Solderless connections

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WEBINAIRE

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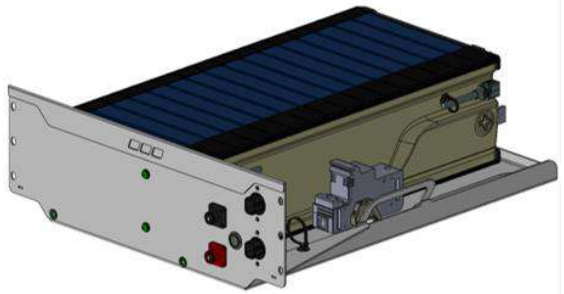
Global Goal

- The REBORN project aims to equip the European battery ecosystem with a modular battery pack (including the BMS and system design), suitable for both first-life and second-life applications.
- The ultimate goal is to implement two stationary energy storage systems capable of absorbing electrical energy generated from photovoltaic sources, in order to release it during production peaks and/or when electricity prices are low.

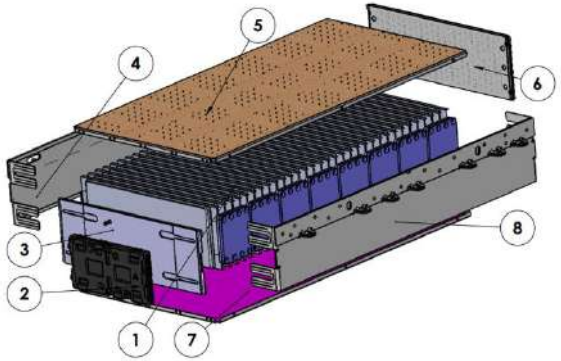
DEMO 1

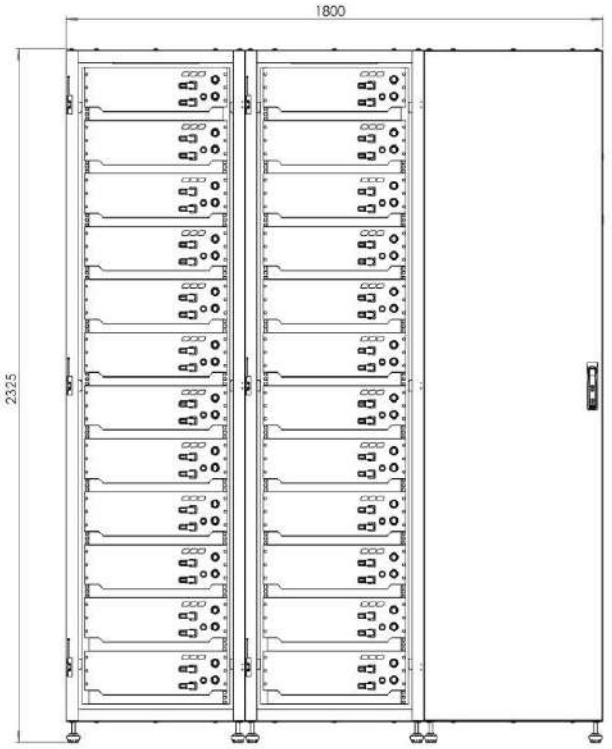
Aged cells SOH 80%



DEMO 2

Mixed aged and new cells SOH 90%
And aged prismatic cells SOH 80%





Work package for solderless connections

WP5 : Battery module, pack and test bench design [M8 to M18] (127.7 h.m)

WP Leader : **EVE**
Partners : SIRO, CEA, FICOSA, VUB, IREC, ETRA, LEI

Task 5.1 : Development of solderless connections at cell and/or module level [M8-M12] (CEA+SIRO+EVE)

For Prismatic and pouch cell design from the cells provided by SIRO and EVE and according to T4.3

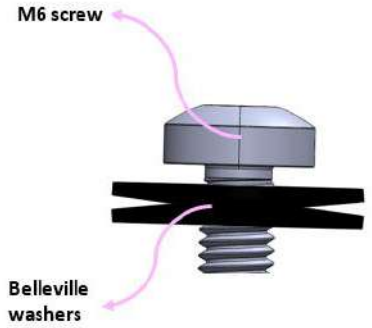
CEA --> developp specific electrical solderless connections for the power tabs of the cell
SIRO --> Support by providing HV module design
EVE --> Support and implement the solution for LV module

