

A white Mercedes-Benz Sprinter van is parked on a dirt road in a desert landscape. The van is shown from a front-three-quarter view, highlighting its large headlights, grille with the Mercedes-Benz logo, and side windows. The background features a vast, arid landscape with sparse vegetation and distant mountains under a dramatic, cloudy sky at sunset or sunrise. The sun is low on the horizon, casting a warm glow over the scene.

# VAN BUILD

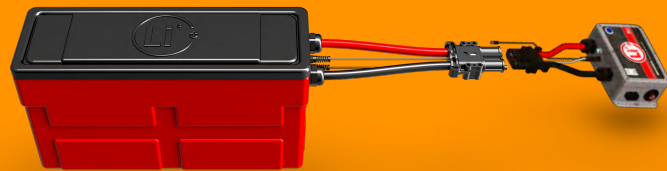
## ELECTRICAL SYSTEM



# ELECTRICAL SYSTEM



## Section 01 OVERVIEW



## Section 02 BATTERY + BMS



## Section 03 SOLAR

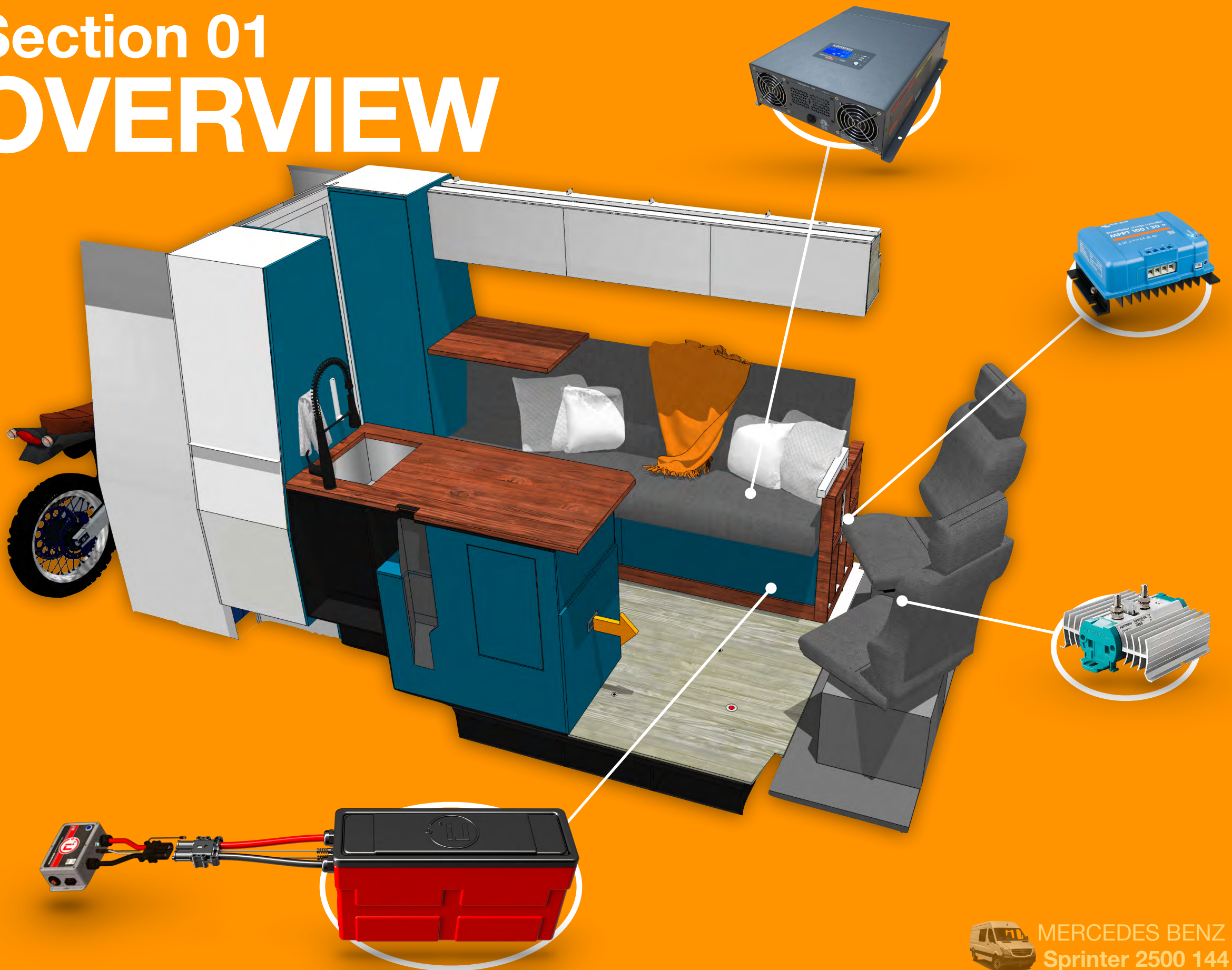


## Section 04 INVERTER / CHARGER



## Section 05 BATTERY RELAY

# Section 01 OVERVIEW



MERCEDES BENZ  
Sprinter 2500 144



