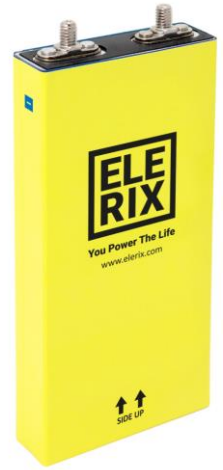
Building a LifePo4 battery for OSET 20

List of equipment to be purchased

- 16-cell LiFePO4 Prismatic 3.2V 15Ah

https://shop.gwl.eu/LiFePO4-cells-3-2-V/ELERIX-Lithium-Cell-LiFePO4-Prismatic-3-2V-15Ah.html?cur=1



Elerix cells are grade A (beware of Aliexpress commands for the quality of the cells that are often reconditioned and their size). Each Elerix cell is 138x65x20mm. That is a volume once assembled of 160mm (length) x 130mm (width) x 138mm (height).

LifePO4s are more robust, more powerful, safer, less polluting and more practical than Li-ion or lead-acid batteries.

With an equivalent capacity of 15Ah, a LifePO4 will give a greater autonomy because the efficiency is much higher than lead-acid batteries.

- 8 long connectors and 8 short connectors (it is also possible to make them or find them on Aliexpress) https://shop.gwl.eu/LiFePO4-accessories/ELERIX-Terminal-Connector-for-Lithium-Cell-LiFePO4-3-2V-short-1.html?cur=1#tab1

https://shop.gwl.eu/LiFePO4-accessories/ELERIX-Terminal-Connector-for-Lithium-Cell-LiFePO4-3-2V-1.html?cur=1

- 14 separation plates

https://shop.gwl.eu/LiFePO4-accessories/ELERIX-Separation-Plate-For-EX-L10-EX-L15-138-65.html?cur=1

List of equipment to be purchased

- 1 BMS Lifepo 16S 100A without ventillator (battery cell manager)

https://fr.aliexpress.com/item/1005002205134036.html?spm=a2g0o.order_detail.order_detail_item.3.63a87d56mrIZxx&gatewayAdapt=glo2fra

On this link, it is sold with an active equalizer that allows to put the same voltage to all cells for better performance.

1 Bluetooth (2 to let it connect to the active equalizer)https://fr.aliexpress.com/item/1005003804541722.html?spm=a2g0o.order_detail.order_detail_item.5.63a87d56mrIZxx&gatewayAdapt=glo2fra

BT

- Optionally, a small accessory to visualize the remaining percentage of the battery

Circular power board

List of equipment to be purchased

- 1 battery chargerLifepo4 16S

https://www.amazon.fr/dp/B07MFRCJPB/ref=pe_27091421_487030221_TE_SCE_3p_dp_1

- 2 connector assemblyAnderson

https://www.amazon.fr/dp/B07C69HJ2B?psc=1&ref=ppx_yo2ov_dt_b_product_details

- Battery wires
  - https://www.amazon.fr/dp/B09CH2V3F6?psc=1&ref=ppx_yo2ov_dt_b_product_details

- Electric Pod 6mm2 and 0.5-1.5mm2
  - https://www.amazon.fr/dp/B07MY8GLRP?psc=1&ref=ppx_yo2ov_dt_b_product_details