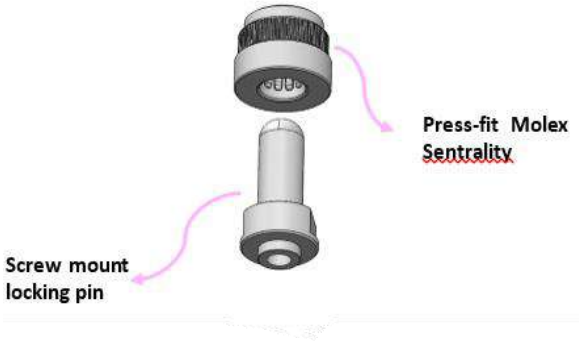
Solderless connections

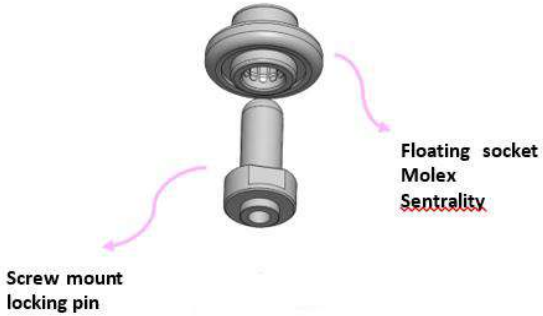
POUCH : ***Farasis P73 NMC***

PRISMATIQUE : ***CALB L135F72 LFP***

Solderless connections for LV module

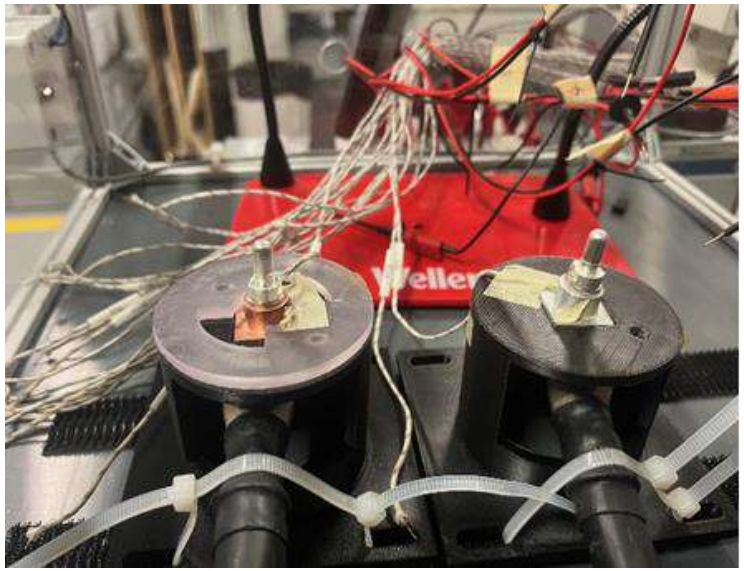


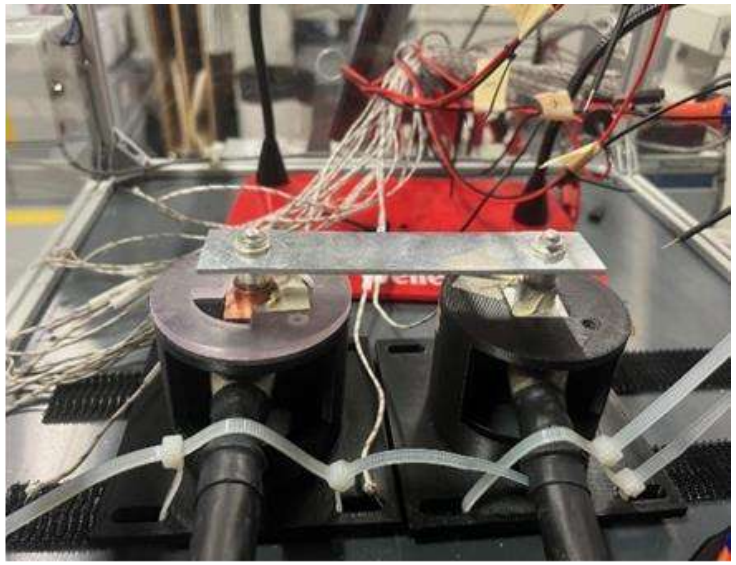


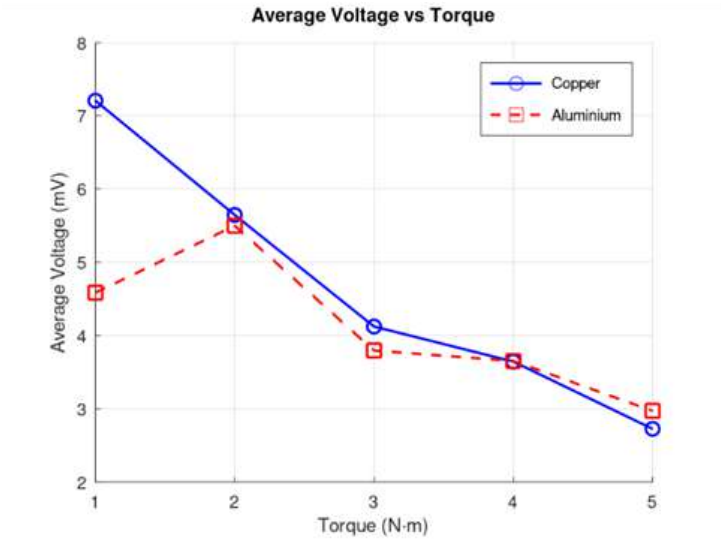


Solderless connections for LV module

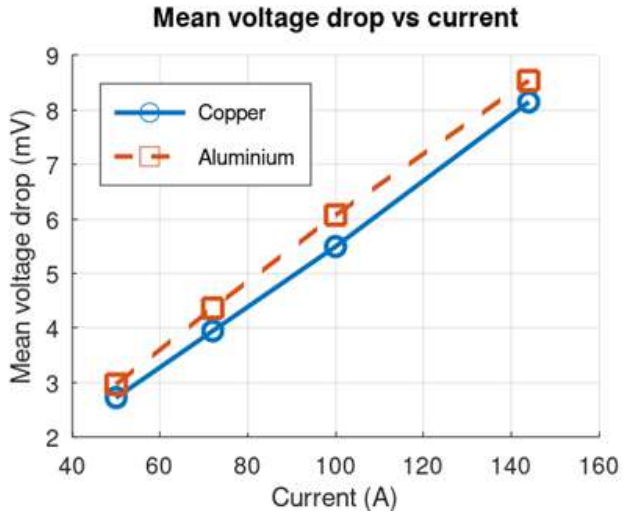
molex



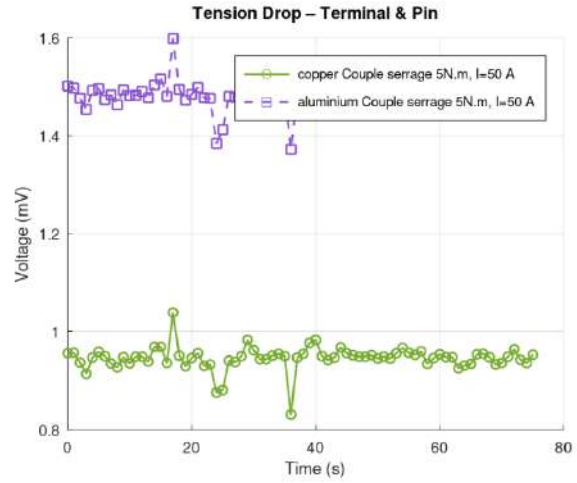




At what tightening torque does the voltage drop stabilize?



