Bailey Unicorn S4 Barcelona adding a Second Battery and an Inverter

A few months ago I decided to replace my 12V AGM battery with a Lithium one. (A variety of reasons, discussed elsewhere but overall in my opinion well suited to Off Grid Rallying) Recently I decided to fit an Inverter mainly to use the Microwave on 12V. My new battery, a 100A one with Bluetooth module, was made by Renogy a make I had settled on for value for money and reputation, so I decided to get a 2000W Renogy Inverter. I then discovered that although the Microwave was only an 800W one, it could take up to 160A on start-up and a 100A battery would only deliver 100A. So after a lot of investigation I found that I needed 200A of battery power to feed the system.
My decision then was to get another 100A Renogy battery and wire it in parallel with the existing one, easy I thought until I found out that in the few months since I had bought it, they had discontinued it and brought out a replacement!! More investigation and although many said they had to be identical and of the same age, others thought it would be OK. So I bought the latest 100A Renogy battery with Bluetooth.

← Original Battery

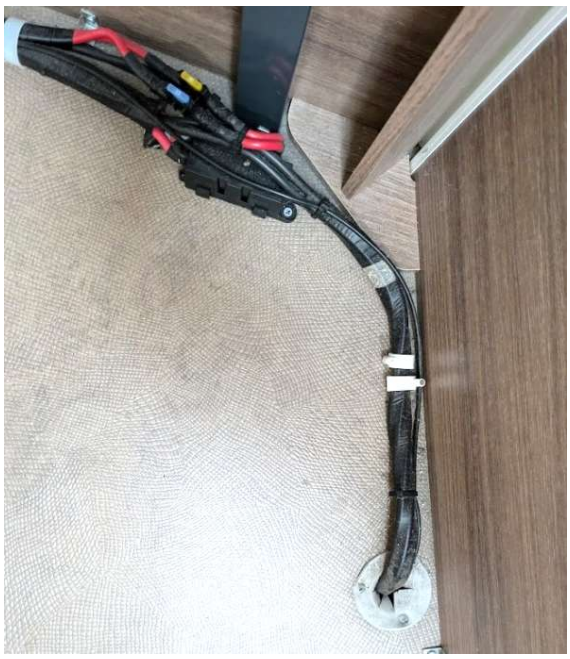
Second Battery →

Renogy 2000W Inverter with remote on/off switch

So, now, where to put the new components and what extra hardware was required to connect it all together and interface it into the existing caravan wiring. One thing I had decided was to keep the original battery in the underfloor housing and to make it all easily removable when selling the van.
Position of the Second Battery and Inverter fairly easy on the Barcelona, under the double bed next to the original battery position and where the wiring to and from the original battery was.