https://www.amazon.fr/dp/B07MY7B73K?psc=1&ref=ppx_yo2ov_dt_b_product_details

List of equipment to be purchased

- WasherM6

https://www.amazon.fr/dp/B0B36K7RLL?psc=1&ref=ppx_yo2ov_dt_b_product_details

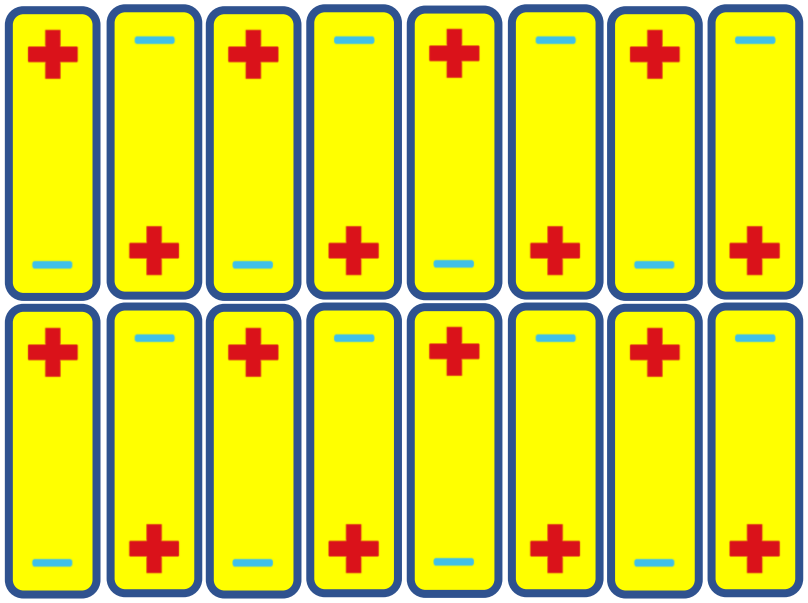
- Self-locking nutM6

https://www.amazon.fr/dp/B0B36K7RLL?psc=1&ref=ppx_yo2ov_dt_b_product_details

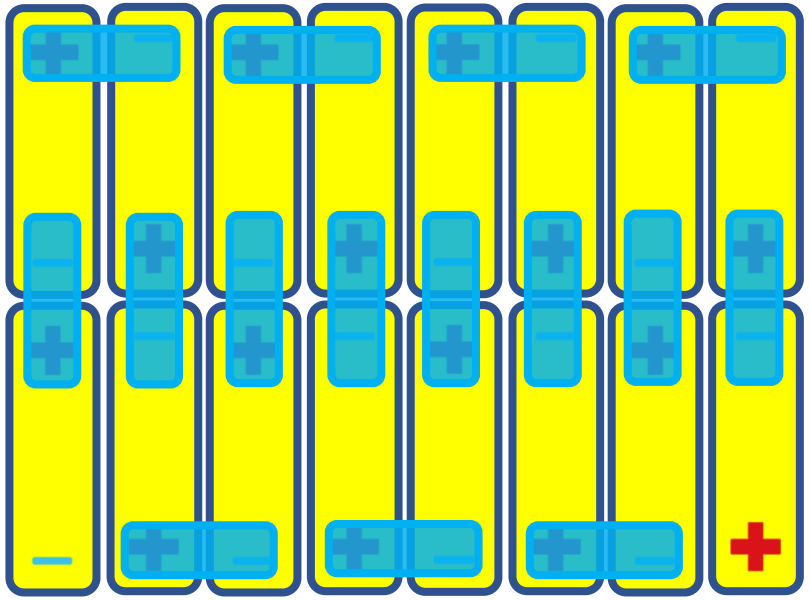
- 1 Heat-shrink tube for battery

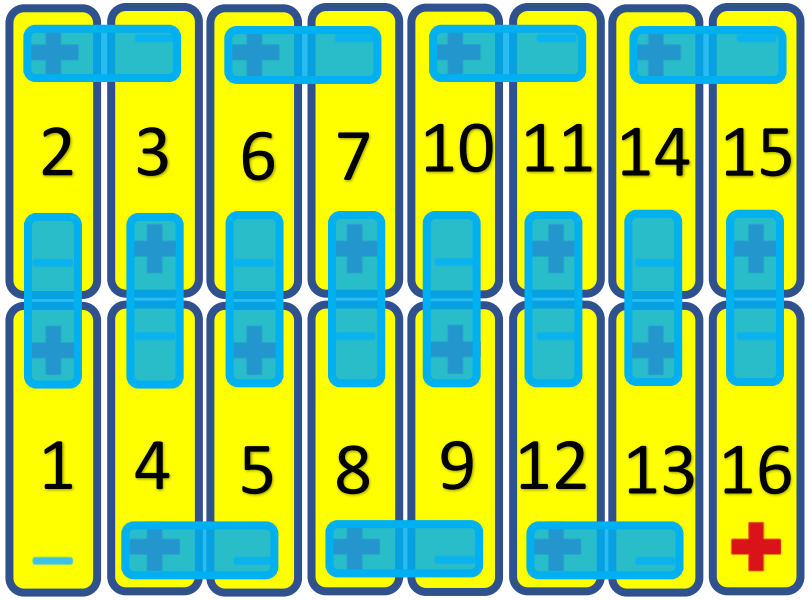
https://www.amazon.fr/dp/B08VDPDBWH?ref=ppx_yo2ov_dt_b_product_details&th=1

Put the cells in 2 rows 8 columns as shown on the graph below, insert the separation plates and tape everything



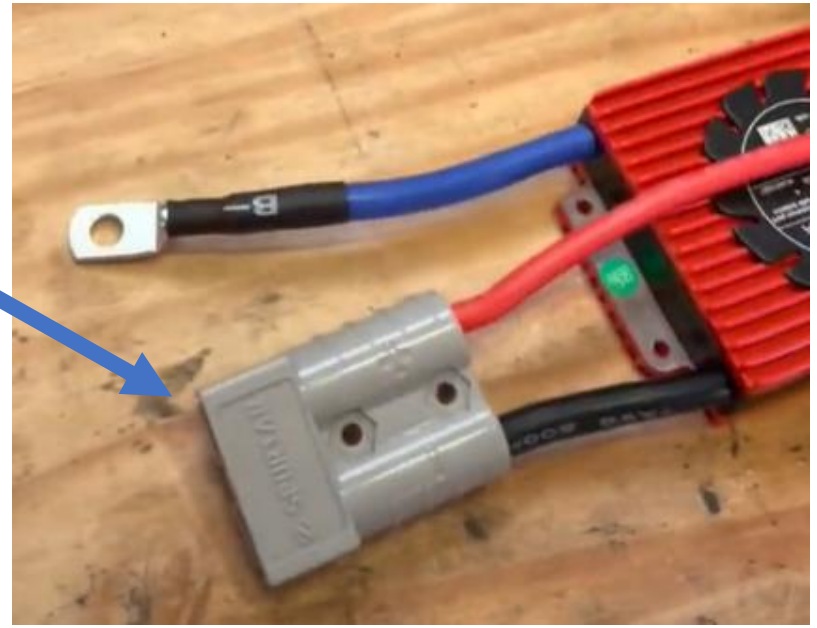
Set up the connectors (copper bar) and cover them with tape as you go (to avoid short circuits with the tools afterwards)