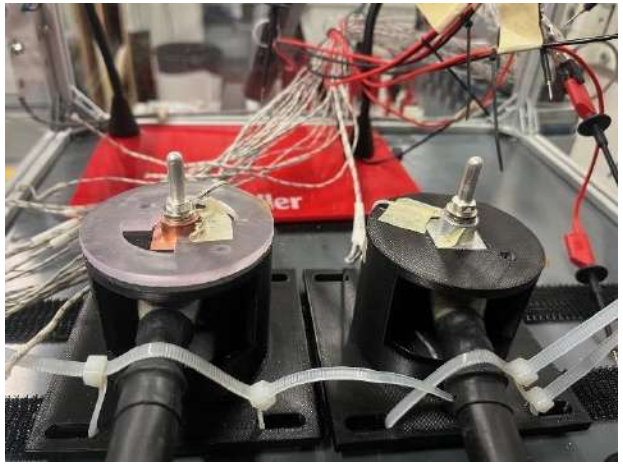
Does the connection degrade as a function of the current?

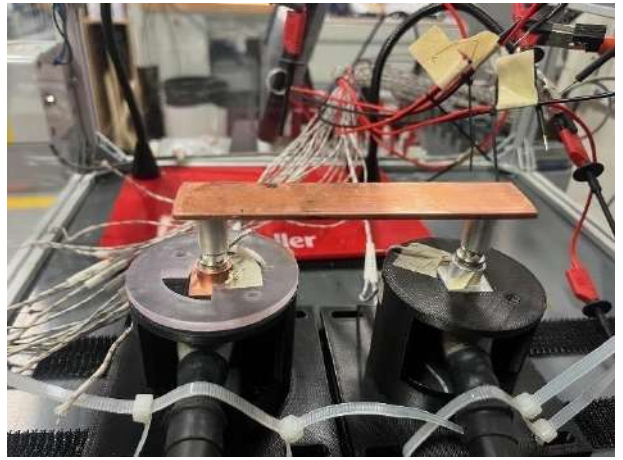


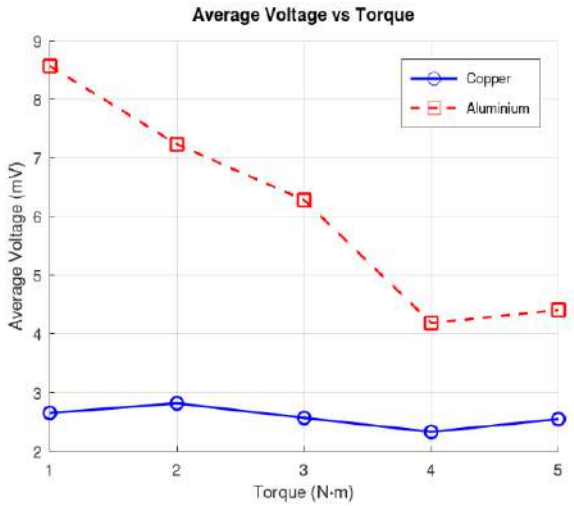
What is the proportion of voltage drop between the pin and the socket?