Under double bed in Barcelona

Mover wiring

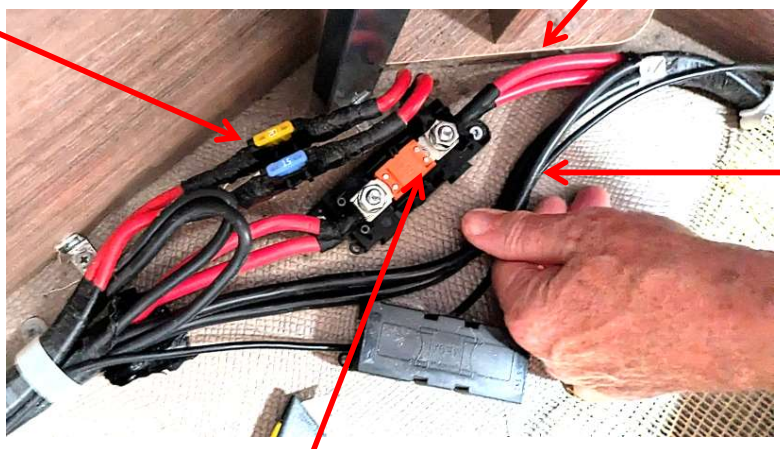


Existing Caravan wiring to original underfloor Battery

Original wiring to battery and caravan

Two fused charging feeds
1 from 240V Mains Charger
2 from Solar Charger

+ve to/from underfloor Battery

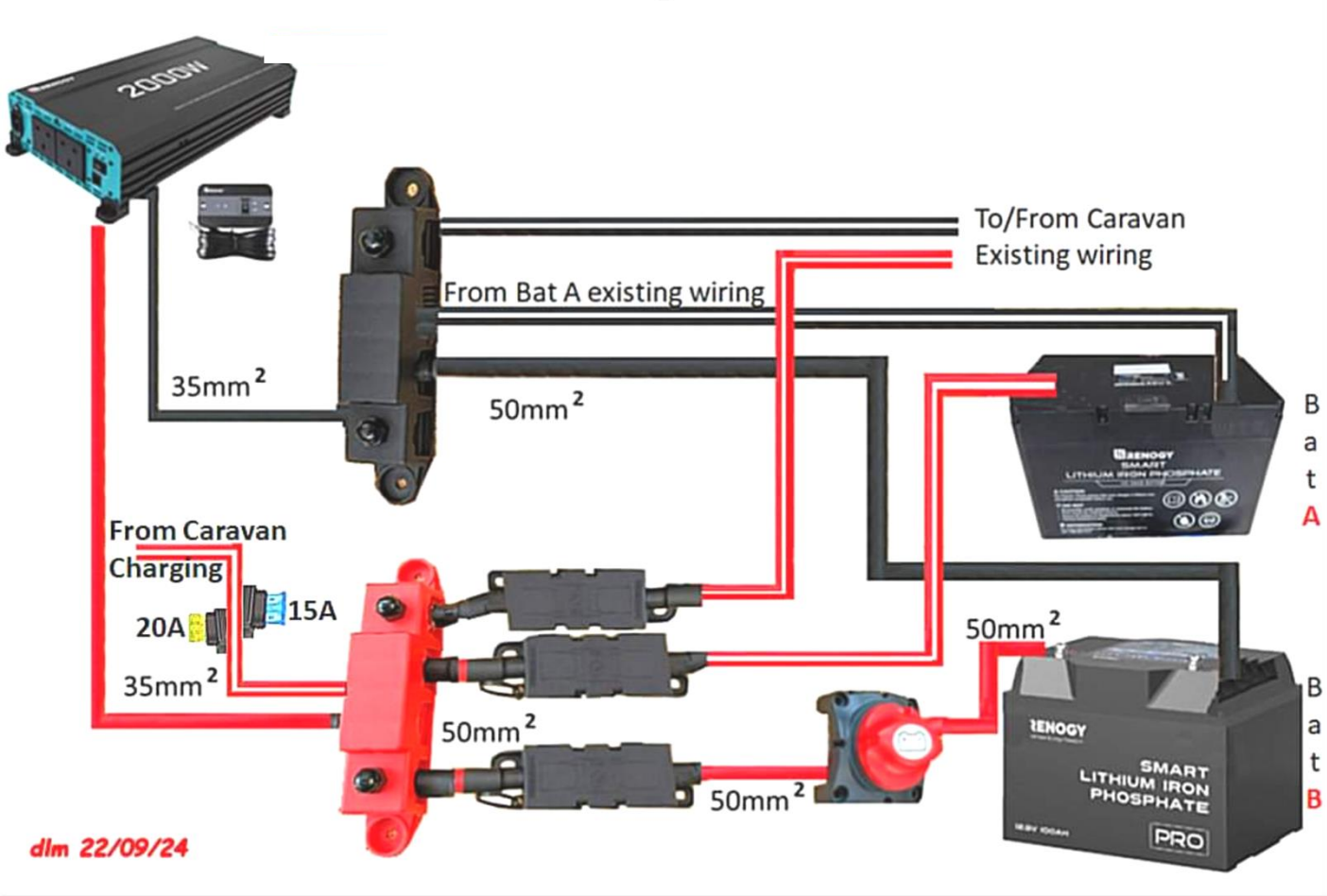


-ve to/from Battery

Original Main Caravan 12V Fuse

Planning and Installation

One of the main things to consider in wiring two batteries in parallel is to have the same cable lengths and capacity (size) between them. In this case this was not possible if keeping the original battery under the floor, so I placed the second battery as close to the original as possible and used large capacity wiring, while using the original caravan wiring and 150A fuse. (see planning diagram)