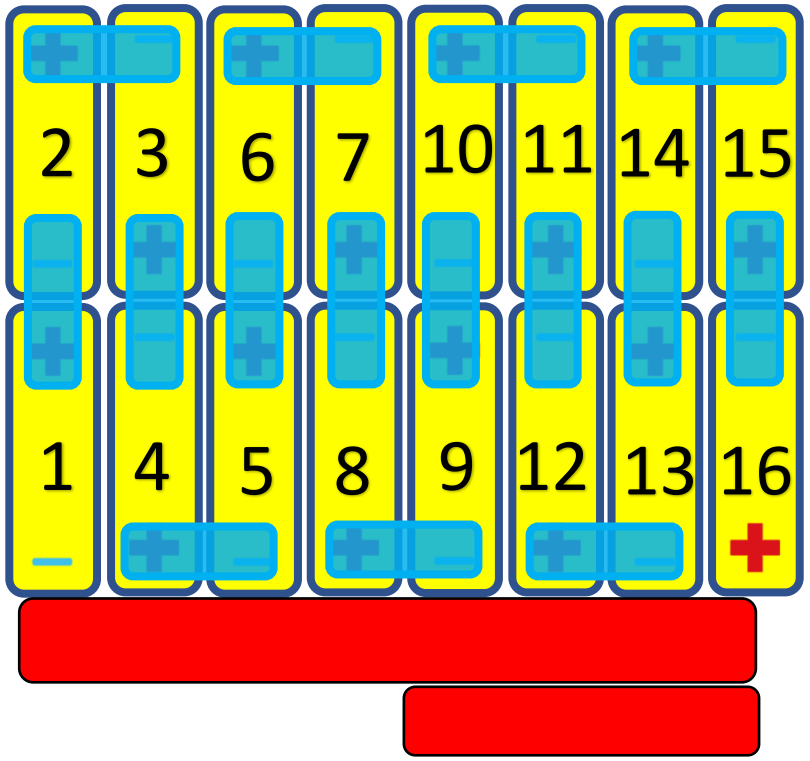
Prepare the Anderson connector for the BMS

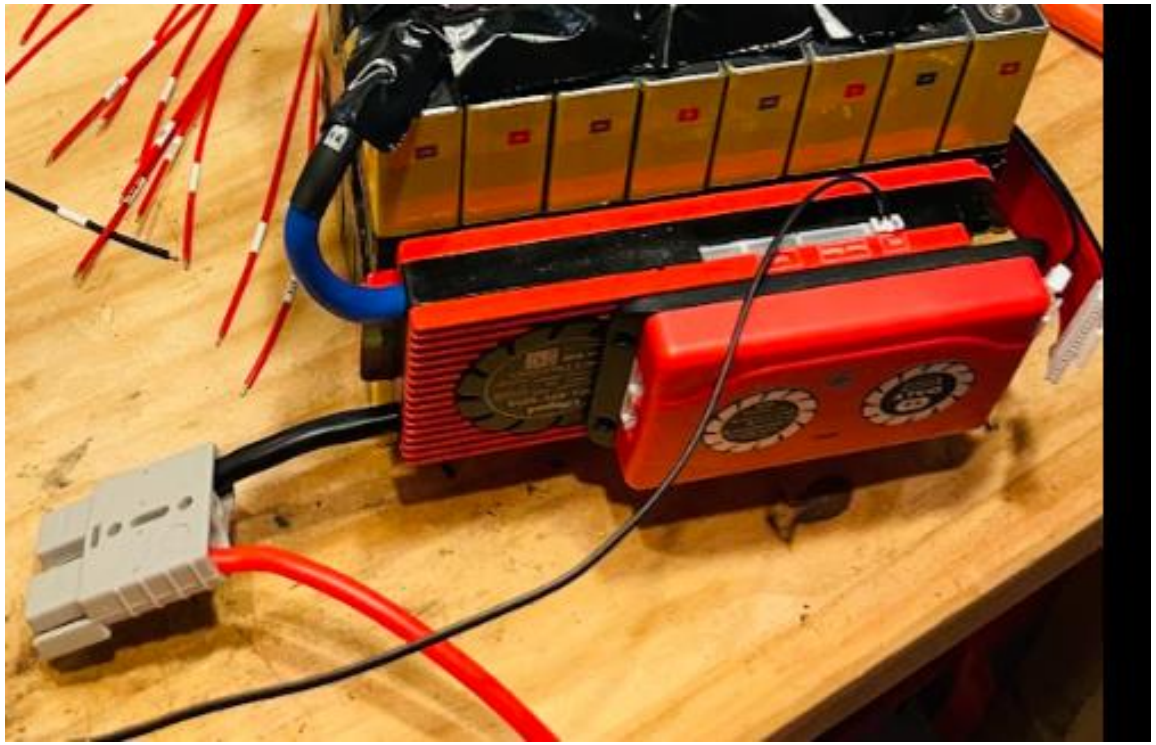
- on the BMS, cut the connector at the end of the black wire
- Strip and crimp the tip for the Anderson connector
- Take a piece of red drum wire. For the length, the blue wire B- will be connected to the (-) of the cell 1 battery and the red wire to the (+) of the cell 16 battery. Strip the red wire and crimp the tip for the Anderson connector
- set up the 2 crimped tips in the plastic part of the Anderson socket (red side +)