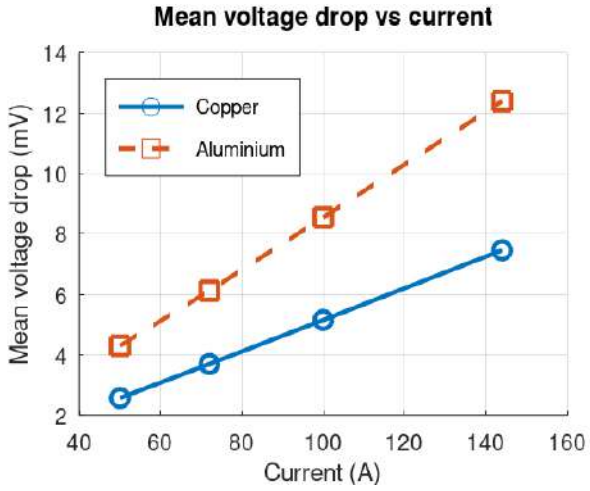
Solderless connections for LV module

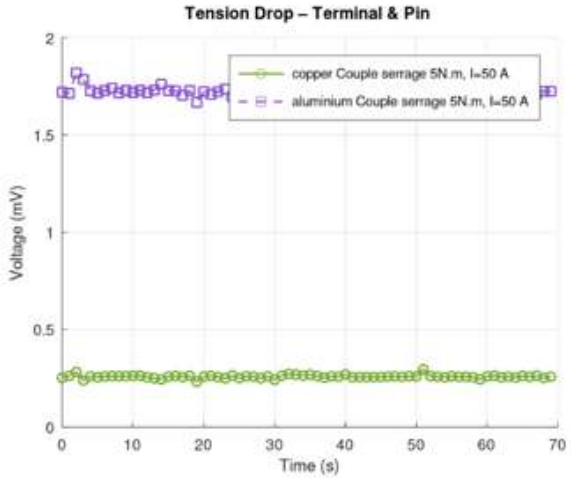
Amphenol



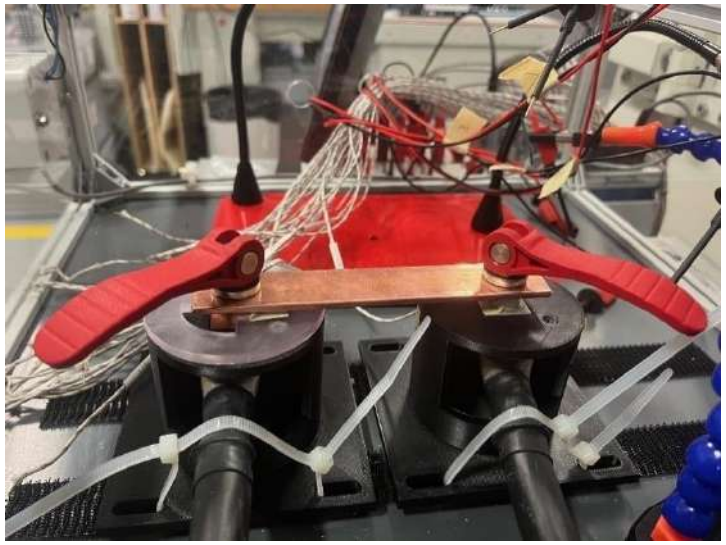


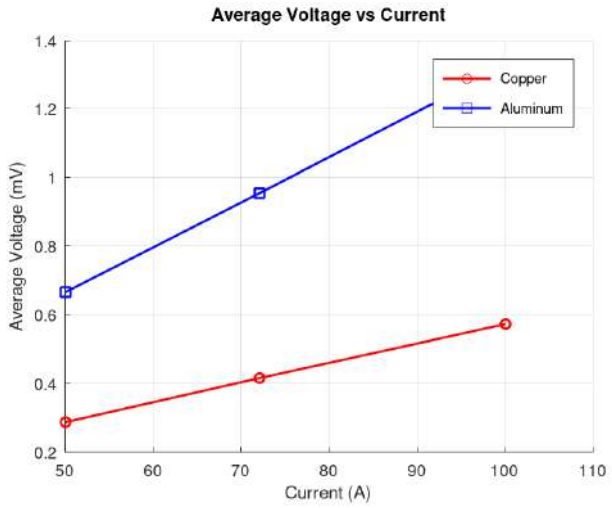


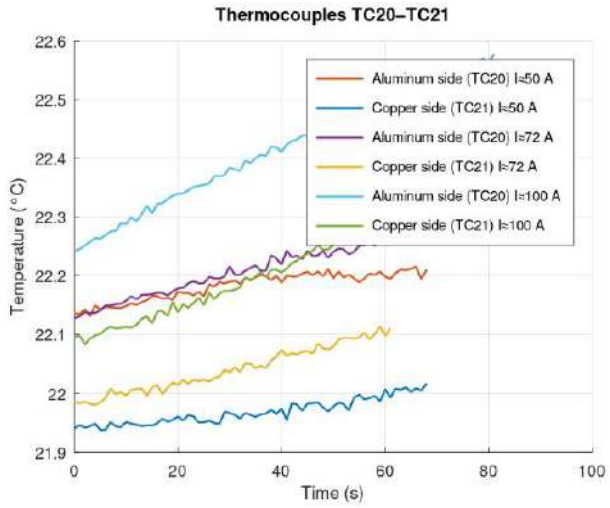




Solderless connections for LV module







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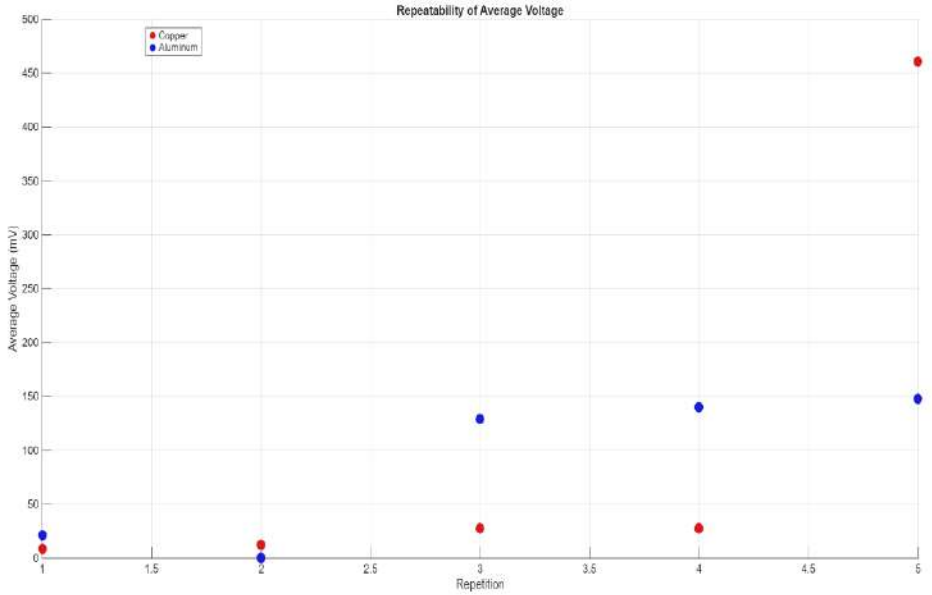
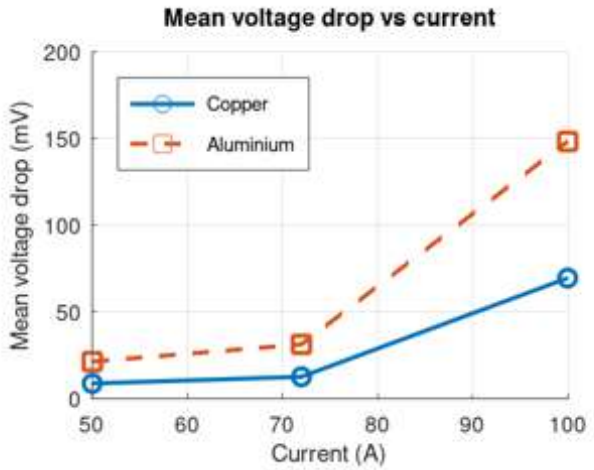
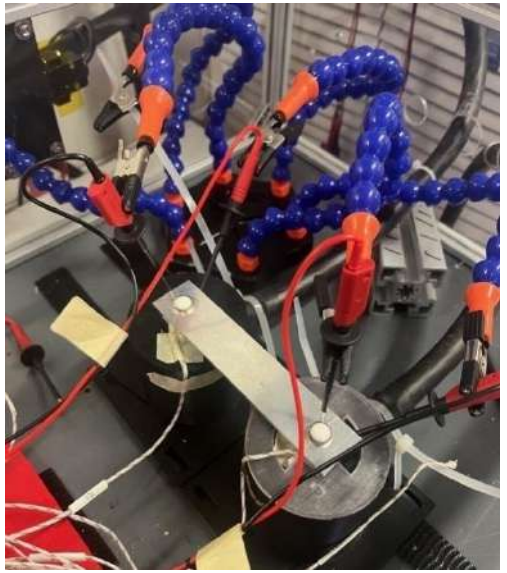


