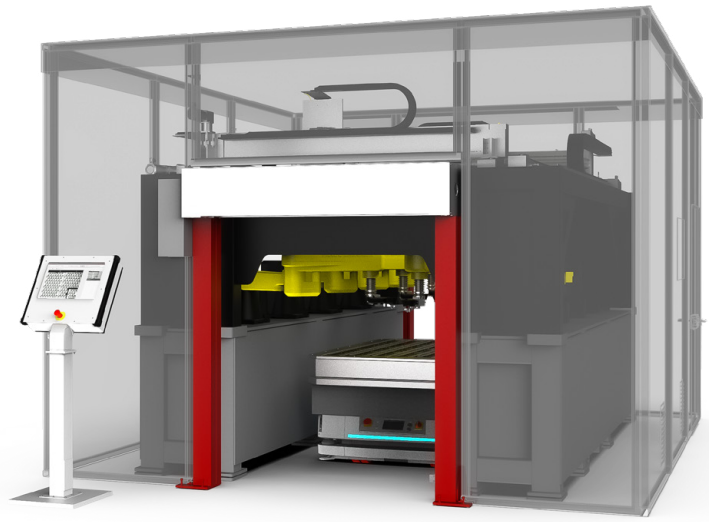
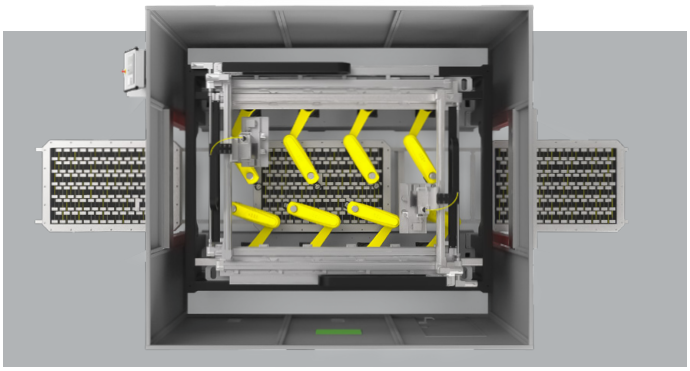
LASERAX

BATTERY PACK LASER WELDING MACHINE

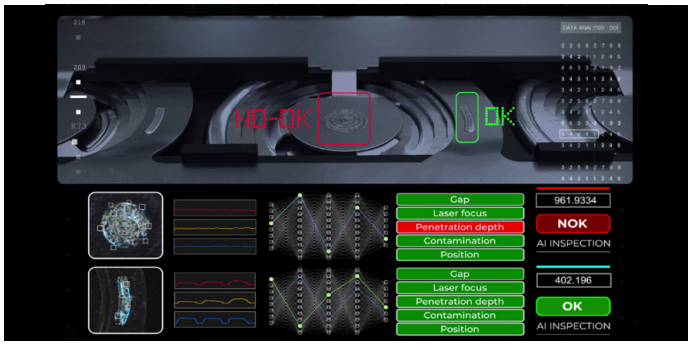
Engineered for inline integration in high-volume EV battery production lines, the Battery Pack Laser Welding Machine performs cell-to-busbar welding at the scale of a full battery pack. Multi-robot dynamic clamping, integrated 3D vision, and Dual-Source AI weld quality monitoring deliver high throughput and high first-pass yield on the most demanding battery designs. Scalable from a fully enclosed Class-1 cell to an open-design configuration, the platform is unified under a single control software that manages clamping, vision, laser, and weld monitoring as one making it a complete inline solution ready for full-pack and cell-to-chassis production.





