

## ADVENTURE TOGETHER

# Van Electrical Basics

Your van's power system - explained simply

**Adventure Together Owner Guide:** This is a simplified educational resource created to help van owners understand basic electrical concepts. It is not an official Noovo, Victron, or Lithionics technical document. Equipment and configurations vary by van. Always refer to your manufacturer's documentation for specifications, settings, service, and repairs.

## The big picture

Your van gets electrical energy in three basic ways. Think of each charging source as making a deposit into your house-battery account.

| SOLAR                                | DRIVING                                                                         | SHORE POWER                                                      |
|--------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------|
| Sunlight helps charge the batteries. | The alternator / charging system can help recharge while the engine is running. | Plugging in supplies outside power and can charge the batteries. |



## HOUSE BATTERIES

Store energy until your van needs it.

## The easiest way to think about it

| DEPOSITS                                     | WITHDRAWALS                                                                                 |
|----------------------------------------------|---------------------------------------------------------------------------------------------|
| Solar<br>Driving / alternator<br>Shore power | Lights<br>Refrigerator<br>Water pump<br>Outlets & appliances<br>Heating / cooling equipment |

# Meet the major components

## SOLAR PANELS

**What it does:** Turn sunlight into electricity that helps charge the house batteries.

**Think of it as:** A slow battery charger powered by the sun.

**Why you care:** Bright sun usually means more charging. Shade, clouds, season and time of day can reduce it.

## HOUSE BATTERIES

**What it does:** Store electricity used by the living area of your van.

**Think of it as:** Your electrical savings account.

**Why you care:** Everything you run makes a withdrawal. Charging sources make deposits.

## SOLAR CHARGE CONTROLLER

**What it does:** Manages electricity coming from the solar panels before it reaches the batteries.

**Think of it as:** The traffic controller between the solar panels and batteries.

**Why you care:** It normally works quietly in the background, but it becomes useful when troubleshooting solar charging.

## INVERTER / CHARGER

**What it does:** Converts battery DC power into household-style AC power and, in many systems, also charges the batteries when shore power is available.

**Think of it as:** A translator between battery power and household power.

**Why you care:** If AC outlets or shore charging are not behaving as expected, this is one part of the system involved.

## ALTERNATOR / DRIVING CHARGE

**What it does:** Uses power produced while the engine is running to help charge the house batteries.

**Think of it as:** Charging while you drive.

**Why you care:** A drive can put energy back into the battery bank; actual charging depends on the equipment and current loads.

# 12V vs. 120V - the part that confuses everyone

Your van has two kinds of electrical power. You do not need to be an electrician - just understand that different equipment may use different sides of the system.

## 12V DC - BATTERY SIDE

Common examples can include lights, water pump, refrigerator / controls and fans.

Think: the van side of the electrical system.

## 120V AC - HOUSEHOLD SIDE

Common examples can include household-style outlets, microwave and other AC appliances.

Think: household-style electricity.

## Shore power

When you plug the van into campground or household power, shore power can supply AC loads and charge the house batteries through the van's charging system. Available power is limited, so several large loads running at once can exceed the connection or system limit.

## Quick terms

**Volts (V):** Electrical pressure.

**Amps (A):** How much electrical current is flowing.

**Watts (W):** How much power something is using.

**Amp-hours (Ah):** One way of describing battery capacity.

**State of Charge (SoC):** How full the battery is, usually shown as a percentage.

**Breaker / Fuse:** A safety device that interrupts power if too much current flows.

# Something isn't working - what do I check first?

Start simple. Try to determine whether the issue is power coming IN, energy stored in the batteries, or power going OUT to an appliance.

**1**

## **LOOK AT BATTERY STATE OF CHARGE**

How full are the house batteries? Is the percentage rising, falling or staying the same?

**2**

## **CHECK WHAT SHOULD BE CHARGING**

Solar? Driving? Shore power? Confirm the source you expect is actually available.

**3**

## **CHECK YOUR LOADS**

Are several large electrical loads running? You may be using power faster than you are replacing it.

**4**

## **CHECK THE DISPLAY / APP**

Look for warnings, disconnected equipment, unusual readings or a charging source showing little or no input.