Is the connection repeatable and reliable?

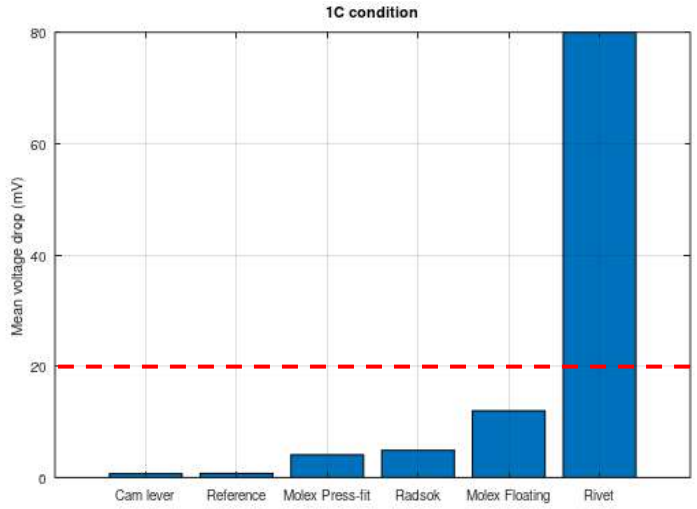


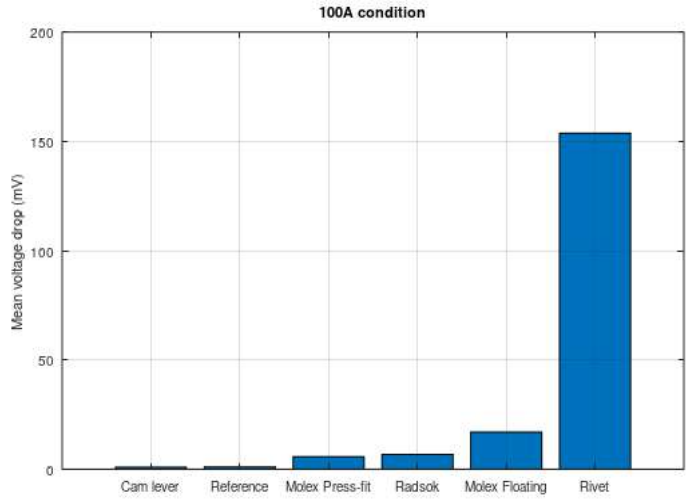
Does the connection degrade as a function of the current?

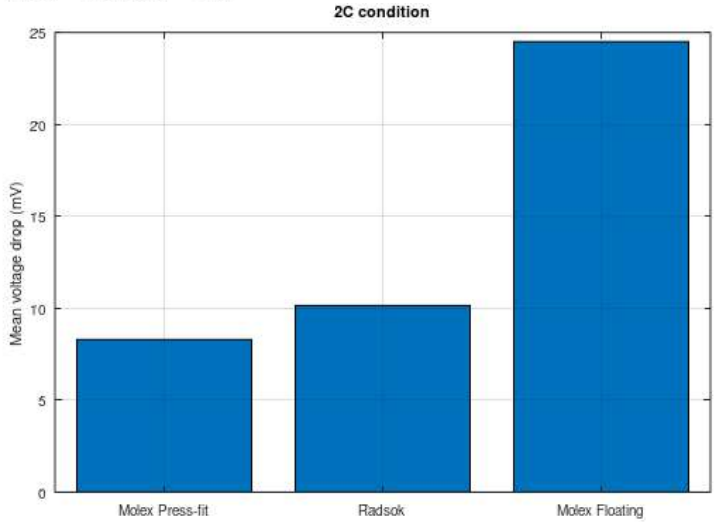


Solderless connections for LV module

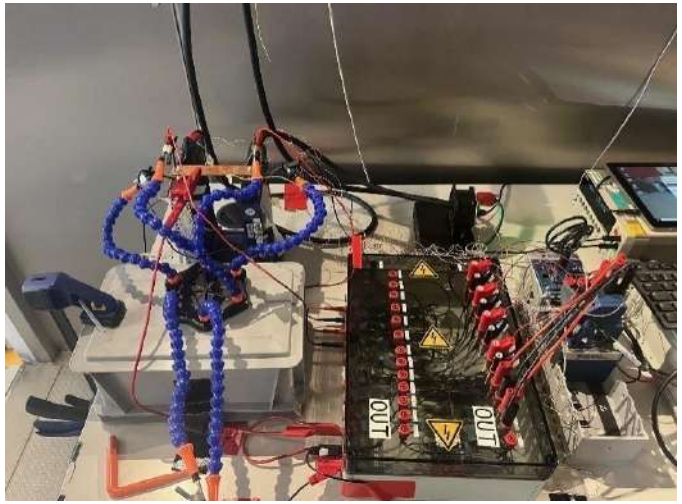
Internal resistance of the cell /2 at 1C

