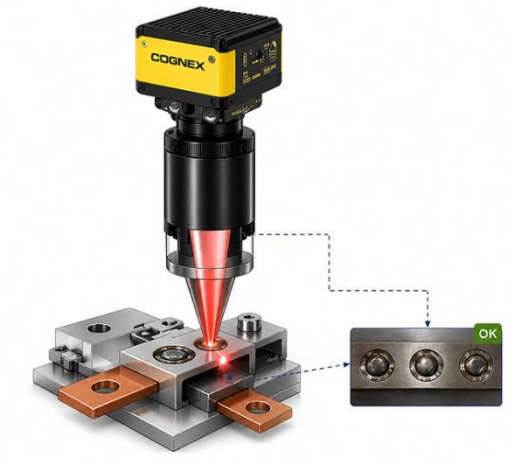
Offset Correction and AI-Assisted Seam Inspection



Our solution combines precise process control and automatic quality inspection in one integrated inline system for laser welding. Immediately before the welding process, the camera integrated into the laser optics captures the exact position of the contact surfaces and calculates the necessary offsets for each individual weld point in real time. This allows positional deviations to be corrected instantly, ensuring highly precise weld guidance even under dynamic production conditions.

After welding, the integrated machine vision automatically inspects the completed weld points. The system reliably detects whether all connections are present and then uses artificial intelligence to assess the quality of the weld seams based on image data. Multiple contact areas within a component can be analyzed in parallel without disrupting the process flow.

The key value lies in combining path correction and quality assurance in a single system. Direct integration of the camera into the laser optics reduces integration effort, enables very short cycle times, and ensures stable, reproducible production. Errors are detected early, scrap and rework are reduced, and every weld point is monitored without gaps.

The solution is particularly well suited to highly dynamic applications in battery production, electronics manufacturing, and precision engineering, where maximum precision, process reliability, and continuous inline quality control are essential.

Customer quote:

“Thanks to camera-based offset correction and integrated quality inspection, we have significantly stabilized our welding process and identified defects early on.”

Technical Highlights & Benefits

Inline Position Detection	■ Detects the position of contact surfaces immediately before welding
Integration into Laser Optics	■ Camera views through the optics ■ No additional sensors required
AI-Based Quality Assessment	■ Assesses weld seam quality based on image data
Multi-Point Inspection	■ Parallel assessment of multiple contact pairs within a single component
Real-Time Offset Calculation	■ Automatic correction of weld position for each individual point
Weld Presence Check	■ Reliably detects whether all weld points have been set
High-Speed Process	■ Designed for very short cycle times and continuous processes
Process Reliability	■ Reduces scrap through early defect detection

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