# Battery pack automated disassembly equipment

What is a battery pack disassembly?
Robotic disassembly involves several research topics such as Task and Motion Planning (TAMP), robot tool design, and robot sensor-guided motion. Battery pack disassembly is a part of this field of applications as a practical approach to preserving operators' safety and health by coping with the high variability of products [38, 64].

How to design a battery disassembly system?
The design of the disassembly system must consider the analysis of potentially explosive atmospheres (ATEX) 1 of the area around the battery pack and, if necessary, adopt tools enabled to work in the corresponding ATEX zone.

Is a fully automatic battery pack disassembly possible?
Battery pack disassembly is a part of this field of applications as a practical approach to preserving operators' safety and health by coping with the high variability of products [38,64]. However,most authors agree that a fully automatic battery pack disassembly is not feasiblewith the current constraints [17,21,37,41,56].

Are battery pack designs a key obstacle to automated disassembly?
As identified in various studies,a key obstacle is the significant variation in battery pack designs,which complicates the automation process . Thompson et al. highlighted that the diversity in battery pack designs,along with the use of various fixtures and adhesives,impedes automated disassembly.

Can a robotic cell disassemble a battery pack?
The analysis highlights that a complete automatic disassembly remains difficult, while human-robot collaborative disassembly guarantees high flexibility and productivity. The paper introduces guidelines for designing a robotic cell to disassemble a battery pack with the support of an operator.

How many tools does a robot need to disassemble a battery pack?
In ,authors identified the four mandatory tasks: handling,separation,clamping,and monitoring to pursue the disassembly of the battery pack into modules. The robot needs at least one tool for each listed task. Several works analysed the disassembly,proposing the design of specific disassembly tools.

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 [101]. Similarly, during the disassembly phase of battery modules, cutting operations are used to separate battery cells bonded together with adhesives and electrical connectors between ...

As part of this project, Liebherr is developing strategies and processes for the automated disassembly of

battery packs. The aim is to recover and recycle the highest ...

This paper addresses the development of a flexible robotic cell for the fully automated disassembly of battery modules from battery systems. The paper presents all required tools and processes for battery diagnoses, machine learning-based object recognition, loosening and removing fasteners, opening sealings, gripping components, separating ...

i.e., to be able to handle different battery packs with the same robotic disassembly unit. Keeping in mind the multiformity of EV batteries, the robot must utilize various tools in order to be able to handle as many different EV battery packs as possible. This means that the robot must have access to different tools

In this paper, a robotic disassembly platform using four industrial robots is proposed to automate the non-destructive disassembly of a plug-in hybrid electric vehicle battery pack into modules. This work was conducted as ...

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 ...

DOI: 10.1109/ETFA54631.2023.10275389 Corpus ID: 264041367; Challenges in the Automated Disassembly Process of Electric Vehicle Battery Packs @article{Miloradovic2023ChallengesIT, title={Challenges in the Automated Disassembly Process of Electric Vehicle Battery Packs}, author={Branko Miloradovic and Eduard Marti Bigorra and Thomas Nolte and Alessandro ...

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Automated disassembly is key to efficient, high-value recycling. MTC developed and demonstrated a machine vision led, autonomous task planner deployed on an industrial robot for the automatic detection and unfastening of bolts on complex assemblies, like battery packs.

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To recover the valuable raw materials and components from the battery packs, they must be disassembled and sorted at the end of their service life. Automated processes provide a basis for economic dismantling while minimizing the ...

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In this paper, a robotic disassembly platform using four industrial robots is proposed to automate the non-destructive disassembly of a plug-in hybrid electric vehicle battery pack into modules. This work was conducted as a case study to demonstrate the concept of the autonomous disassembly of an electric vehicle battery pack. A two ...

Design for Assembly and Disassembly of Battery Packs Master"s Thesis in Product Development Mikaela Collijn 931215 Emma Johansson 920728 Department of Industrial and Materials Science CHALMERS UNIVERSITY OF TECHNOLOGY Gothenburg, Sweden 2019 . MASTER"S THESIS 2019 Design for Assembly and Disassembly of Battery Packs A collaboration between ...

This paper addresses the development of a flexible robotic cell for the fully automated disassembly of battery modules from battery systems. The paper presents all ...

Battery Pack Assembly Line Equipment ... detection, NG station, A-side laser welding, automatic fixture plate flipping, B-side laser welding, and manual fixture disassembly. It features a unique double-sided cross spot welding equipment, achieving one-time welding without flipping or moving. 3: Technical Specifications: Dimensions: 45.5M×3.4M×2.3M. Weight: 3000KG. ...

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