# 01 Overview



## System Design Assumptions:

Load, Summer: 2.7 kW-hr

Load, Winter: 1.7 kW-hr

Load, Inverter: 1.8 kW

Sunshine, Summer: 8 hr

Sunshine, Winter: 5 hr

## System Design Capacity:

Battery: 400Ah (4.8 kW-hr)

Solar Panel, Summer: 400 W (3.2 kW-hr)

Solar Panel, Winter: 400 W (2.0 kW-hr)

Inverter: 2.0 kW



Kitchen cabinet, adjacent to sliding door. Cabinet houses: refrigerator, water pump, and 120VAC receptacle for inductive cooktop.



View from sliding door, past kitchen cabinet, to sofa-bed; which houses battery, solar controller, inverter and all associated fuses / busbars. Overhead cabinet contains fuse + breaker box.

# Section 02 BATTERY

+

# BMS



LITHIONICS  
12V400A-5D-DIN-Module

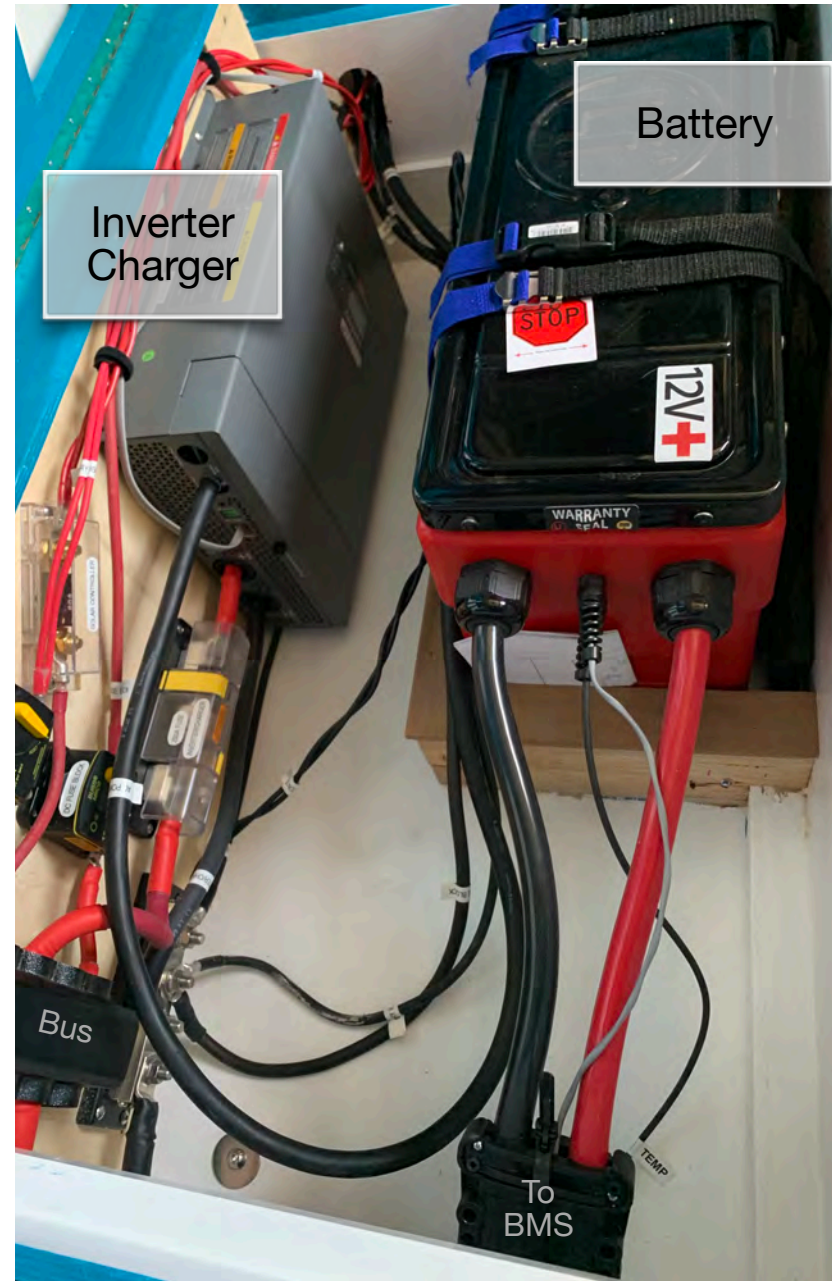
LITHIONICS  
Advanced-Series Never-die BMS  
With Bluetooth & 23-Pin Ampseal