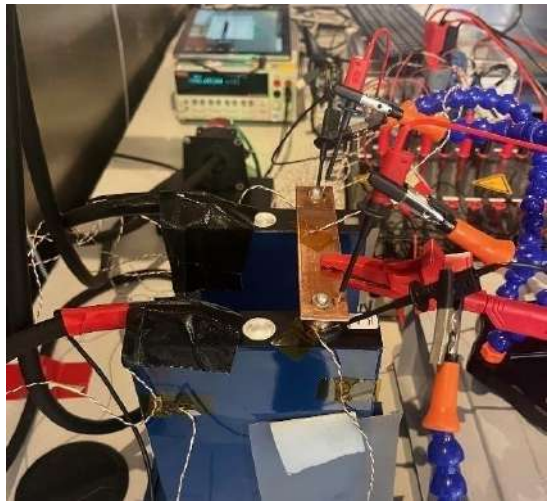






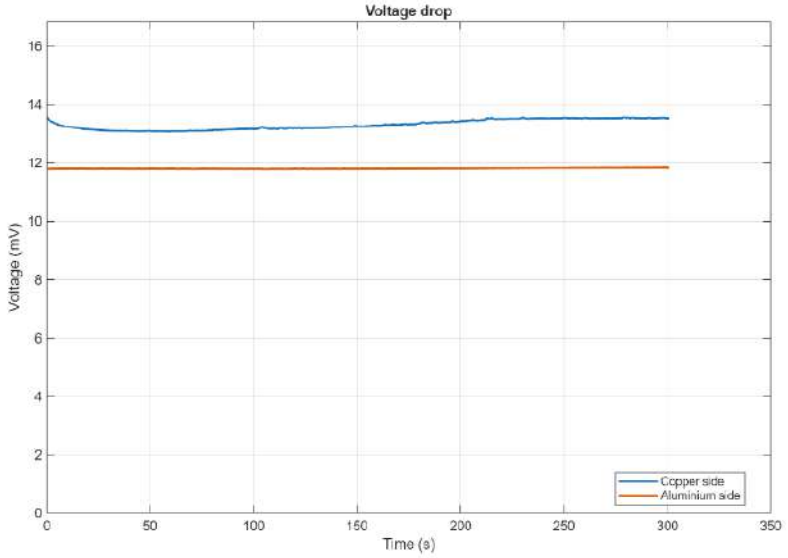
Solderless connections for LV module

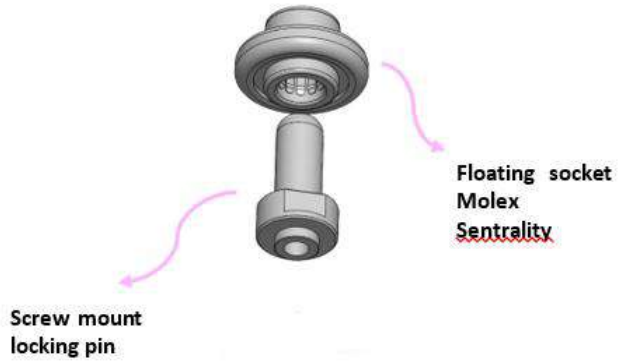




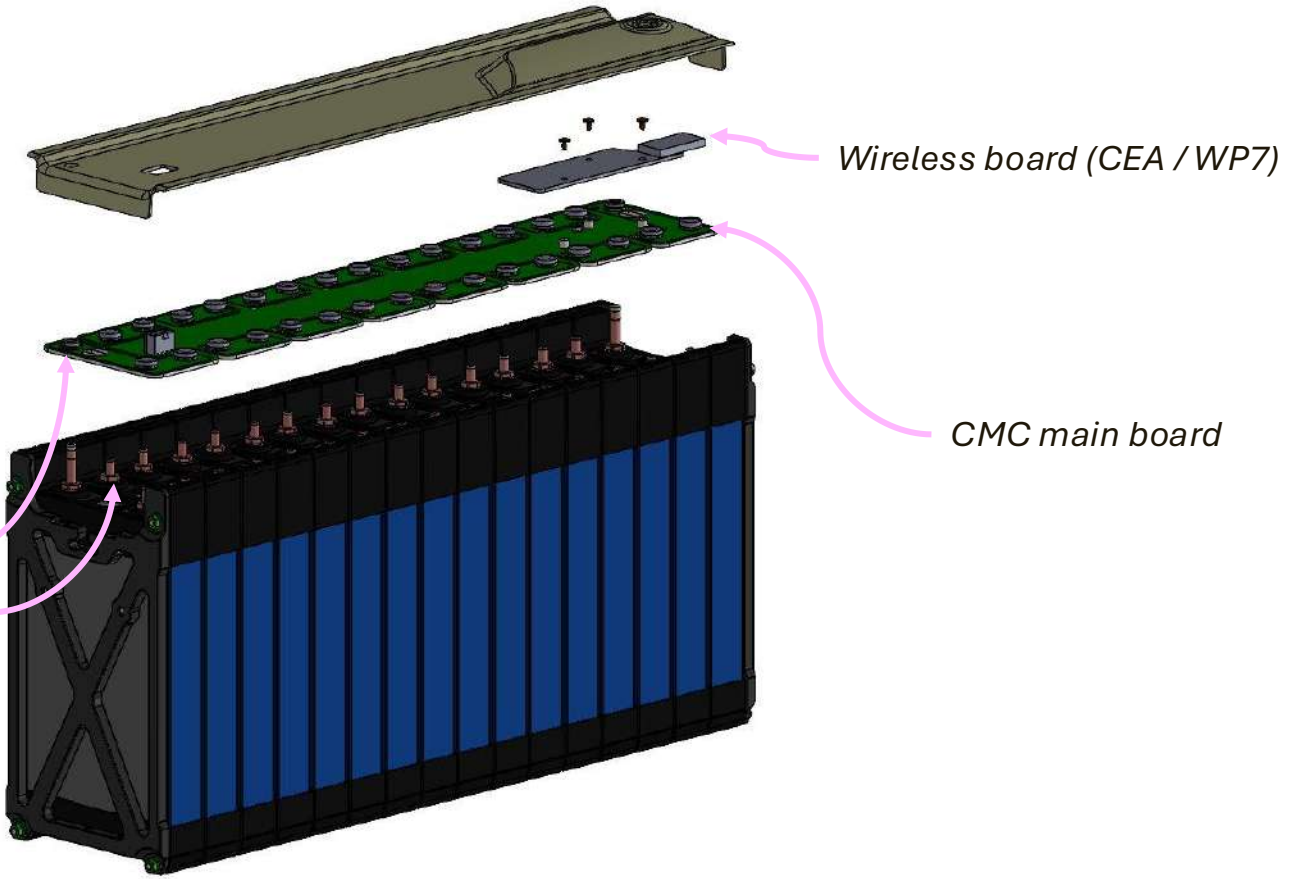
- Aluminium : +20 %
- Copper : −7,1 %

What is the impact of using second-life tabs on the voltage drop?

