EV BATTERY PACK ASSEMBLY

Accelerate throughput and reduce rework with fast inspection and code-reading solutions

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Electric vehicle (EV) battery pack assembly is the final stage of the battery manufacturing process. A battery pack comprises several battery modules and components that protect the battery system and efficiently manage energy.

The EV battery pack assembly process begins with applying an adhesive to the pack tray, which holds modules and other components in place. Cognex machine vision solutions use artificial intelligence (AI) to separate defective glue beads from acceptable beads with tolerable cosmetic anomalies, reducing scrap rates and rework costs. Machine vision also verifies busbars, fasteners, and other components are connected while accounting for various battery pack arrangements.

Various components throughout the battery manufacturing process have direct-part marks (DPMs) to track important information such as product origin, material composition, and manufacturing history. Cognex fixed-mount and handheld barcode readers increase traceability by decoding DPMs in challenging conditions.
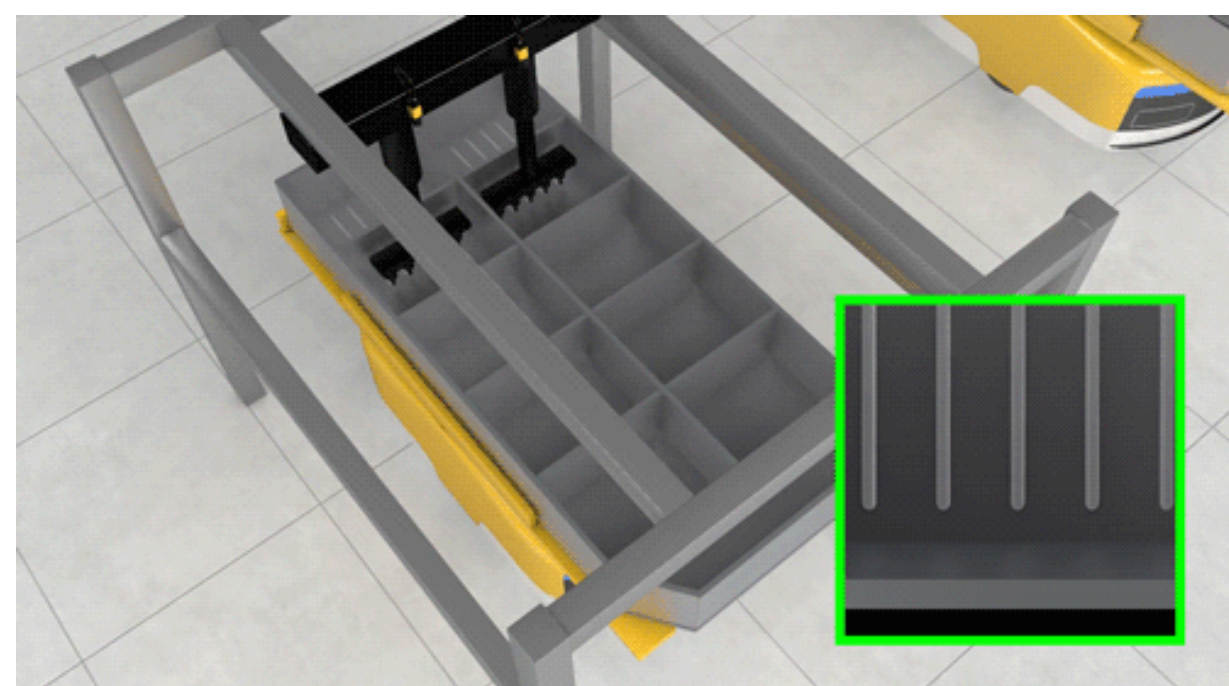
Cognex solutions use advanced machine vision systems and AI-based vision analysis software to analyze glue bead features to separate acceptable from defective beads.

Glue bead inspection

Glue beads help safeguard EV battery pack quality and longevity. Flaws such as gaps, blobs, and uneven volume can cause long-term issues.

