **Lynx Shunt** measures in- and outgoing energy currents. This module keeps track of how full the batteries are. The main fuse is also placed in this module.
- The **Lynx Ion** 'instructs' the individual BMS's in the battery sets.
- The **Lynx Ion Out** is the final module. This is a clever fuse box which, among other things, contains electronics to detect which fuse is burned and which is still functioning properly. This information is sent to the display.

Safety

When designing the Victron Lithium-ion battery system, a lot of thought was put into the safety aspect of the system. Each battery is equipped with a BMS to monitor the performance on a cell level. To monitor the global performance we have chosen the Lynx Ion. This serves as a master unit and instructs the slaves (individual batteries) based on the information that it gets from the BMS's. This way the system as a whole can function at its best, ensuring a maximum return. The battery differentiates itself from other batteries thanks to its safety relay. This breaks the connection between the battery and the rest of the system when the Lynx Ion is unable to disconnect the external equipment due to complications.

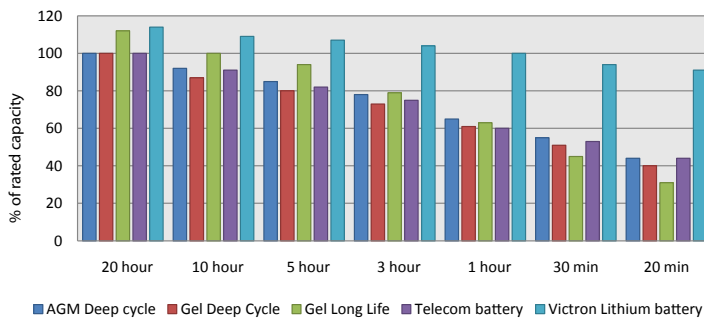
Measuring is knowing

The Lynx Ion enables the end user to get an understanding of the measured data (via the NMEA2000 Canbus-network). This can be done using an easy-to-use display:

- Battery sets are connected to the Lynx Ion (up to four battery sets per module)
- Time-to-go at current usage until the battery is empty
- Charge status of the battery
- Actual charge- and discharge current
- Actual battery voltage
- Actual internal battery temperature
- Actual individual cell voltages

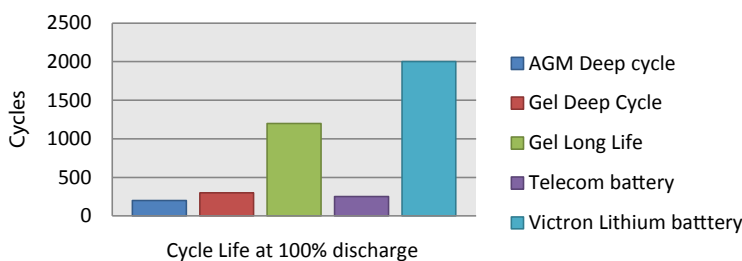
PERFORMANCE IN COMPARISON TO CONVENTIONAL BATTERIES

The advantages of Li-ion batteries in general and the Victron Lithium-ion battery system in particular are evident. At least just as interesting is the question how the Victron Lithium-ion battery system performs in comparison to conventional Victron batteries. Some illustrating facts:



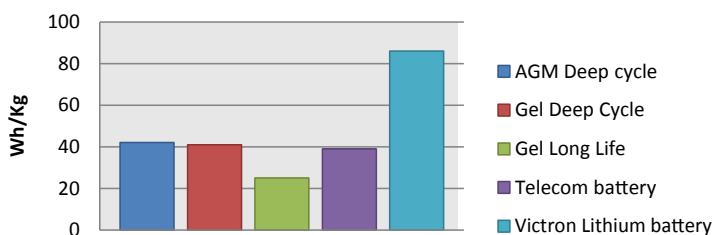
Effective capacity

A conventional lead battery should only be discharged up to a maximum of 50%. A higher percentage will decrease the battery life. A Li-ion battery can be discharged up to a maximum of 80%.