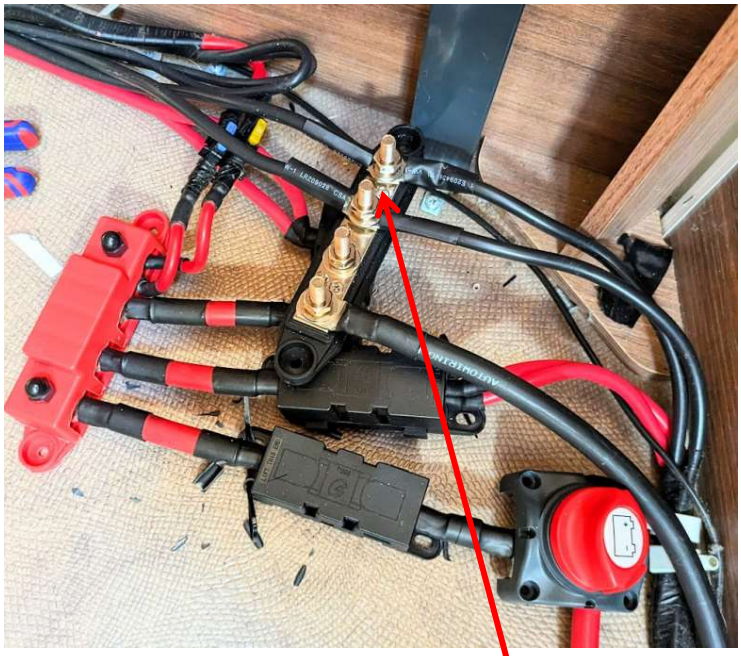


+ve and –ve Busbars
To connect wiring together

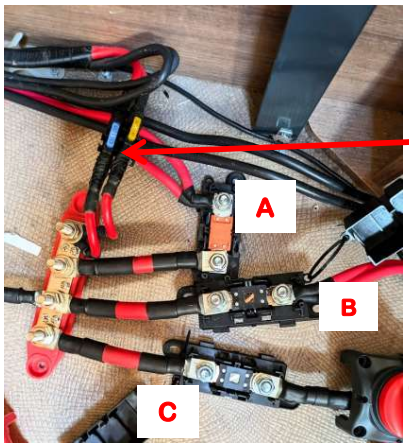
Mega Fuse Holders
and appropriate fuses

12v Battery Switch
Isolator

I used 50mm² cable (345A) for all the second battery wiring to the Busbars and 35mm² cable (240A) for the Inverter wiring. Some say over capacity but I think it is important to avoid voltage drop even over short distances..