The In-Sight series of 2D machine vision systems are embedded with BeadInspect and other advanced software to quickly analyze glue bead features. More robust inspections may require VisionPro Deep Learning, an image analysis software that uses AI to separate defective from acceptable beads by comparing thousands of "good" and "bad" images. When an inspection system needs to measure the height or profile of the glue bead, 3D machine vision systems such as the In-Sight 3D-L4000 are the most effective solution. The system uses a speckle-free blue laser to capture high-quality images and minimize glare.

Busbar and harness assembly verification

Once modules are placed into the battery pack housing, they are secured with busbars, harnesses, connectors, and other electrical components. The arrangement of battery modules and how module parts are connected can vary significantly, complicating the assembly verification process.

Manufacturers mount 2D machine vision systems onto a robotic arm to pick up modules and place them into the EV battery pack tray. In-Sight machine vision systems quickly identify and calibrate visual cues into coordinates, increasing throughput with fast, accurate part fixturing. The In-Sight 3D-L4000 uses 3D vision tools to find the center of connectors and calculate dimensions, automating assembly applications by communicating 3D positions.
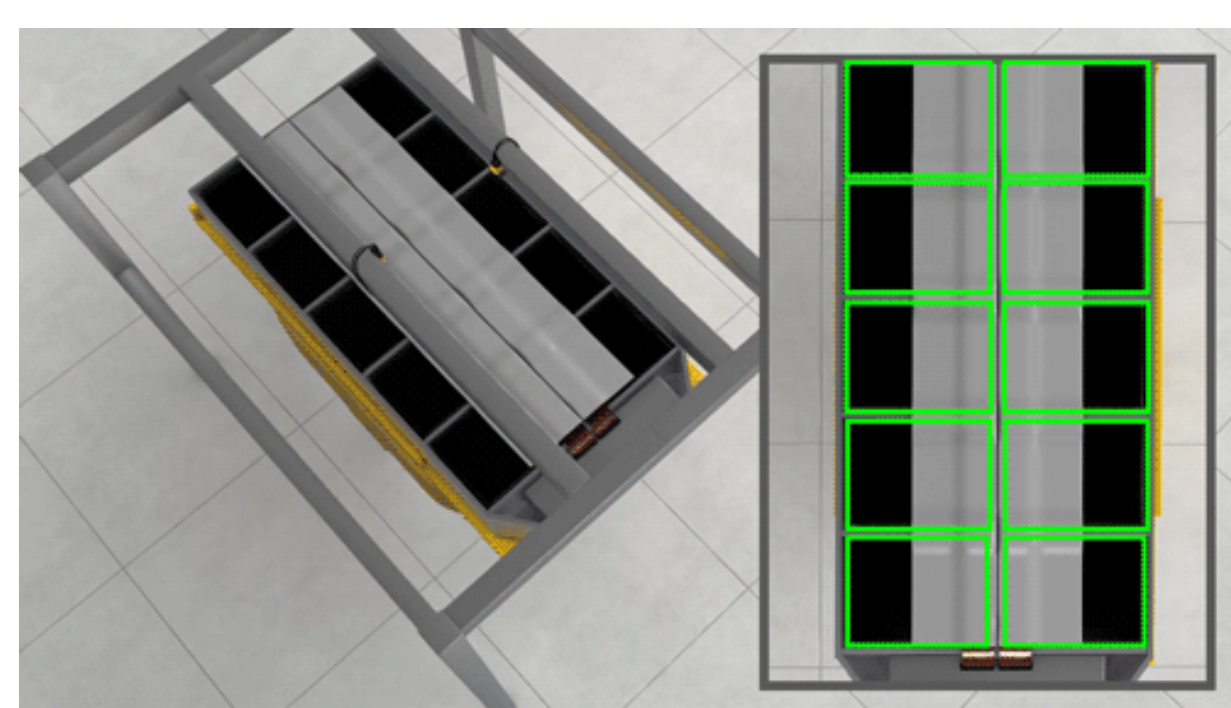

Cognex machine vision systems accelerate EV battery pack assembly guidance and verification by identifying and calibrating visual markings and cues into coordinates.