Attach the BMS and active equalizer

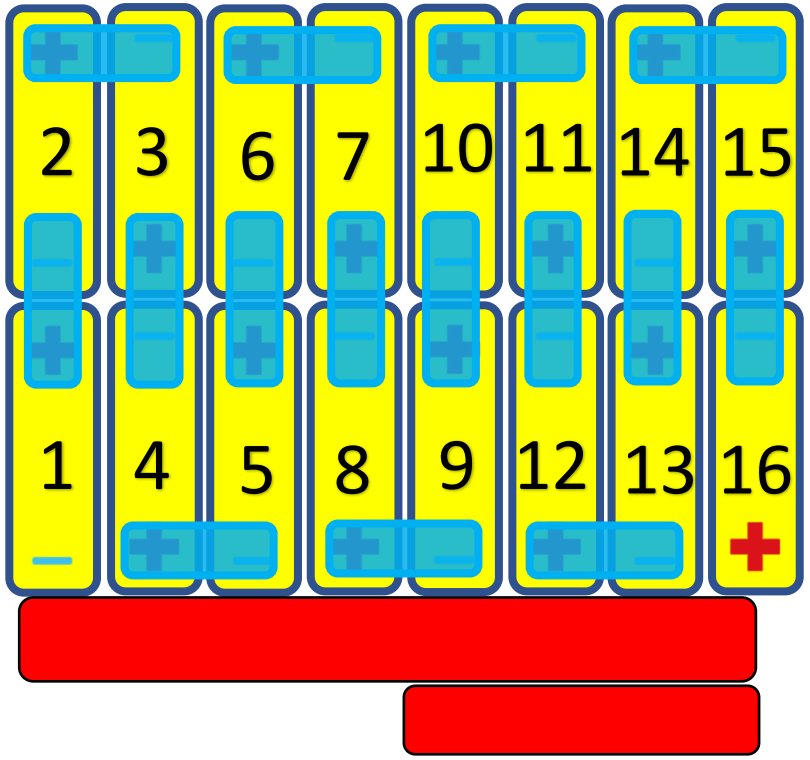
- With double-sided on the side of the cells
- Blue wire B- of the BMS on the (-) of cell 1, to be fixed with a washer M6 and a nut M6 (self-locking).
- IMPORTANT: put tape on your tools if there is a large metal area to avoid any short circuit due to clumsiness during assembly...





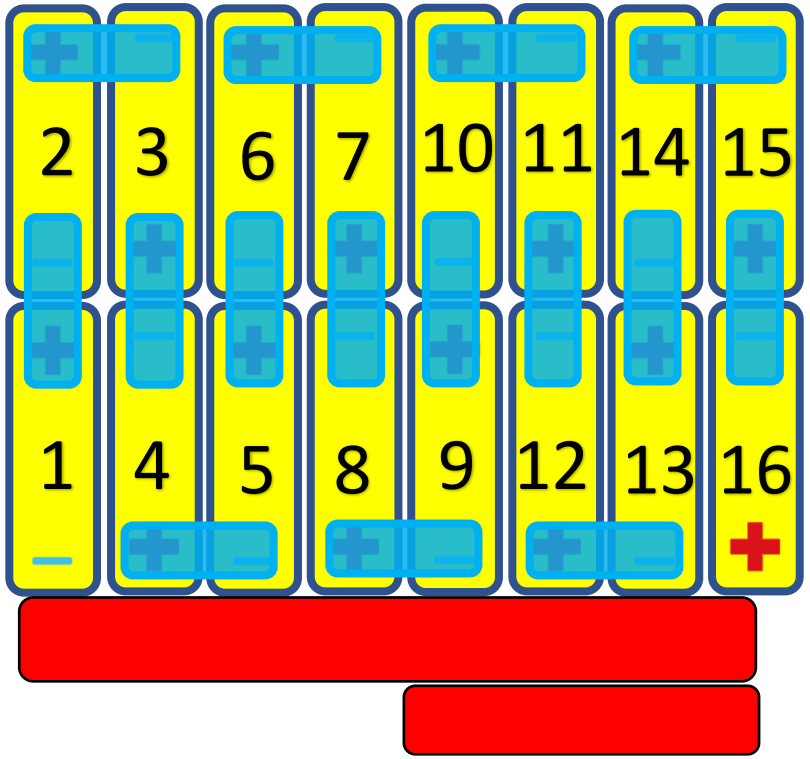
Start wiring

- Unplug the connectors on the BMS and Equalizer side
- Start by connecting the black wire to the terminal (-) of cell 1, making sure to put the right length of cable (see next slide) and to crimp the electric lug (if heat-shrinkable, put a heat stripper stroke)



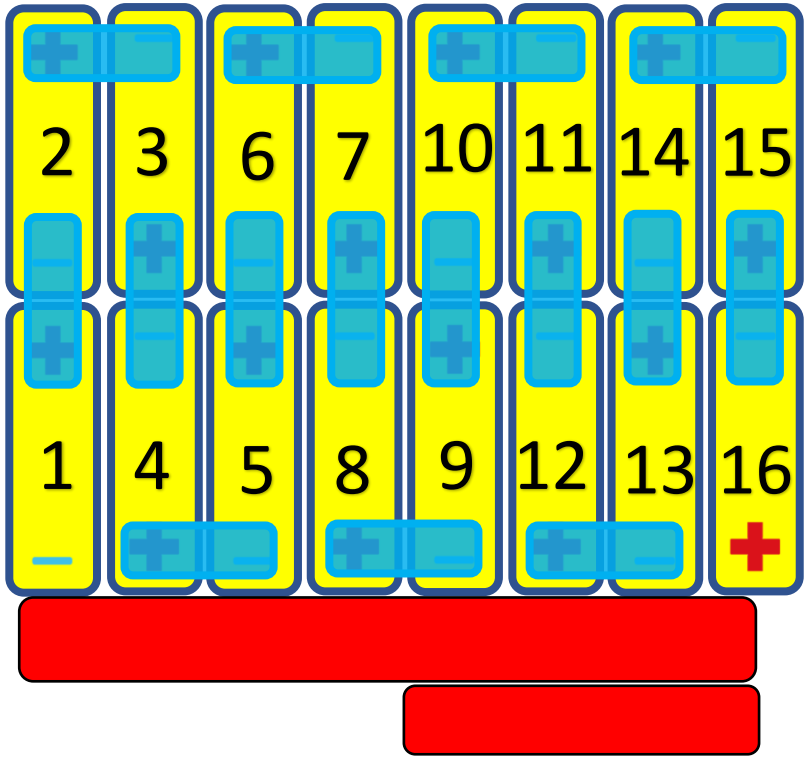
Start wiring the BMS and Active Equalizer