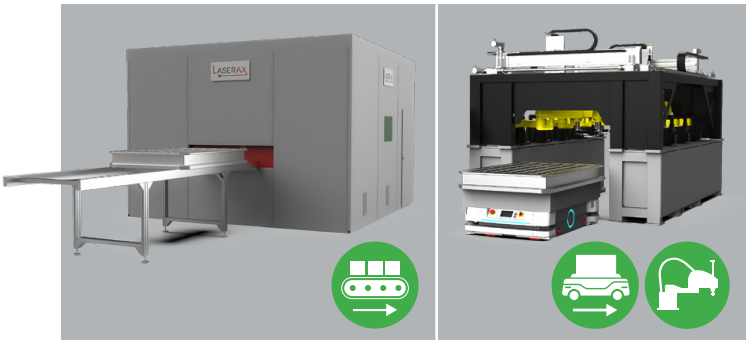
HIGH-THROUGHPUT MULTI-ROBOT CLAMPING

Up to 8 SCARA robots dynamically clamp each cell-to-busbar connection while the laser welds in parallel, keeping laser duty cycle high. Clamping tools provide force feedback and motorized angle adjustment. Optional second laser source on an independent gantry for increased throughput or full redundancy.



AI-POWERED IN-CYCLE WELD QUALITY

Our Dual-Source AI inspects every weld, identifies the defect type, and triggers automated rework inside the same station, in the same cycle. Photodiode emissions and HD images analyzed in real time, boosting first-pass yield and reducing scrap on high-value packs.



ADAPTABLE and CONFIGURABLE

The platform scales to different battery module, pack, and cell formats. Available as a fully enclosed Class-1 safety cell or open-design configuration. Robot count is sized to your throughput target. Configurable part loading and laser monitoring options available.

UNIFIED CONTROL ARCHITECTURE

Clamping robots, vision, laser, and weld monitoring are managed within a single integrated control software. Built-in recipe manager, calibration routines, and MES communication accelerate deployment and simplify long-term support. A single point of accountability across the complete welding process.

Laser Specifications

Battery Pack Laser Welding Machine (BPWM)	
Laser Power	2000W single-mode continuous-wave (typical for <2mm busbar) 1000-6000W power range available (Single-mode, Multi-mode, Ring-Core)
Laser Type	Ytterbium-doped fiber
Wavelength	1070 nm
Laser Source MTBF (typical)	100,000 hours
Laser Process	Laser welding of busbar for cylindrical and prismatic cells
Part Material	Nickel-plated steel, aluminum, copper, stainless steel (all metals)
Cooling	Water-cooling (chiller included)
Weld to Cell Accuracy (typical)	± 100 µm (with vision)
Tooling/Clamping	Laserax engineered, included module adapted busbar clamping tool on SCARA robots
Machine Control	Laserax controller with complete welding machine programming interface on operator HMI
Communications	Ethernet/IP, PROFINET, EtherCAT, OPC-UA (others available)
Power Requirements	480V/60Hz or 400V/50Hz
Power Consumption	27kW (typical with a 2000W laser source) 40kW (typical with a 6000W laser source)
Operating Temperature	15°C to 35°C
Operating Humidity	< 70%
Part Loading Options	Conveyor / AGV / Floor Conveyor
Vision	Integrated 3D vision system X-Y-Z measurements Pre-welding inspection
Fumes Extraction	Included
Enclosure	Class-1 certified laser safety enclosure with interlocked doors (Open structure version available)
Laser Machine Size*	
Total Welding Area (X-Y)	2400 x 1500 mm (Adaptable)
SCARA Robots Configuration	4 to 8
General Dimensions (W x D x H)	3500 x 3000 x 2600 mm (Open structure) 4500 x 4000 x 3000 mm (with Class 1 enclosure)
Typical Weight	7000 kg

*Adapted sizes available

Welding Process Data and Options	
Welding Optics Field of View	400 x 400 mm 650 x 650 mm
Welding Speed (typical)	100ms per cell (2 welds, 21xxx series) 150ms per cell (2 welds, 46xx Series) 300ms per pole (Prismatic)
3D Vision Field of View	400 x 400 mm 650 x 650 mm
Weld Monitoring	Dual-Source, AI-powered weld quality monitoring Defect type identification with Root-Cause detection and In-cycle rework
Tooling/Clamping	SCARA robots with dynamic tooling for individual cell clamping Clamping tool pressure tip adapted to cell and busbar types
Tooling/Clamping Features	Automated clamping position correction from vision feedback Clamping pressure feedback Motorized angle adjustment Shielding gas option Integrated dust extraction Automated clamping tool cleaning station
Laser Monitoring Options	Power measurement Focus position and spot size measurement Full beam caustic measurement

LASERAX

INDUSTRIAL LASER SOLUTIONS

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