## 02 Battery + Battery Management System



Battery compartment with 20psi foam mat and battery securing straps. Located below sofa-bed, behind driver, & away from van exterior (safeguarding against collision-related damage).



Battery compartment with equipment. Inverter/Charger on the top left, 400Ah Lithionics battery (120 lbs) to the right, external BMS in adjacent cabinet (not shown), main bus bars lower left.



User interface of the "Li3 Battery" app. Enables user to monitor system parameters. In the above case, battery is in bulk charge and sky is overcast (low power input of 53.2W).

# Section 03

# SOLAR



VICTRON ENERGY  
SmartSolar MPPT 100 | 30



RENOGY  
Eclipse Monocrystalline Solar Panels



## 03 Solar Panels + Controller



Solar controller on outside of sofa bed, directly behind driver's seat. The black and yellow breaker isolates panels from controller. Deliberately, there is NO switch between controller and battery.



On the roof, (4) 100-amp solar panels are connected in series. Series, not parallel because Renogy Eclipse panels have bypass diodes, which allow current to flow, even in partial-shade condition.



UI of the "VictronConnect" app, which allows user to program the solar controller and to monitor system parameters. In the above case, battery is in float.



# Section 04 INVERTER CHARGER



XANTREX Freedom XC 2000



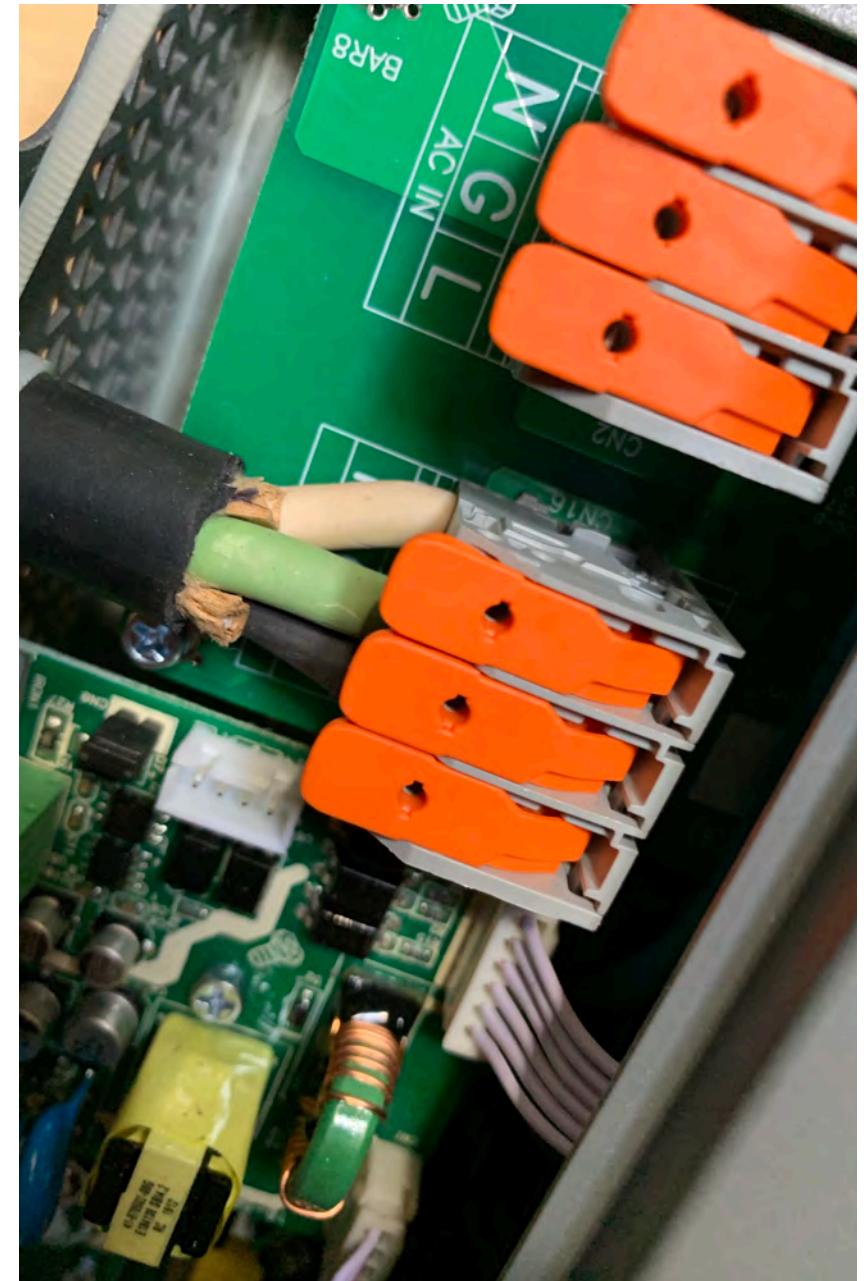
## 04 Inverter / Charger



Within the kitchen cabinet is the 120VAC receptacle for inductive cooktop. Note: the inverter is 2kW pure sine wave and weighs only 16 lbs. It is located in sofa bed (not shown).



Remote panel for Xantrex Freedom XC 2000 installed overhead, in cab headliner. Inverters are best kept "OFF" when not in use. Thus, a highly visible location (such as this) is ideal.

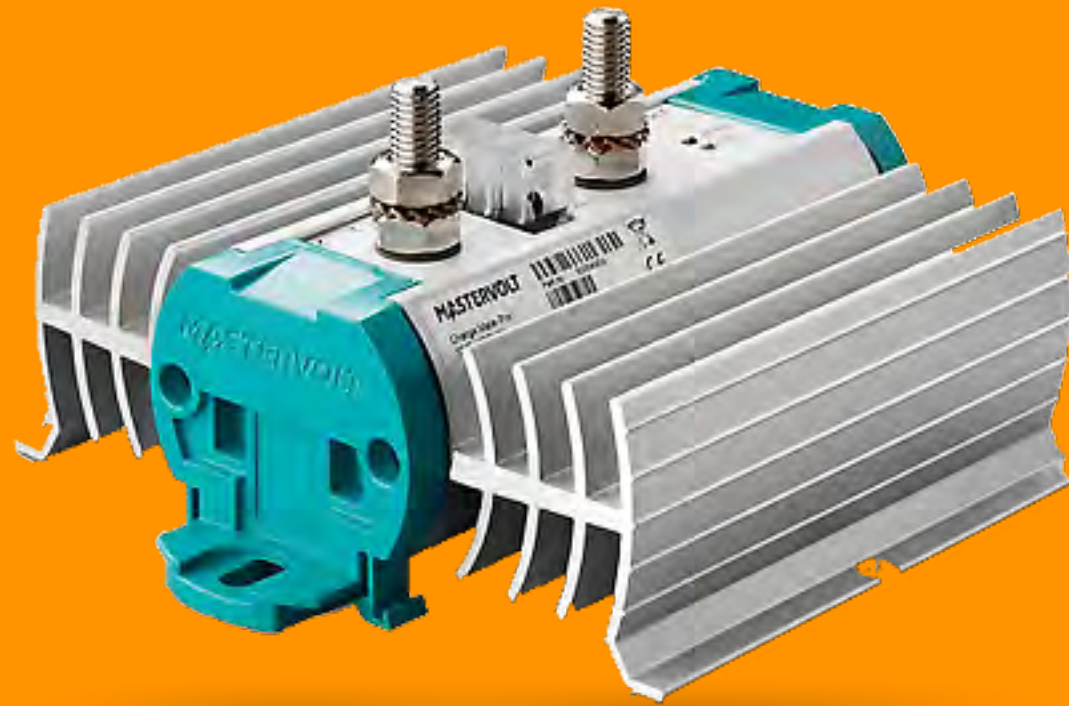


Looking inside inverter / controller. The top "N-G-L" is for incoming shore power connections (not installed). Below are the "N-G-L" connections for the 120VAC supply to breakers.