Original Caravan black –ve cables cut and joined at –ve Busbar



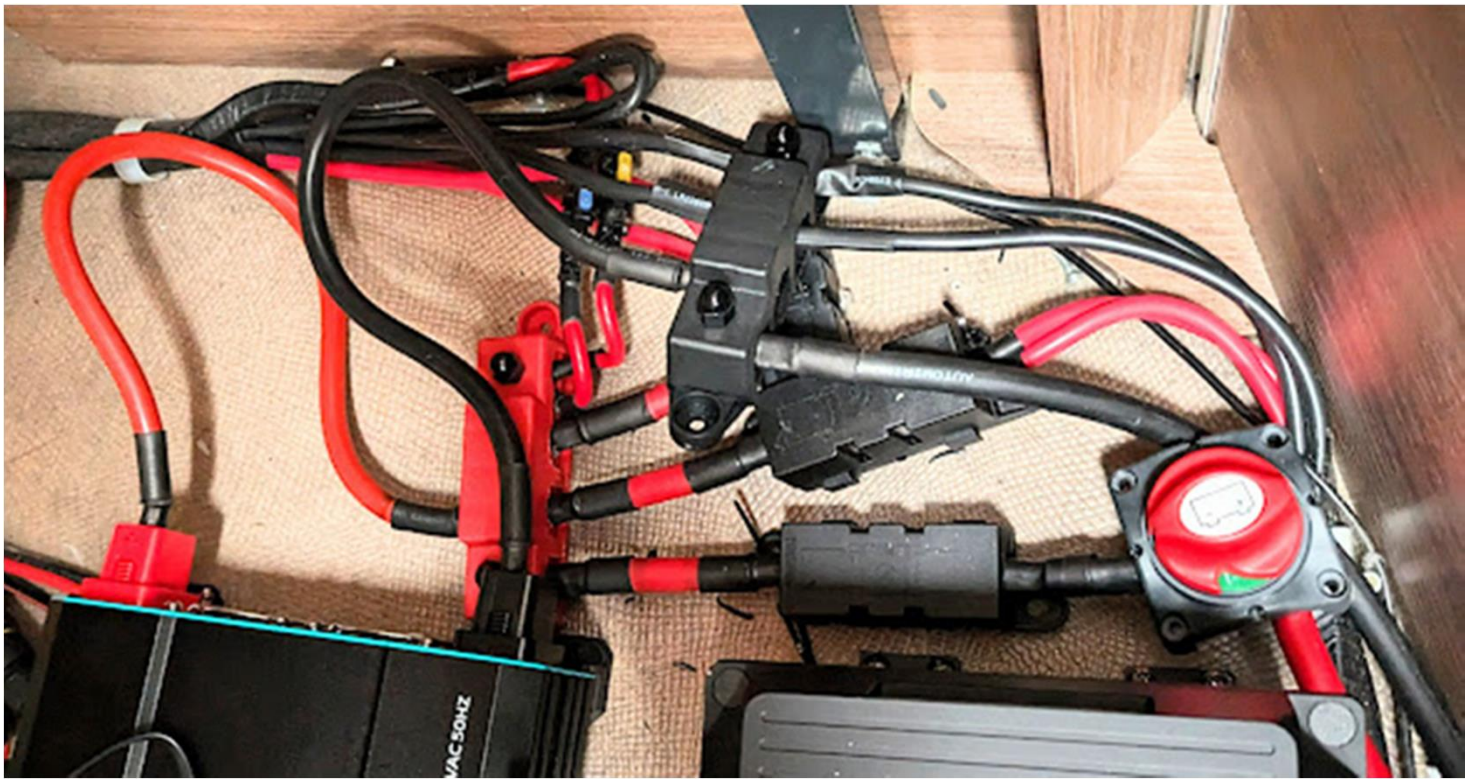
