

# Build your own battery pack

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In one sense we think the two-parter is in the wrong order. Part two takes us through all the technical details and theory, from lithium-ion chemistry to battery management systems and spot-welding nickel busbars, while part one shows us the construction of his battery pack. There are also a couple of videos, which we've placed below the break. It's still not a job for the faint-hearted, but we'd say he's produced about as professional and safe a pack as possible.

It's always dangerous when you have more than 1 lithium cell without a fuse. All it takes is for one of them to go bad, enter a low impedance state, then the other battery discharges through it causing a fire or explosion.

With more batteries comes higher likelihood of failure, but with only 2 batteries you can also cause a fire. It seems like most young hackers don't seem to understand or care about the consequences of sticking even a few 18650 batteries together.

I had a 36 v go in my small shop, took 2-5lb, 1-10lb and 1-20lb to finish putting it the fire and explosion. The biggest headache was cleaning the shop of extinguisher powder. And how did all that powder get into all my drawers ?

This lands perfect on my feed right when I'm trying to rebuild my scooter battery for air travel. To anyone that perhaps can share their knowledge or feedback, I want to turn my cylindrical 5.4AH 36V 10S2P 18650 pack, into a 3D printed, removable cell for 5AH 10S1P 36V 21700. Any thoughts or suggestions for this endeavor?

Seconded here. I know that it is more work to photo and document a project properly, but i use most of my references like this as a quick reference guide to search for that one detail I couldn't remember when I needed it.

This won't work on naked cells as the flat ribbon wire shorts + to the negative case. I do prefer Tesla style passive fuse to each cell (0.5mm resistor leg) instead. Can be soldered easily, damaged cells can be replaced within minutes, is dead simple and safe. No BMS needed, and so is much cheaper. However, that requires hot glueing the cells together which brings own pros and cons.

Bad advice here. A BMS is ALWAYS required with lithium batteries, even if just one or two cells. This is why any laptop battery, for example, has one. They may only have a few cells, but they still have some type of BMS installed.

good thought but how you choose fuses? which of the many currents do you take in to account? nominal, max

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continuous discharge, max current for 10s, some other current maybe? In general I agree that unprotected cells should be fused, we can discuss the method.

looking at building a 12v 15ah SLA replacement from 18650's cells. space allows me a 8S5 configuration. i need 12v ideally as circuit was designed for SLA, however hope to have a BMS between that and cells. ideally 4s is the best for SLA 12v replacement as 3S would not fair so well. Any suggestions on BMS boards for 40cell array? I'm keen to not turn this into a fireball. I'm also looking at LiFePo drop in replacement, but have a large number of laptop cells available hence asking here.

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