# Section 05

# BATTERY RELAY



MASTERVOLT  
Charge Mate Pro40



## 05 Battery Relay (Isolator/Combiner)



Battery relay (isolator/combiner) is located below driver's seat. Vehicle's fuses and chassis grounding studs (M6, 0.25") are also below seat.



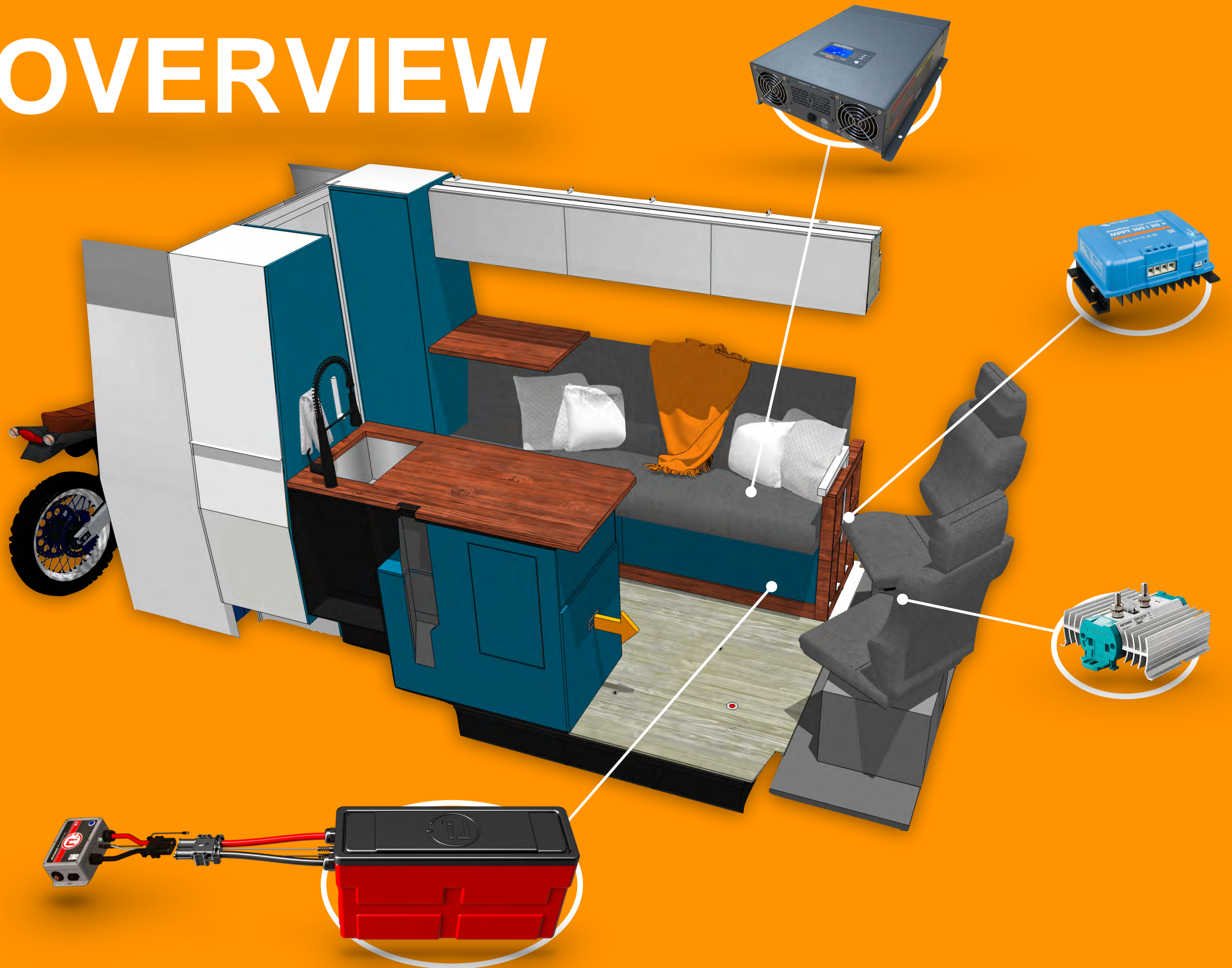
Close-up view of final mounting for Charge Mate Pro40 in seat pedestal. Note: this unit limits current to 40amps, per Mercedes recommendations.