**5**

## **IF ONE ITEM DOESN'T WORK**

Think fuse, breaker, switch or the individual appliance before assuming the entire electrical system has failed.

## ADVENTURE TOGETHER

# Meet Your Electrical System

Victron + Lithionics explained in normal language

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## First: these pieces have different jobs

The names can make an electrical system sound complicated. The easiest way to learn it is to give each component one job and one memorable analogy. Your van may not contain every component listed here, and exact equipment varies by build.

### VICTRON MULTIPLUS - The Translator

**What it does:** Combines inverter and charger functions: it can turn battery DC power into AC power for household-style loads and charge batteries from an AC source when the system is configured for it.

**Think of it as:** The translator between battery electricity and household electricity.

**Why you care:** It is involved when you use AC power from the batteries and when the batteries are charging from shore power.

### CERBO GX - The Communication Hub

**What it does:** Connects to compatible system devices and brings their information together for local or remote monitoring and control.

**Think of it as:** The coordinator gathering reports from everyone.

**Why you care:** The Cerbo does not necessarily create every number you see; it can display information received from connected devices, including battery state of charge.

### GX TOUCH / DISPLAY - The Dashboard

**What it does:** Provides a visual interface for information from the GX system.

**Think of it as:** The dashboard for the electrical system.

**Why you care:** It gives you one place to see what connected equipment is reporting.

# The components that keep score and protect the battery

## BATTERY MONITOR / SHUNT - The Accountant

**What it does:** Measures battery voltage and current; depending on the device and system, it can calculate values such as state of charge and time remaining.

**Think of it as:** The accountant tracking deposits and withdrawals.

**Why you care:** It helps you understand how much energy is going into or coming out of the battery system.

## LITHIONICS BATTERY - The Bank

**What it does:** Stores electrical energy for use in the living area of the van.

**Think of it as:** Your energy bank account.

**Why you care:** The amount of stored energy determines how long you can run loads before you need to recharge.

## LITHIONICS BMS - The Bodyguard

**What it does:** Monitors and protects the battery system. Lithionics describes its NeverDie BMS as able to disconnect the battery from the rest of the system when potentially harmful conditions are detected.

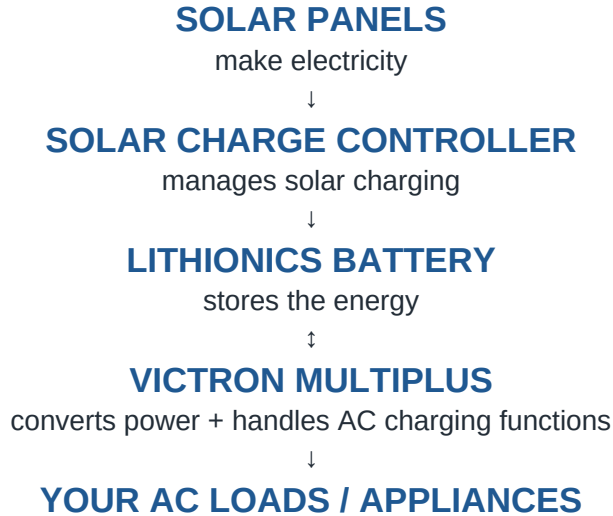
**Think of it as:** Security for the battery.

**Why you care:** The BMS is a protection system. Do not bypass it or change technical settings based on a simplified owner guide.

## A helpful distinction

**Cerbo GX = displays / coordinates information.** Battery monitor, BMS, inverter/charger and other connected devices may be the sources of the measurements and status information you see.

# Who does what?



## Meanwhile...

|                                |                                      |
|--------------------------------|--------------------------------------|
| <b>BATTERY MONITOR / SHUNT</b> | Keeps score                          |
| <b>CERBO GX</b>                | Collects and coordinates information |
| <b>GX TOUCH / DISPLAY</b>      | Shows the information to you         |

## What this guide intentionally does NOT cover

Programming, charge-voltage settings, BMS configuration, wiring, fuse sizing, firmware changes or repair procedures. Those are configuration-specific and should come from the manufacturer, installer or qualified service technician.

## Manufacturer references

For technical details, use the current Victron Energy and Lithionics Battery manuals for the exact components installed in your van. This guide is meant to help the terminology make sense - not replace those manuals.