The Right to Repair Battery Packs for Power Tools

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To whom it may concern. My name is Wayne Mathie. I repair and rebuild battery packs for cordless tools for myself and clients. I want better repairability, access to spare parts, and accessible repair information for these products.

All manufacturers I have contacted for spare parts consider their battery packs non-repairable. They do not offer a repair service or supply spare parts, schematics or repair information. The only solution for a failed pack is to throw it away and buy a new one. Within warranty, they also do not offer repair – only replacement. These packs are sent to third party recyclers for destruction or recycling.

All packs consist of a plastic housing, a number of cells (almost always Lithium-ion currently), nickel or stainless strapping, and a Battery Management System (BMS) circuit board that manages the charging, keeps the cells balanced, and prevents charging, discharging or overheating.

In many cases of failure, only one or two cells have failed and these can be replaced and sometimes revived. The cells, usually industry standard Li-Ion 18650, 21700 and other variants, are readily available from many sources around the world in OEM brand and others. The problems with recycling and repair vary a little from brand to brand.

Brands

Brand A: When the BMS detects that some or all cells are out of usable range, it will go into fault mode and stop the tool or charger from working. If there is sufficient power in other cells, it will flash LED indicators to show failure. However, you can easily replace the cells. Once replaced, the battery will be back within the voltage range the BMS expects. Charging the battery will reset the BMS and the pack will work again.

Brand B and C: These are similar to Brand A packs but with a key difference. The BMS goes into fault mode when some or all of the cells go out of usable range and will stop the tool or charger from working. The LED indicators will flash to show failure if there is sufficient power. The difference is that once the cells are replaced and within the correct voltage range, the BMS will NOT reset when charged and the pack will NOT work again.

Brand D: The same as Brand A batteries – the LED display indicates the fault, but the BMS does not need resetting once the pack is repaired.

Brand E: These packs are incredibly difficult to open and, in most cases, impossible to replace some cells without damaging or destroying adjacent cells. I have not had any success in repairing these packs.

There are many other brands – most of which have similar practices.

	Brand A	Brand B	Brand C	Brand D	Brand E	Others
Cells can be replaced	Yes	Yes	Yes	Yes	Causes damage to cells	With difficulty
OEM parts available	No	No	No	No	No	No
Can be reset	Yes	No	No	Does not need reset	?	?

Warranty

All manufacturers require that the retailer or repair agent send the faulty packs to a recycling company, where they are destroyed and shredded for scrap and raw materials. Many of the cells and often the BMS and pack housing could be reused or repurposed. The packs could be refurbished and put back into use. Repurposing the cells or refurbishing the packs would mean less raw materials used for new product, less waste from the recycling process, and less landfill from dumping the unusable material.

A representative from an Australian battery recycling company advised me that most battery manufacturers or suppliers require a Certificate of Destruction or Certificate of Recycling. It means that perfectly good and reusable items are being scrapped. I do understand the safety issues involved, as improper handling, storage and processes pose a serious safety risk. But it is obviously in the manufacturers interest that their batteries are not repaired or efficiently recycled, because it ensures them a full opportunity to sell new product.

Summary

I believe there is an opportunity to make these battery packs repairable and serviceable at great benefit to the consumer and the environment. With some very small changes, the manufacturers can provide spare parts and a repair service. They can harvest usable components from returned packs, or allow the packs themselves to be fixed or refurbished, whether by themselves or third-party repairers.

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