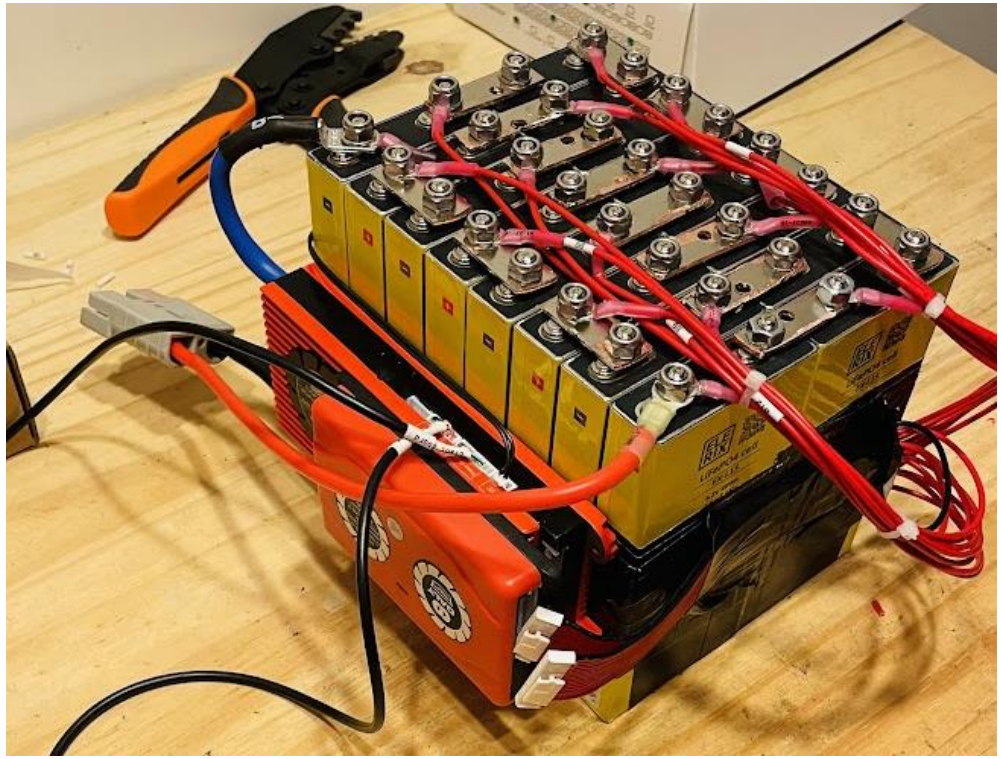
- Continue by connecting wire 1 to the positive terminal of cell 1 (or negative terminal of cell 2 since they are connected).
- Fil2 on the positive of cell 2
- Up to wire 15 to connect to the + wire of cell 15.
- Remember to put the protective tape back between each connection



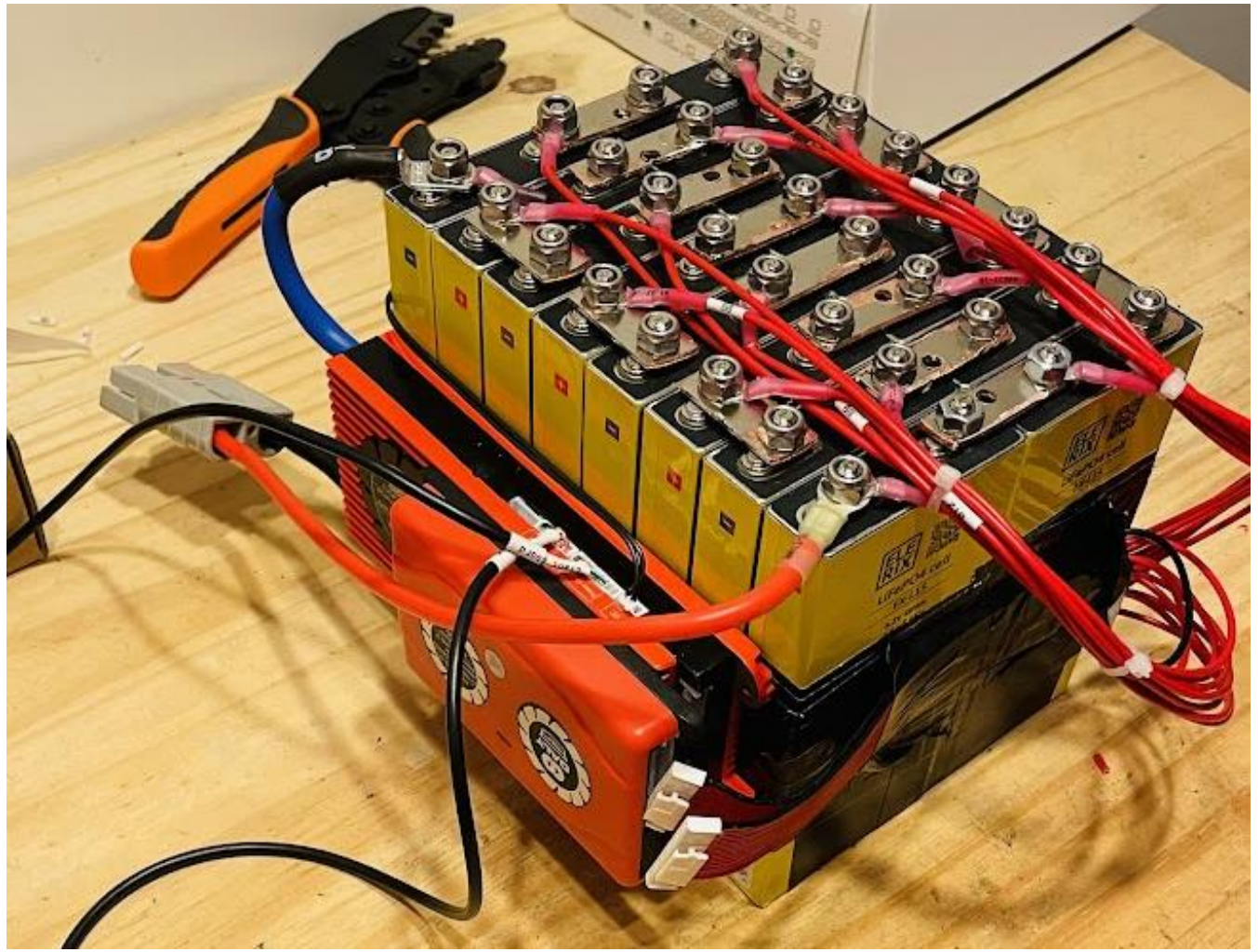
Start wiring the BMS and Active Equalizer

