

# Li ion voltage chart

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Lithium-ion batteries play an important role in modern technology due to their outstanding performance and wide range of applications. Whether it is a portable electronic device, a Tesla electric car, or a home energy storage system, the voltage characteristics of Li-ion batteries are a key factor in their efficiency and stability. This article will explore the voltage characteristics of 12V, 24V, and 48V lithium-ion batteries in detail, providing an in-depth understanding of battery performance.

A lithium-ion battery is a battery that stores and releases electrical energy through the migration of lithium ions between the positive and negative electrodes. Its typical structure consists of a positive electrode (usually lithium cobalt oxide or lithium iron phosphate), a negative electrode (usually graphite) and an electrolyte. With high energy density, low self-discharge rate and long cycle life, lithium-ion batteries are widely used in cell phones, laptops, electric vehicles and energy storage systems.

The voltage of a lithium-ion battery is the potential difference between the battery terminals during charging and discharging. The change of voltage directly affects the energy output, charging efficiency and service life of the battery. Different types of lithium-ion batteries use different chemistries, resulting in nominal voltages at different voltage levels. For example, common lithium-ion batteries have a nominal voltage of 3.7V, but in applications, the cells are constructed into battery packs to meet higher voltage requirements.

Lithium-ion batteries are available in different voltage sizes, the most common being 12 volts, 24 volts, and 48 volts. Each API has a different voltage rating for a specific discharge capacity.

Typically, a battery voltage chart represents the relationship between two key factors - the battery's SoC (state of charge) and the battery's operating voltage. The following table illustrates a 12V lithium-ion battery voltage chart (also known as a 12-volt battery voltage chart).

When a lithium-ion battery is inserted into the charger, it continues to charge until it reaches 100% state of charge. The charge is then terminated and the Li-Ion battery is allowed to slowly discharge. In Li-Ion batteries, the relationship between SoC and voltage is relatively flat over the entire discharge range of the battery. This is a diagram of the state of charge of a Li-Ion battery:

A typical lithium ion battery voltage profile is a relationship between voltage and state of charge. When the battery is discharged and current is supplied, the anode releases lithium ions to the cathode to create a flow of electrons from one side to the other. The charge and discharge curves of lithium-ion batteries vary by type.

The voltage of a lithium-ion battery is not fixed; it changes according to several factors. These factors include ambient temperature, load conditions, and the state of charge and discharge of the battery. Understanding these variations is critical to the performance and life of the battery.

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**High Temperature:** When the temperature rises, the chemical reaction inside the lithium-ion battery accelerates and the battery voltage may rise. Although the battery may show better performance for a short period of time, prolonged use at high temperatures will accelerate battery aging, reduce safety, and may even lead to thermal runaway.

**Low temperature:** Under low temperature conditions, the internal resistance of lithium batteries increases, and the discharge capacity of the battery decreases, resulting in a significant decrease in voltage. Usually, the environment below 0°C will cause the voltage to be too low, affecting the power output of the battery, and even in extreme cases, it may lead to the battery can not be discharged.

**Light load:** Under a small load, lithium batteries can maintain a relatively stable voltage output. Due to the small current consumption, the voltage fluctuation of the battery is small and most of it can be kept within the normal working range.

**Heavy Load:** Under high load conditions, the voltage of the Li-ion battery will drop instantly due to the high current demand. In this case, the internal chemistry of the battery may not be able to keep up in time, resulting in a temporary drop in battery voltage. Although this is usually temporary, it can affect the health and life of the battery if it continues for too long.

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Web: <https://www.hollanddutchtours.nl/contact-us/>

Email: [energystorage2000@gmail.com](mailto:energystorage2000@gmail.com)

WhatsApp: 8613816583346