Custom switch positions: UP allows "jumpstarting" of starter battery from leisure battery, MIDDLE charges leisure battery, and DOWN isolates the batteries (ideal for vehicle maintenance event).



# OVERVIEW



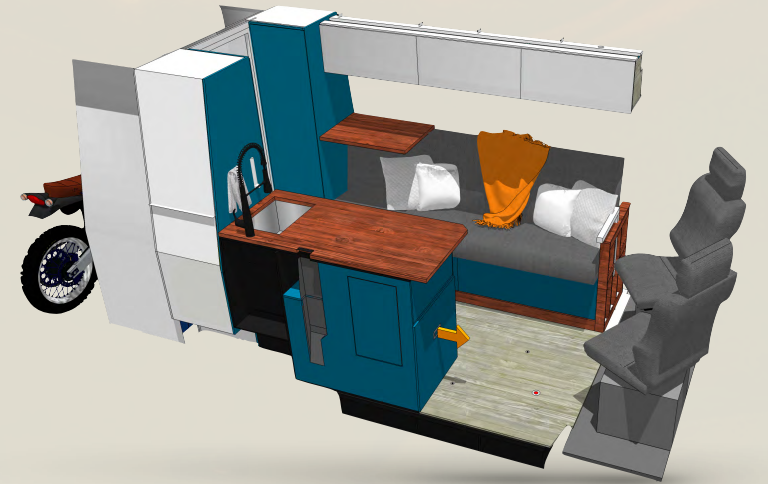


# About the Author



## Heather Maslowski

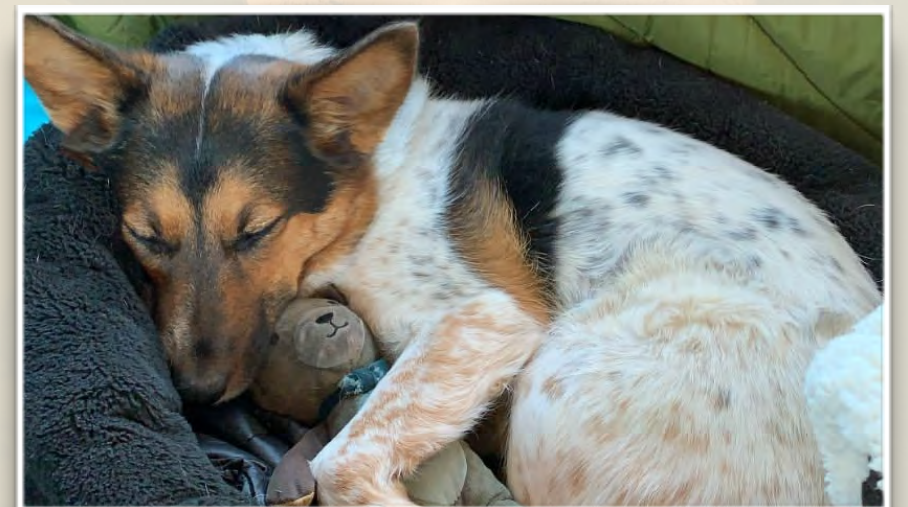
Raised in beautiful California, and fascinated with architecture, it was always her dream to live in a (tiny) space of her own design.



Despite living in a studio apartment in the heart of Silicon Valley, with no tools and no build experience, she began drawing a camper van for her and her rescue pup, Stevie Nips.

The abundance of “how-to” videos and the thorough engineers at Lithionics gave her peace-of-mind.

So, she bought a cargo van, joined a community build space, and got to work; confident that her camper-van would be unique, beautiful, functional, and, above all, safe.







ONWARD