- For wire16, connect it to the (+) of cell16 and add the battery red wire (from the Anderson connector previously assembled) then screw everything.





Installation of serflex for clean mounting and removal of protective tape

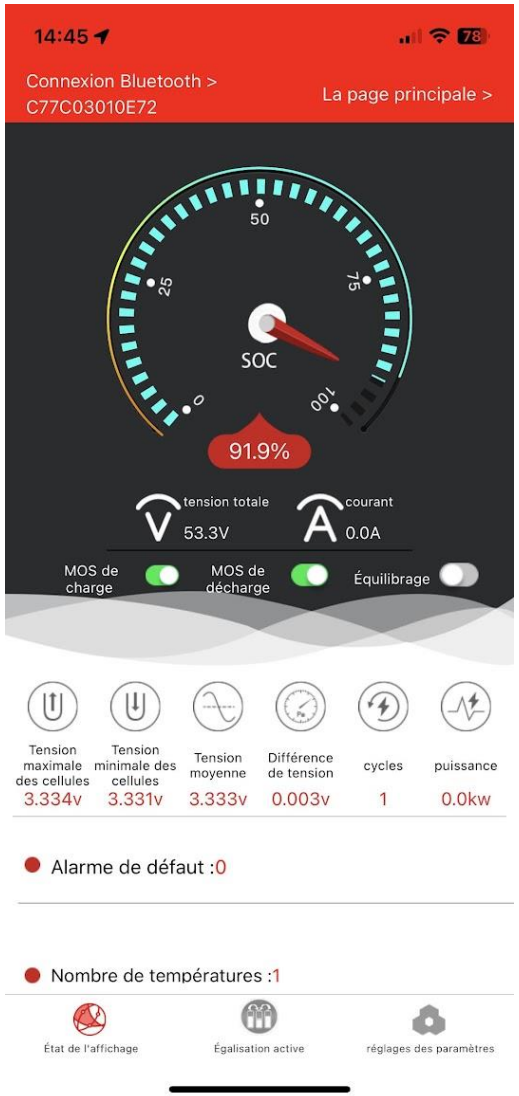


Connecting and configuring the BMS

- Connecting the Bluetooth module to the BMS
- Downloading the SMART BMS app on smartphone
- Connection to the recognized Bluetooth module and in Tandem mode (series)

BT

Setting the BMS (code 123456)



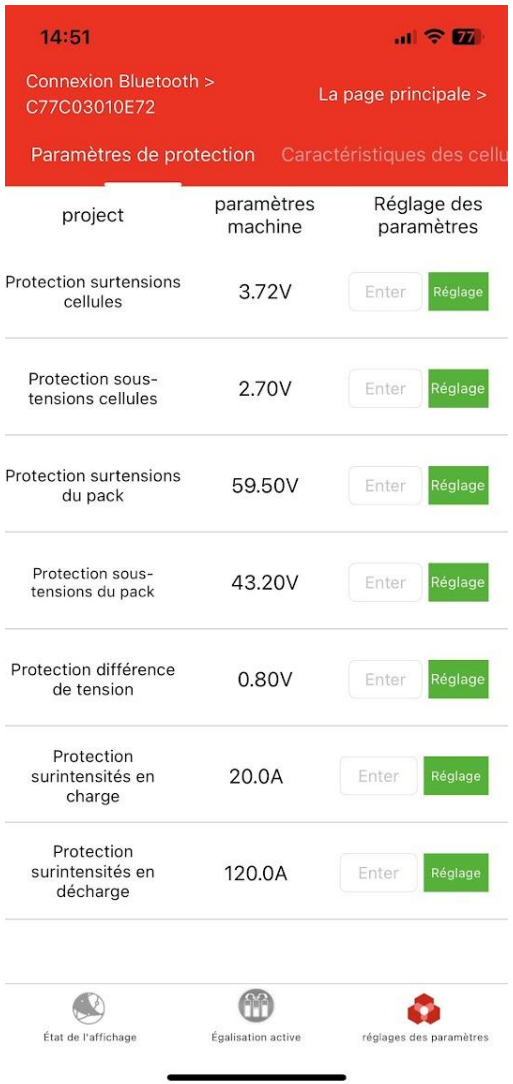
Set LFP/LifePo4 cell type

Put the battery capacity

Reference cell voltage as shown on the battery datasheet

BT

Setting the BMS (code 123456)



Refer to the data sheet (3.72 seems a good compromise; below the recommended max value to not take risks)

Refer to the data sheet (2.7 seems a good compromise)