Battery life

Lithium-ion batteries can be charged and discharged much more often than equivalent conventional batteries. Thanks to its high cycle life the Li-ion battery will give you a much better return on investment.



Weight

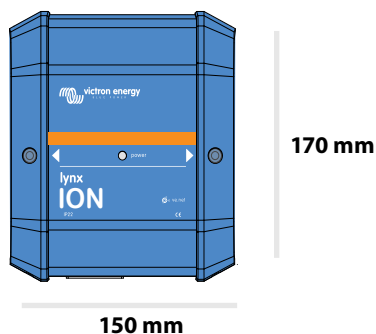
The weight of a Lithium-ion battery is less than half of that of an equivalent lead battery. This results in a large weight reduction. Less weight is attractive for end users (recreational sailors, campers, etc.) The Power-to-Weight ratio is the perfect tool to express this key Li-ion advantage. Example: the Victron Lithium-ion battery system weighs 55 kilos. In order to reach the same performance level you will need two 12/220Ah batteries, weighing 66 kilograms each. That's a total of 132 kilos.

| | AGM Deep Cycle | Victron Li-Ion |
|---|----------------|----------------|
| Efficiency between charge and discharge | 75% | 92% |
| Effective capacity @ 1C | 65% | 100% |
| Life cycle @ 100% discharge | 200 cycli | 2000 cycli |
| Power-to-Weight ratio | 42 Wh/Kg | 86 Wh/Kg |

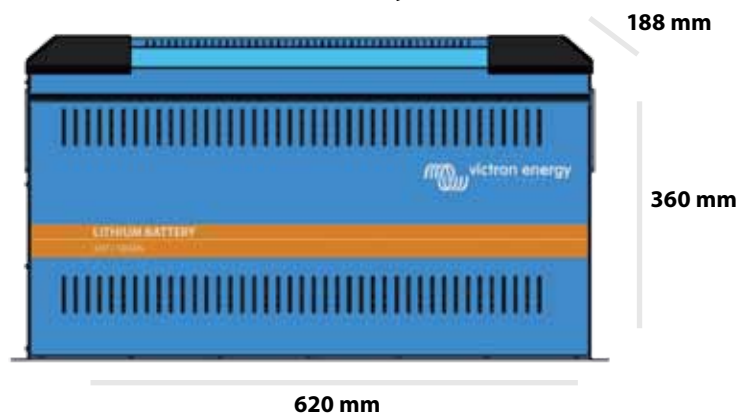
SPECIFICATIONS



Lynx Ion



Victron Lithium Ion Battery



Technical specifications Victron Lithium Battery

| | |
|---|---|
| Technology | Lithium iron phosphate (LiFePo4) |
| Nominal voltage | 26,4 V |
| Nominal capacity | 180 Ah |
| Nominal power | 4,75 KWh |
| Weight | 55 Kg |
| Power/Weight ratio | 86 Wh/Kg |
| Dimensions (LxWxH) | 620x188x360 mm |
| Charge cut-off voltage at 0.05C | 28,8 V |
| Discharge cut-off voltage | 20 V |
| Recommended charge/discharge current (0.3C) | 54 A |
| Maximum charge current (1C) | 180 A |
| Maximum discharge current (1.5C) | 270 A |
| Pulse discharge current (10s) | 1000 A |
| Cycle Life @80% DOD (0.3C) | 2000 |
| Series configuration | Yes, easy up to 2 (more in series on request) |
| Parallel configuration | Yes, easy up to 4 (more parallel on request) |
| Operating temp. charge | 0~45 °C |
| Operating temp. discharge | -20~55 °C |
| Storage temp. | -20~45 °C |

Victron Lithium Ion

More power



Why Victron Li-Ion?

- Simple, flexible installation
- NMEA2000 communication
- Safest on the market thanks to multiple charge- and discharge process checks
- BMS system easily linkable in lynx system



Victron Energy B.V. / De Paal 35
1351 JG Almere / The Netherlands
Phone: +31 (0)36 535 97 00
Fax: +31 (0)36 535 97 40
e-mail: sales@victronenergy.com
www.victronenergy.com

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