Fuses

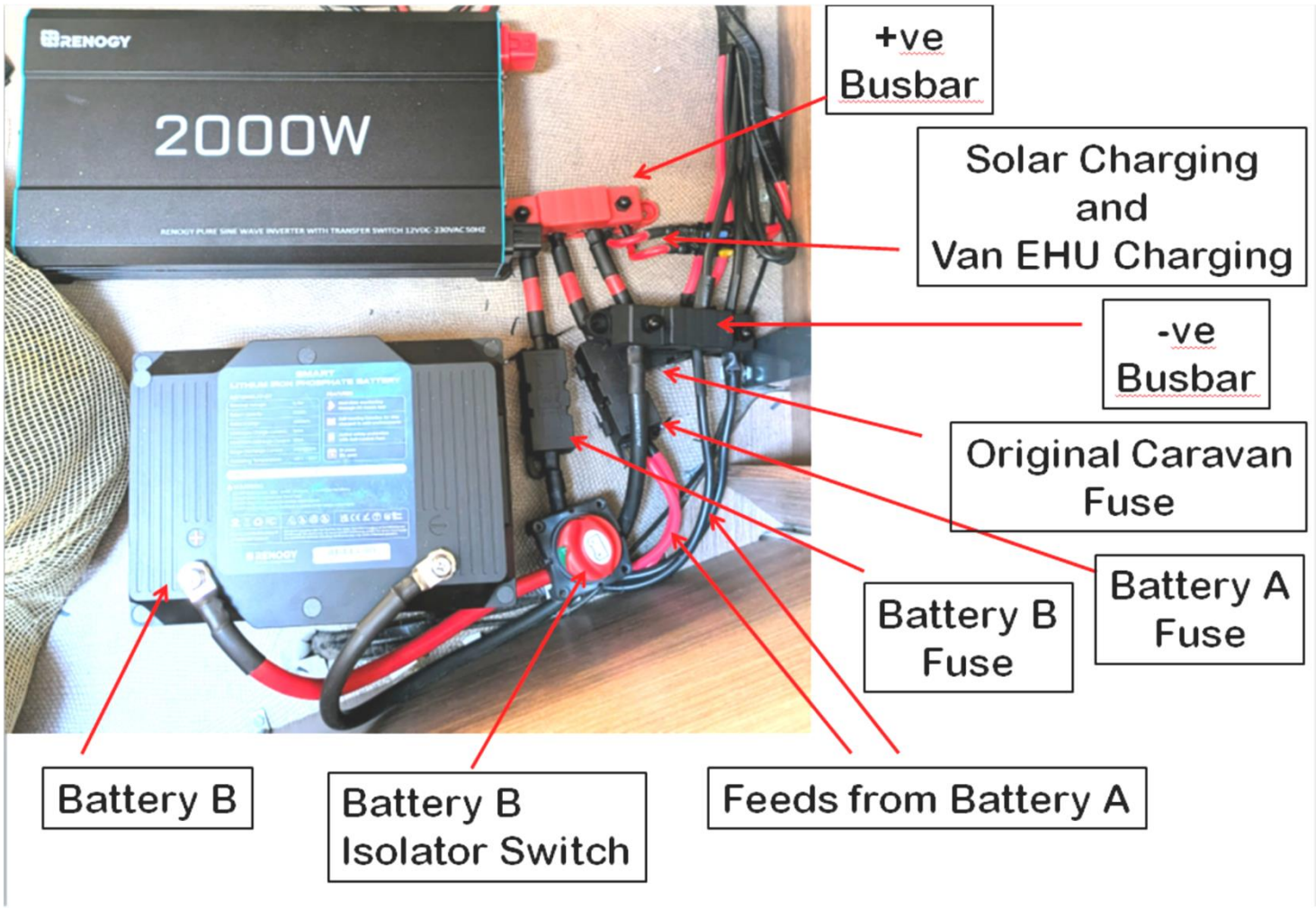
15A and 20A original Solar and Mains Charging