Threshold 1st row x16

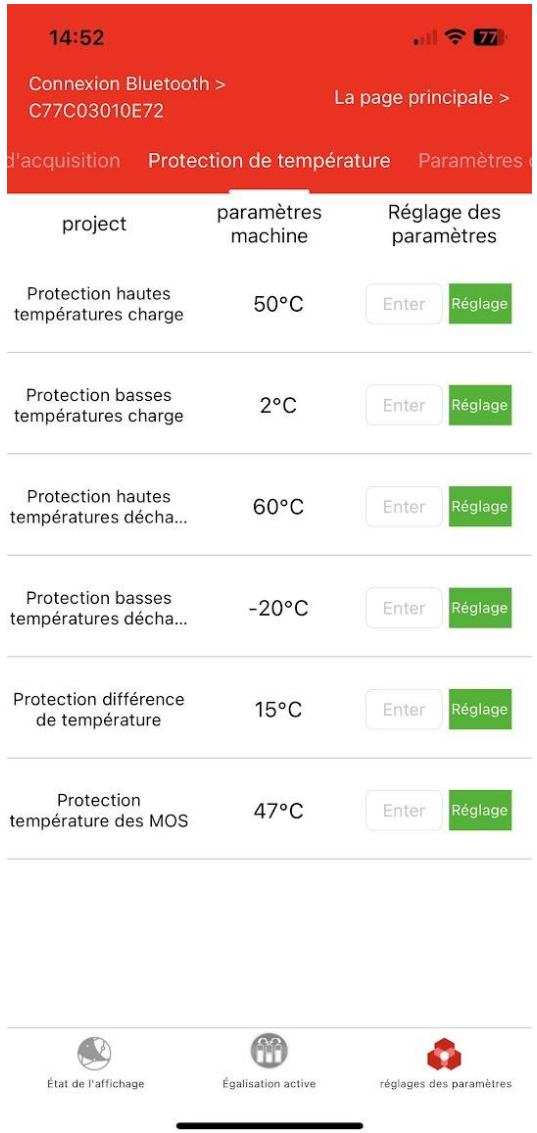
Threshold 2nd row x16

Datasheet Info

120A, the OSET 20R can have a current of up to 120-130A a priori.

BT

Setting the BMS (code 123456)

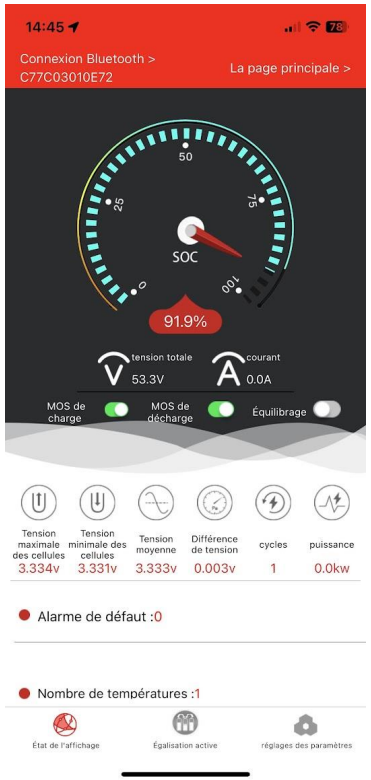


BT

Setting the active equalizer (code 123456)

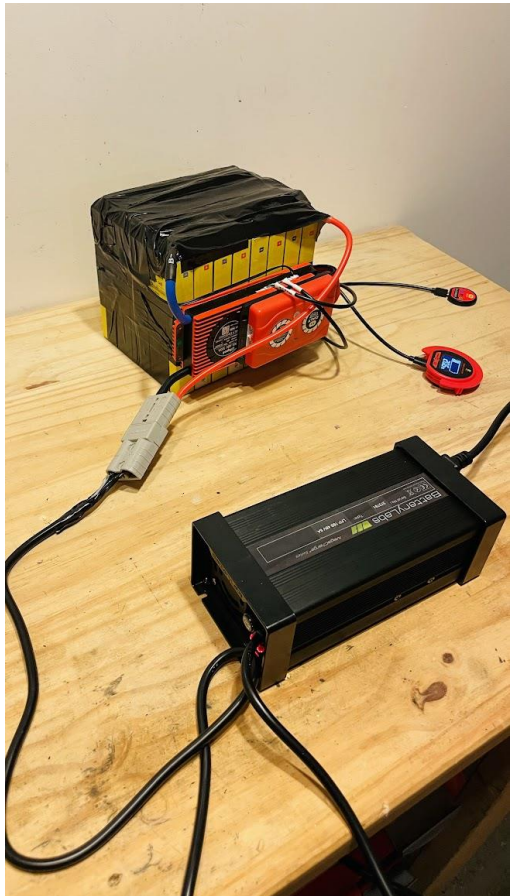
- Connecting the Bluetooth module to the active equalizer
- Connect to the recognized Bluetooth module and in Tandem mode (serial)
- Setting the active equalizer (same info as on the previous slides)
- Equalization can be set to 0.02V minimum.