Cognex AI Automates EV Battery Pack Verification

"The main advantage of using Cognex is the ease of use of the products. The software, the setting up of the tools, is one of the easiest I've seen by far in the industry."

- Mathieu Van Parys, Co-Founder and Head of Research and Development, Ansomat

Watch the Video
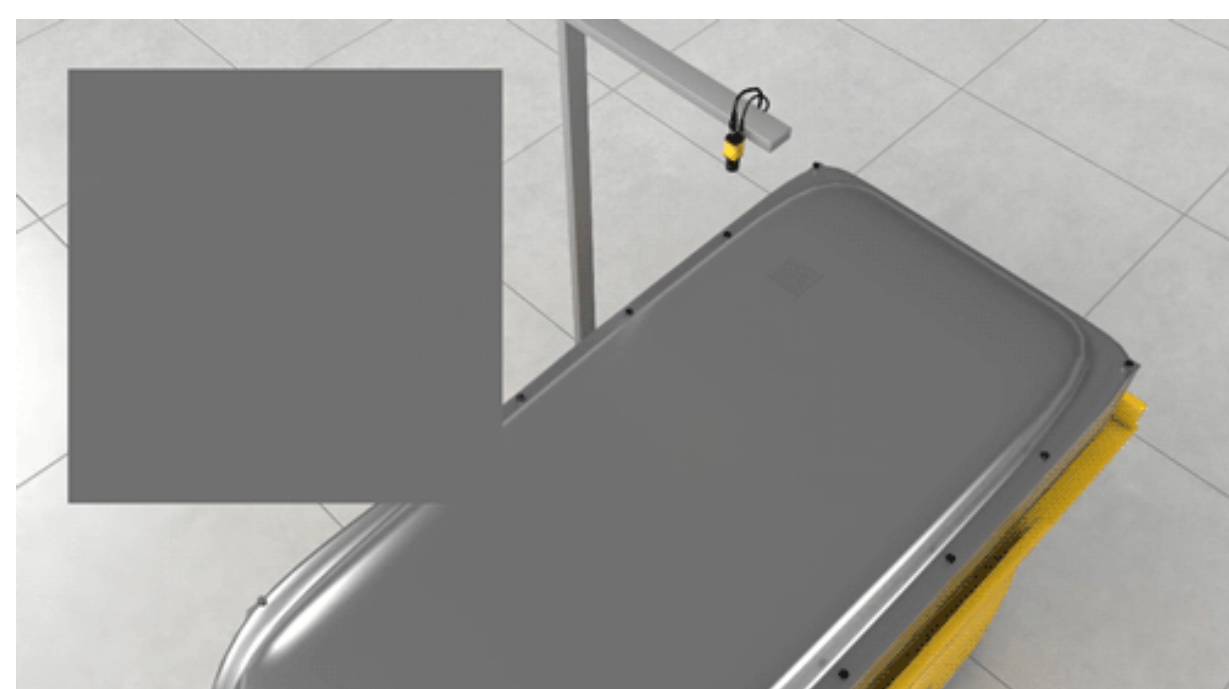
Cognex barcode readers use advanced image formation and decoding technology to read DPMs on reflective surfaces, such as EV battery packs, in challenging environments.

DPM reading

Tracking component information such as origin, material composition, and manufacturing history is critical to conforming to EV regulations. Reading DPMs is generally more challenging than reading label-based codes; surfaces can be matted, cast, highly reflective, dirty, or in various finishes.

Choosing between a fixed-mount and handheld DPM reading solution depends on the level of automation, part positioning, and other variables. Fixed-mount DataMan 280 series and handheld DataMan 8700 series readers increase component traceability, using robust image formation and decoding technology to read DPMs on reflective, curved surfaces in challenging settings.

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Machine vision and barcode reading solutions for EV battery manufacturers and automotive makers

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Discover how deep learning is being used in EV manufacturing

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