

Here's what's needed for a safe lithium installation using a 2kW or 3kW inverter.

More and more people want to use their campervans and motorhomes "off-grid". Thanks to lithium batteries, going off-grid is easier than ever, at least as far as electrical power is concerned.

At RoadPro, we've been supplying and installing lithium systems since 2015, so we know what works. But there's no such thing as a "one size fits all" lithium battery installation. Some people might only want to run 12V equipment such as lights, pump and, maybe, a TV. Others might be spending all their time off-grid and need to run all their 240V appliances as well. Everyone's needs are different, with different equipment required.

Different lithium batteries perform in different ways and have their own features. They have different capacities and physical sizes, discharge and charge at different rates, can be connected in parallel in different quantities and some have built-in heaters. Make sure that the batteries in your motorhome are suitable.



1, 2, 3 or 4 Lithium Batteries
(See 12V Lithium Leisure Batteries)

To run powerful 240V appliances from a 2kW or 3kW inverter requires a lot of energy, so you'll need to use batteries that are up to the job. Tempra batteries from NDS and Poweroad Infinity batteries, with a discharge rate of 150A, are what we recommend.

Choose the number of batteries according to how long the vehicle will be off-grid, what charging will be available - solar? - and what appliances will be used - induction hob? coffee maker? hair drier? One crucial factor is the available space. We have several batteries that are 190mm high, so that they fit under some vehicle's seats.

Use our online energy calculator to help work out what capacity the batteries need to be: <https://rpotech.co.uk/>

One of the main advantages of lithium batteries is the speed at which they can be charged. But, to ensure that they are charged correctly, the correct equipment is essential. We recommend the products shown here.



1 x Battery-to-Battery Charger
(See Battery-to-Battery DC-DC Chargers)

To ensure correct charging, you must have a B2B charger which is installed between the starter and leisure batteries. Which model you choose depends on various factors including how fast you want the leisure batteries to be charged. We have chargers with outputs from 30A to 90A and all our chargers are compatible with lithium batteries.

For a 200Ah installation, we recommend a charger with an output of 40A-80A.



1 x 240V Battery Charger
(See Battery Chargers)

If your vehicle already has a 240V charging system built in, it can probably be used to charge lithium batteries, as long as the charging voltage doesn't exceed 14.4V. This can happen if the charger has a "desulphation" mode and a charger with this feature should not be used unless it has a specific lithium mode as well. However, if the voltage is much less than 14.4V, the lithium batteries won't ever be fully charged and won't last as long as if the charger had a dedicated lithium battery setting. So, for maximum performance and useful life, a dedicated 240V charger is always preferable.



1 x Solar Power set-up
(See Solar Power)

Solar panels are a great way to charge batteries and we recommend getting as many Watts as possible on the roof. We have a range of panels, rigid and semi-flexible in a variety of sizes.

Panels need regulators and we only supply MPPT models which can increase the amount of energy going into the batteries by as much as 30%. They make a big difference, especially in overcast weather or when conditions are less than ideal.

(Click on the pics for more information)

Installing a lithium battery in such a way that it performs to its maximum capability and lasts for many years requires a different approach to lead-acid batteries. On this page, you can see what's needed.



Cable & terminals



Fuses & fuse holders



2 x Bus bars / Joining boxes (U0063)



1 x D+ Simulator (C85179)



Temperature sensors



1 x Energy Meter (C9454)
or Battery computer (C8462)



1 x 2kW (C7688) or
3kW (C7689) inverter



1 x Inverter
remote control (C7658A)



1 x Cliveway (C7679A) OR
1 x RCD (C8474)

If a B2B charger or an inverter is being installed, they'll need cable that can carry the current. For B2B chargers, we recommend 15mm cable as a minimum, depending on the charger being used and the length of the cable run. For 2kW or 3kW inverters, we recommend 35mm or even 50mm cable depending on the distance to the leisure battery. And terminals are important too!

Fuses are essential. They have to be installed in the appropriate places and be suitably rated.

We have found that - especially when there connected in parallel - lithium batteries work better when connected to bus bars or joining boxes. In fact, some batteries won't work at all unless bus bars or joining boxes are used. This method also makes it easier to connect other items and ensures a neat finish.

D+ is a 12V signal from that is only present when the engine is running. When installing a B2B charger in a vehicle with a "smart" alternator, it's essential to connect the unit to D+. Unfortunately, in some vehicles it's very difficult or even impossible to find a D+ signal and a D+ simulator can save hours of looking for one. This Votronic unit does the job perfectly..

Temperature sensors help to ensure correct charging of lithium batteries and are available for most type of charger. They are optional on some and essential on others. Some chargers come with a sensor, some don't.

Even if a lithium battery has Bluetooth and connects to an app, we always recommend the use of a battery monitor with a shunt. This is because app-based monitors can give inaccurate and misleading readings. A battery computer will be more accurate and reliable.

The inverter converts 12V DC to 240V AC and which one you need depends on what appliances are going to be powered by it. Find the Watt ratings of the appliances and the highest will determine the inverter required.

For example, a coffee maker may be rated at 1,600 Watts, which needs a 2kW inverter.

If the inverter is only to run an e-bike charger rated at 160W, a 400W inverter will do the job. For an induction hob rated at 2.4kW, use a 3kW model but make sure the wiring being used is the right gauge.

If the inverter is installed out of sight, a remote control is a useful thing to have.

If an inverter is connected to all the 240V sockets in the vehicle, it's necessary to use an RCD. (If appliances are connected directly to the socket/s on the inverter, an RCD is not required.)

If the inverter has a built-in priority switch, the output can be connected to an RCD. If it doesn't (NDS 3,000W for example), you'll need a Cliveway.

The Cliveway is designed to ensure that an inverter installation is "as safe as houses". It incorporates a switch so that 240V is automatically supplied from the inverter when mains hook-up is not available.

All the products shown here can be found on our website, along with specifications, further details and instruction manuals.

www.roadpro.co.uk