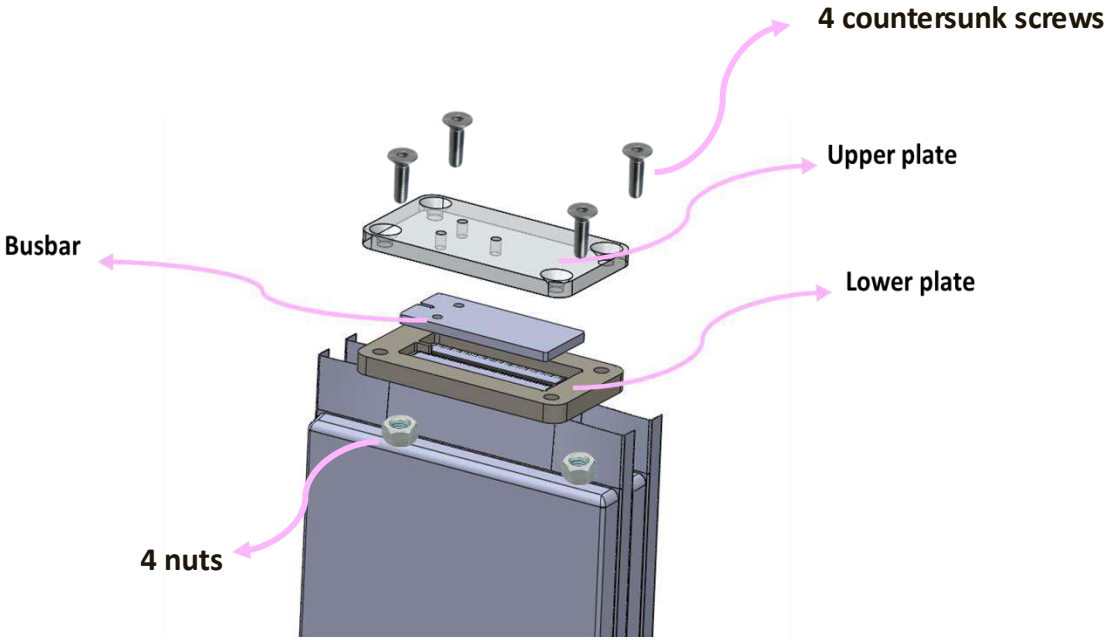




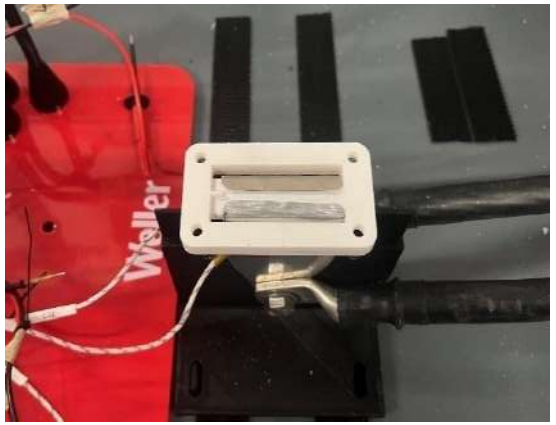
Solderless connections for LV module

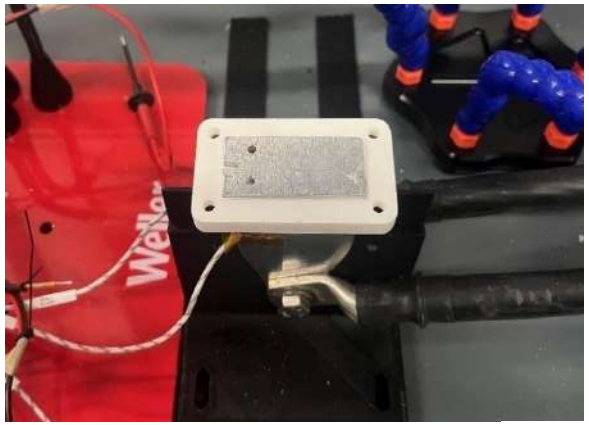


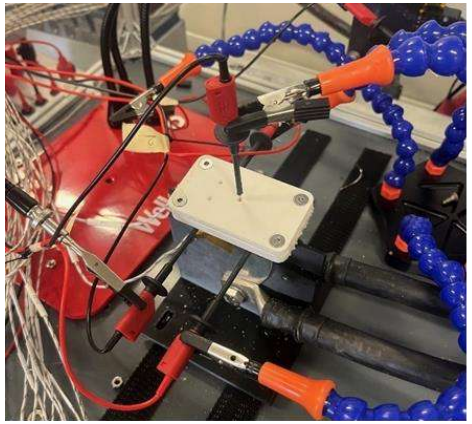
Solderless connections for HV module



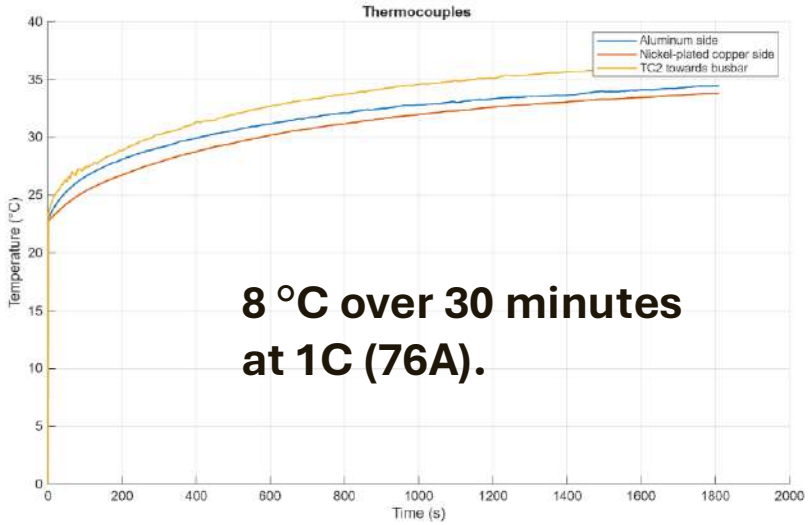
Solderless connections for HV module





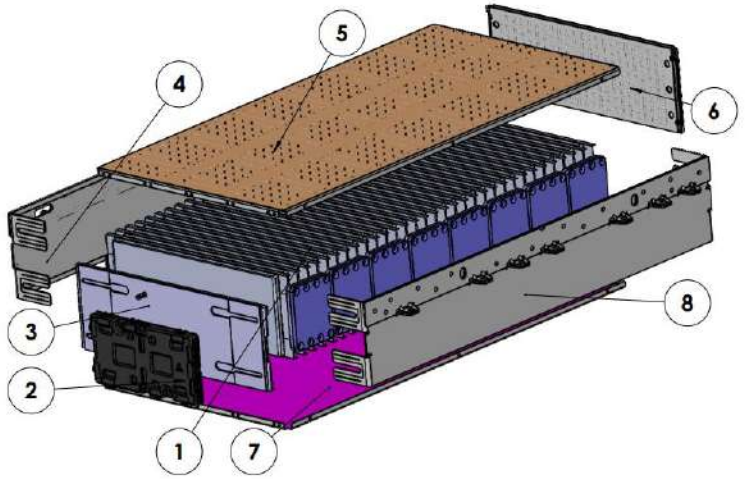


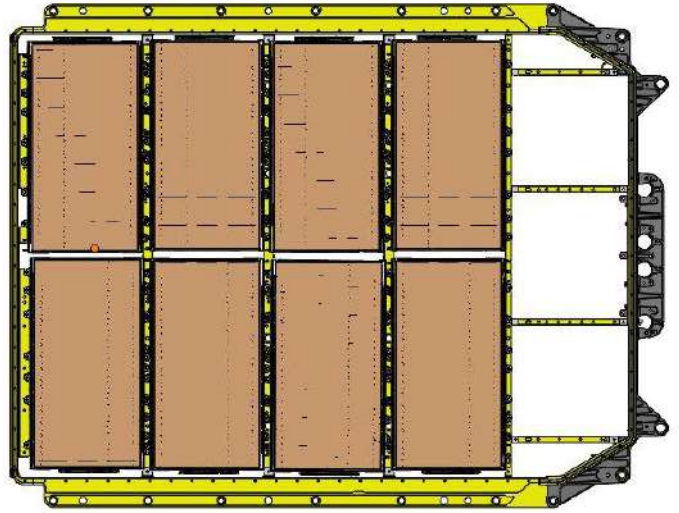
Measurement point	Voltage drop	Equivalent resistance	Contribution to total drop
Entire connection	24.8 mV	325 µΩ	100 %
Aluminum tab → busbar	10.0 mV	130 µΩ	40.3 %
Nickel-plated Cu tab → busbar	14.8 mV	195 µΩ	59.7 %



8 °C over 30 minutes at 1C (76A).

Solderless connections for HV module





Others goals

- Solderless mechanical interconnections to simplify assembly and disassembl
  Wireless RF communication between the cells and the BMS.

- Data analysis using AI and physics-based algorithms to derive unique indicators of cell aging.

- Implementation of the battery passport concept to track the life cycle and healt
  status of the cells.

- Fast sorting and grading of packs using cloud data and machine learning algorithms.
  Minimization of the post-characterization process for first-life batteries.

- Semi-automated robotic disassembly controlled via virtual reality.

- Prospective life cycle assessment (LCA) to quantify the benefits and environmental impacts of second life.