A 150A original Caravan +ve Fuse

B 125A Battery A, Fuse

C 125A Battery B, Fuse

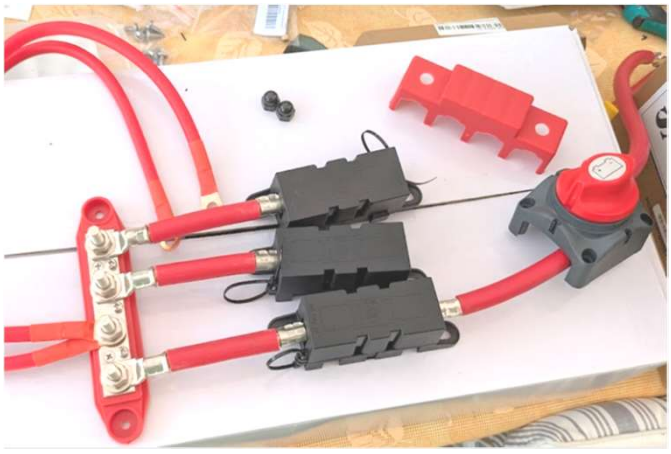


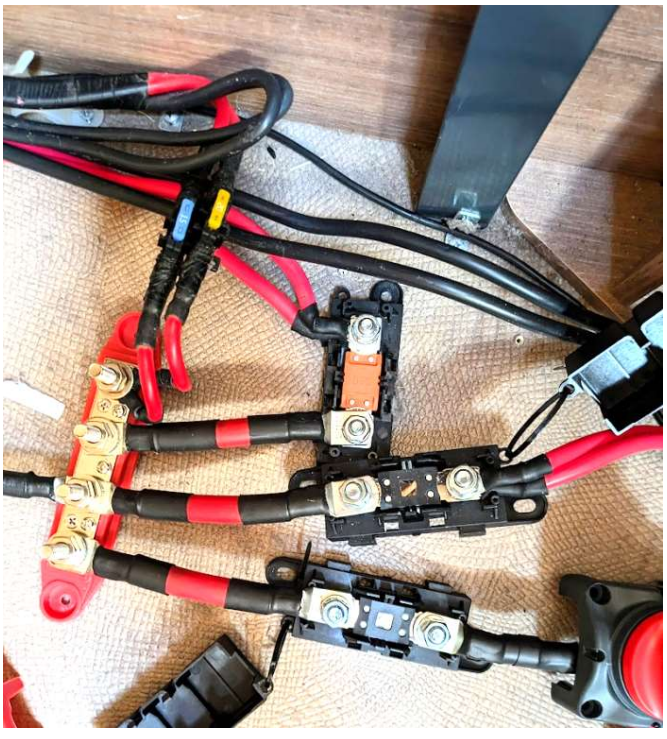


Final result!! Mains light from Inverter!!

The Results

The large interconnecting cables needed a Lug Crimper due to the size.
All cable runs were kept as short as possible.
Due to the size of the cables the layout was not very tidy but practical.
The current draw was higher than I expected it would be so bigger capacity cables used.
The quality of the Caravan cabling was poorer than expected.
As discovered, before batteries are paralleled up they need to be fully charged. Since the installation the Solar Charger has kept both batteries fully charged. The Bluetooth on both batteries keeps me up to date with their charge/discharge levels.

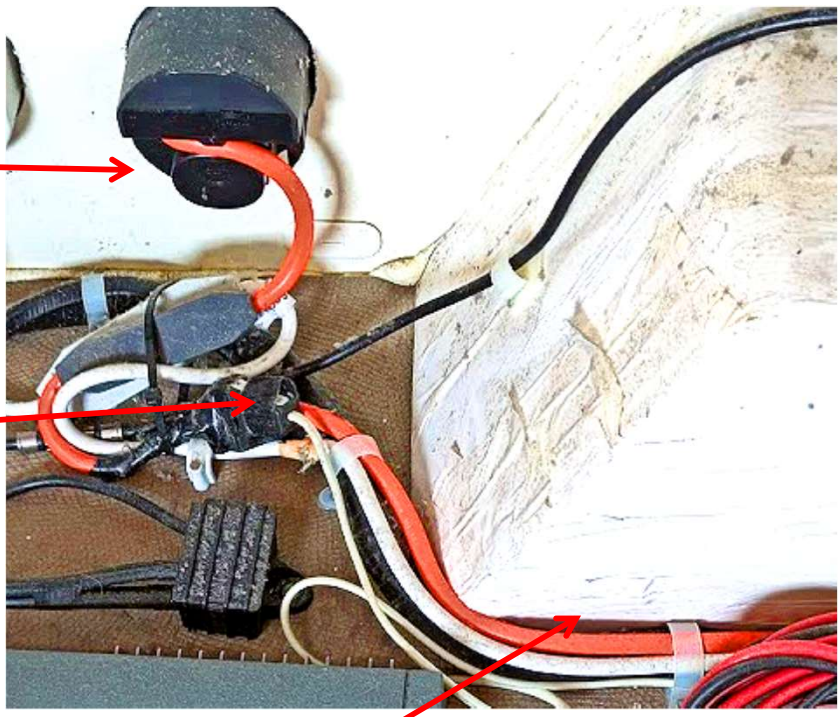




Caravan Mains Input C/O

In-coming EHU Mains

Alde Load Monitor



Mains lead to 230v Consumer Unit

Mains Input C/O Switch

The aim is to be able to switch the caravan 230v system away from the site EHU input to the Inverter Output thus enabling the van sockets etc. to be run from the Batteries via the Inverter. **Obviously if doing this the Caravan Mains Power Supply needs to be switched OFF.**

Mains lead to Consumer Unit to be cut and I/C side fed to C/O switch position 1. Output of C/O switch to be fed to the feed to the Consumer Unit. Output of Inverter to be fed to position 2 of C/O Switch.

1- EHU
0- OFF
2- Inverter

Pictures show C/O switch and wiring waiting to be inserted in the Mains Feed to Consumer Unit