

*A Collaboration Driving the Future of Battery Welding*

# Welding at Warp Speed: RMA & RAYLASE Redefine Battery Production



As demand for battery packs accelerates, manufacturers are under pressure to deliver ever-faster, more reliable, and scalable production systems. This is where the collaboration between RMA – a Polish machine builder specializing in industrial laser systems focused on battery production – and RAYLASE – a German provider of precision laser beam deflection units – is setting new benchmarks in battery laser welding performance.

Their joint effort brings together RMA's robust automation platforms and welding know-how with RAYLASE's high-performance scanning heads and control technology. The result? A powerful, flexible welding solution tailored to the needs of battery production today – and ready for the innovations of tomorrow.

## Built for Speed: RMA's Battery Welder in Action

RMA's Battery Welder platforms – including models like BW Spot, BW Flex, BW Flex Turntable, and BW Max – are engineered for industrial-scale battery production. These systems offer:

- ▶ Short welding cycles (even less than 0.1 second per weld),
- ▶ Adaptability to different battery cell types (cylindrical, prismatic, blade, pouch),
- ▶ Modular automation, with options for manual, semi-automated, or fully automatic configurations.

The machines are designed with industrial reliability and serviceability in mind. They can operate 24/7 in demanding environments and include diagnostic tools, user-friendly software (BW Interface), and open integration standards for lasers, optics, and monitoring systems.

## RAYLASE Technology: Precision at the Core

To achieve high-throughput laser welding with consistent quality, precise beam steering is the key.



That's where RAYLASE's AXIALSCAN FIBER series comes into play. These pre-focusing laser scanning heads are engineered for dynamic, high-power laser applications like battery tab and busbar welding. Key features of RAYLASE's heads include:

- ▶ Pre-focusing optical architecture with real-time Z-axis adjustment,
- ▶ Compact, sealed IP64 housing, built in a Class 7 cleanroom,
- ▶ Integrated collimator, allowing direct fiber coupling without external optics,
- ▶ SP-ICE-3 controller and RAYGUIDE software, enabling fast pattern programming, flexible power modulation, and precise timing.

Thanks to this design, the AXIALSCAN FIBER series is plug-and-play from a machine builder's perspective. The optical path is factory-aligned and protected by internal and external glass layers. The only maintenance required is occasional replacement of a protective window – a process that takes minutes and doesn't interrupt production.

RMA integrates these heads into its welding platforms without additional alignment, ensuring consistent optical performance and short commissioning times.



## Battery Laser Welding Without the Complexity

One of the biggest advantages of the RMA–RAYLASE combination is simplicity. Because the scanning head arrives fully configured, it integrates directly into RMA's systems. There is no need for manual beam alignment or adjusting optical components between the laser source and weld point.

This significantly reduces the chance of misalignment, maintains beam quality over time, and allows system integrators to focus on process development, not optics setup.

Moreover, thanks to RAYLASE's advanced software platform, welding patterns can be adjusted with precision, including velocity-based power control and path shaping options such as spirals or Lissajous curves. This gives RMA and its customers the flexibility to optimise each weld for material thickness, cell geometry, and required strength.

## Scalable Technology with Tailored Implementation

RAYLASE's product portfolio includes a range of advanced features designed to support even the most demanding laser welding applications. Among them there are options such as distance-based focus control, camera-guided vision alignment, and air-knife nozzles for fume and spatter suppression. These capabilities offer a roadmap for enhanced process monitoring, precision, and optical cleanliness.

In the collaboration with RMA, the system configuration remains highly application-driven. RMA's engineering team selects and integrates features based on performance criteria validated through real-world testing and customer requirements. This ensures that every welding station delivers optimal results without unnecessary complexity.

By aligning feature sets with functional priorities, RMA and RAYLASE demonstrate a pragmatic approach to high-performance battery laser welding: delivering what matters most now, while staying open to what may be needed next.





## Collaboration That Drives Progress

One area where collaboration has already resulted in meaningful innovation is OCT sensor integration. In cooperation with RMA, RAYLASE has adapted its scanning architecture to allow external monitoring modules—including optical coherence tomography (OCT)—to interface with the head.

This paves the way for advanced process feedback, such as measuring weld depth or surface height before or after the weld. The platform is now open for future sensor integration. As battery production scales and traceability becomes a must-have, these features will become increasingly relevant.

Importantly, this co-development also helped both companies enhance process monitoring capabilities – ensuring that every delivered solution is not just fast, but also repeatable, clean, and robust.

Ready for the Next Generation of Battery Welding  
RMA and RAYLASE are both focused on the evolving needs of battery manufacturers. While today's systems prioritise speed, reliability, and ease of integration, tomorrow's welding platforms will incorporate more process control, inline verification, and multi-layer joining as battery pack designs become more complex.

With their current collaboration, the two companies have already laid a scalable foundation. RMA offers a proven machine architecture with sophisticated control software that can integrate the latest laser, sensor, and motion technology – while RAYLASE continues to push the envelope in scanning head performance and control intelligence.

## Conclusion: A Partnership Built on Precision and Practicality

In the world of battery laser welding, not every system needs every feature, but every system needs to deliver speed, consistency, and uptime. The RMA–RAYLASE partnership hits that balance: it offers a smart combination of field-tested reliability and technological agility, giving manufacturers a path to high-performance welding today, with options to evolve tomorrow.

Whether building EV battery packs, energy storage modules, or industrial power systems, this collaboration delivers a welding platform that is fast, clean, and ready to scale.

### Highlights:

- ▶ Integrated RMA–RAYLASE solution for high-speed battery laser welding
- ▶ Sub-0.1 second welding cycles with modular Battery Welder platforms
- ▶ Plug-and-play AXIALSCAN FIBER scanning heads with no manual alignment
- ▶ Advanced pattern control via SP-ICE-3 controller and RAYGUIDE software
- ▶ Optional features: OCT sensors, vision alignment, air-knife nozzles
- ▶ Application-driven system configuration focused on reliability and scalability