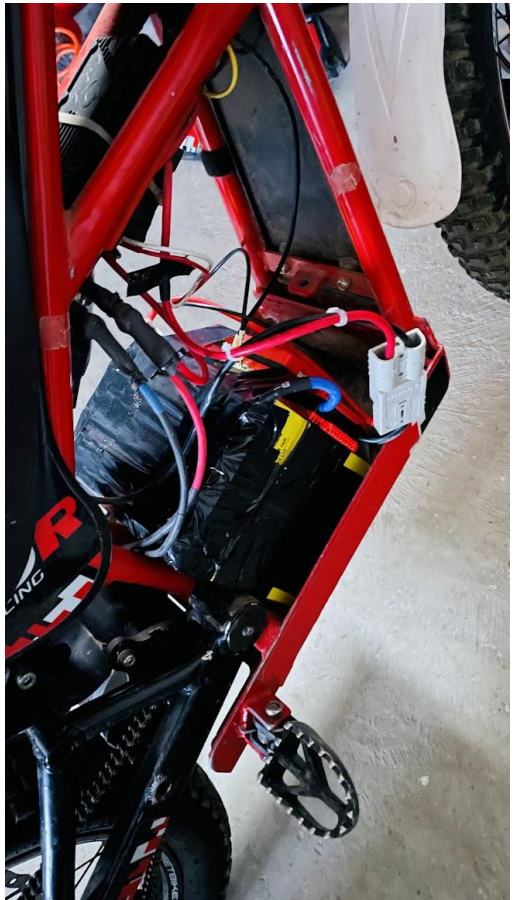
BT



Anderson connector on charger and motorcycle

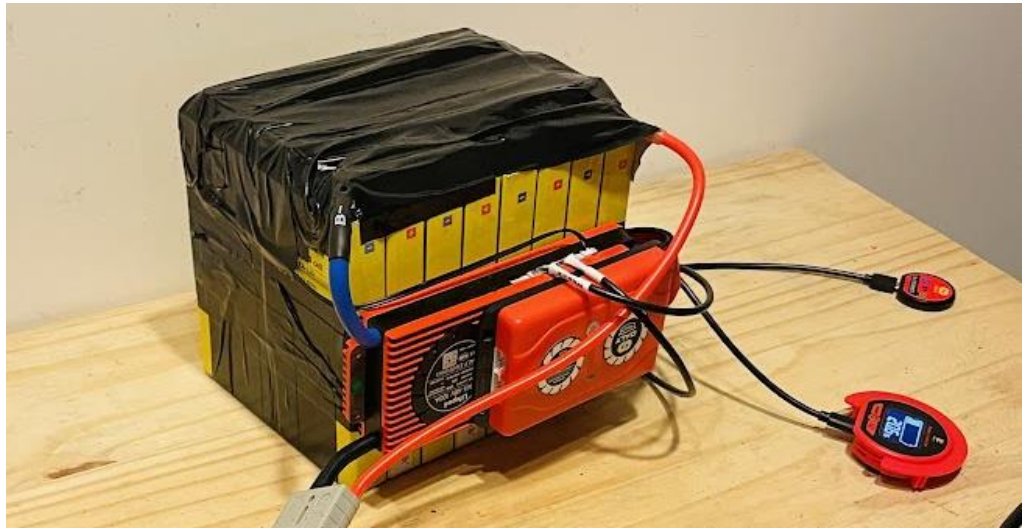
- Put an Anderson connector on the charger
- Put an Anderson connector on the old red and black wires of the motorcycle to connect them to the battery

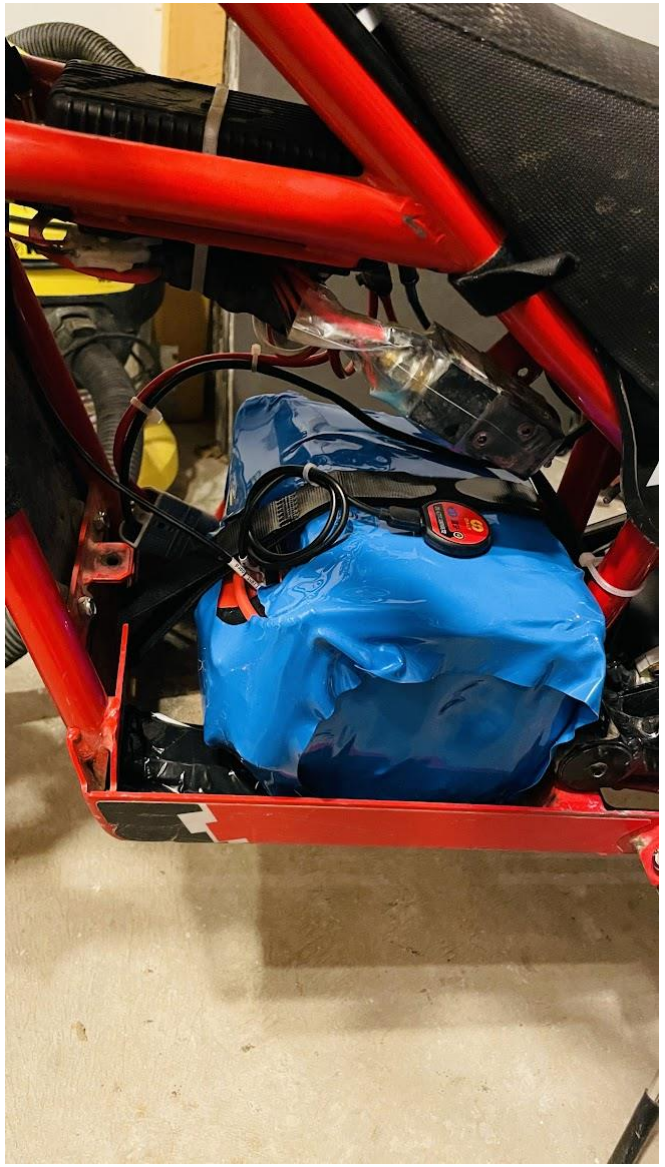




Package the battery to protect it

- Either with tape (not very clean)
- Either with a dedicated box
- Either with a heat shrink tube
- Mount the battery and attach the





Charge the battery and drive

- The SMART BMS app allows you to check the battery status and charge of each cell.
- If you added the accessory to have the charge level, fix it somewhere.