

Battery module disassembly

How to remove battery modules?

The removal of the battery modules is characterized by a combination of steps, starting with loosening the screw connections, finding the exact gripping points, and the hurdle of the highly adhesive effects caused by the heat-conducting paste. Therefore, 83.3% considered this step to be a challenge for automated process control. 3.4.

What is a battery disassembly?

The disassembly of battery systems is a particularly relevant process in the battery cycle. It forms the starting point for reuse, remanufacturing, and recycling paths [5]. These downstream paths and the preceding steps before disassembly can be observed in the bottom section of the cycle in Figure 1.

How do you disassemble a battery pack?

To conduct the operations, destructive disassembly has been a prevailing practice. The disassembly phase of the battery pack includes cutting cable ties, cutting cooling pipes, and cutting bonded battery modules and the battery bottom cover for separation.

How do you disassemble a car battery?

In most cases, disassembly begins with opening the battery pack. Either the housing cover or the switch box is removed first, depending on whether the latter is located on the outside of the housing cover. In both cases, this is mostly done by loosening a number of screws [20].

Can battery disassembly process be automated?

As automation of the battery disassembly process must always be seen in relation to the subsequent purposes, the potential degree of automation according to the respective 3R scenario (Reuse, Remanufacturing/Refurbishment, and Recycling) was also discussed with the experts.

What are the different types of battery disassembly?

According to the degree of automation, the battery disassembly process can be divided into several categories, namely manual disassembly, semi-automatic disassembly, and fully automated disassembly. Automated disassembly has gradually become a significant trend since there are certain safety risks in the disassembly process.

Overview of the closed-loop battery life cycle with disassembly as the central branching point for the 3R paths. The disassembly of battery systems is a particularly relevant process in the battery cycle. It forms the starting point ...

They presented a qualitative framework based on robots for a safer and more efficient disassembly of battery modules with cylindrical cells. The framework integrates a battery information acquisition system, a

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robot-based disassembly system, and a battery classification system . A disassembly time comparison was carried out between manual and ...

The disassembly of battery packs or modules is in line with the relevant requirements of the specification for EV battery recycling, echelon utilization, and disassembly (GB/T33598). Echelon utilization enterprises are encouraged to extend possible echelon products that are suitable for signal base stations, energy storage, charging and replacement, and other ...

In the automotive traction battery recycling process, the disassembly step is crucial for reusing components and recovering recyclates with high purity. Therefore, this ...

Several interconnected modules can analyse the battery pack and, thanks to AI-based algorithms, make decisions on the EoL of the battery for further disassembly actions. Then, a perception unit, such as a vision system, acquires data, produces information, and stores it in a cloud for the execution unit, for example, a robot. Finally, an ...

This work describes the first step in recycling the LIBs nickel-manganese-cobalt (NMC) based module from a full battery electric vehicle (BEV) holding its high recycling ...

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This paper analyses the use of robotics for EVs" battery pack disassembly to enable the extraction of the battery modules preserving their integrity for further reuse or recycling. The analysis highlights that a complete ...

Adding a part to a vehicle means it must be assembled as well as disassembled which results in a need for a product that is optimal for an assembly-line. A literature study is therefore ...

Lithium-ion battery module-to-cell: disassembly and material . analysis . A Prazanov á 1,* , M Havlík Míka 2 and V Knap 1. 1 Department of Electrotechnology, Facu lty of Electrical Engineering ...

AI-driven methods for planning battery disassembly sequences are examined, revealing potential efficiency gains and cost reductions. AI-driven disassembly operations are discussed, highlighting how AI can streamline processes, improve safety, and reduce environmental hazards.

It has been proven that an optimal option for pack disassembling is a human-robot collaboration. The robot conducts efficient cutting on the battery module and allows the operator to quickly sort the battery components and remove connectors or closures.

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This paper presents a method for 3D camera-based localization of points on deformed battery modules, aiding in identifying support points for milling operations in robot-assisted disassembly cells and demonstrates that a balance between accuracy and computational speed can be attained by adjusting point density. Automated robot-assisted disassembly is essential for the ...

This work describes the first step in recycling the LIBs nickel-manganese-cobalt (NMC) based module from a full battery electric vehicle (BEV) holding its high recycling efficiency and considering the process costs and environmental impact. This paper is devoted to module-to-cell disassembly, discharge state characterization measurements, and ...

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