RMA®

Laser Welding Systems

Battery Welder Series

Laser welding platforms for battery pack and module production
- from R&D bench to full-volume line.

myrma.eu

Inside

This brochure walks through the Battery Welder series, our Laser Application Center on both sides of the Atlantic, and why laser welding earns its place on your line.

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ABOUT RMA

Process first. Machine second.

We are an engineering and technology company **focused on laser technology solutions** for battery manufacturing.

Rather than supplying standalone machines, **we design and deliver complete production processes.**

Our work begins in the Laser Application Center, where **we develop and validate optimal welding parameters**. From there, we translate process requirements into fully engineered production systems tailored to each customer's application and manufacturing environment.

A key element of **our approach is process control at every stage**.
By precisely verifying the position of each joint before welding, we ensure that high throughput is matched with accuracy, consistency, and repeatability.

Engineered for process stability.
Built for production reality.

WHAT WE DO

We deliver complete production processes.

RMA enables manufacturers to transform innovative laser technologies into reliable, scalable and cost—effective industrial production.

01

Develop

Development & optimization of laser processes - feasibility studies, PoC, parameter optimization, design for manufacturing, prototype and sample production.

- FASTER TECHNOLOGY DEVELOPMENT
- REDUCED DEVELOPMENT RISK

02

Validate

Proving process quality and production readiness - metallography, material analysis, pull-off and tensile testing, repeatability assessment, validation reports.

- VERIFIED PERFORMANCE
- OBJECTIVE QUALITY CONFIRMATION

03

Industrialize

Transforming validated processes into reliable production systems — standard Battery Welders, custom machines, automation, robotics and line integration.

- FASTER RAMP—UP
- LOWER TOTAL COST OF OWNERSHIP

04

Support

One accountable partner for the entire system — spare parts stock, service contracts, hotline and remote diagnostics, continuous process optimization.

- MAXIMUM UPTIME
- ONE PARTNER FOR THE COMPLETE SOLUTION

The Business Impact — Customer Value

— from concept development to serial production

Faster time—to—market	Reduced technology and investment risk	Stable, repeatable manufacturing processes	Higher product quality at lower manufacturing cost	A single technology partner for the entire lifecycle

RMA

BATTERY WELDER SERIES

One process. Every volume.

Parameters validated on one machine transfer directly to any other in the series — no re-engineering, no repeat validation.

	MAX	SPOT	FLEX	TURNTABLE
APPLICATION	Full automation, highest throughput	R&D, low-volume, rework	High customization, mixed production	Flexibility & efficiency, turntable-fed
LOADING	Fully automated	Manual / auto-loading ready	Configurable	Semi automatic
BEST FIT	High-volume production	Entry point, prove the process	Mixed-model lines	High volume semi automatic

Four platforms, one engineering DNA

The Battery Welder series is built on one idea: the weld process shouldn't depend on the machine it runs on. From a manual lab cell to a fully automated line, every system uses the same optics, sensors and software - you choose the level of automation, not a different process.

Every Battery Welder shares the same process-control architecture - automatic vision recognition, zero-gap clamping, connection height measurement, focal position adjustment and online process monitoring.

ENTRY POINT

Battery Welder Spot

The simplest entry point into the series - configurable with up to four press fingers, built to prove the process before it scales.

Spot is where most programs start: manual or automated loading, up to four press fingers, and the same strategy process control used across the entire series. It's built for R&D, low-volume production and rework — proving a weld recipe before it moves to a Flex, Turntable or Max option.

ENTRY POINT | VISION-VERIFIED | DIRECT PROCESS TRANSFER

DEFINING FEATURES

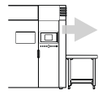
Clamping unit designed for the specific product

OPTION

Rotary clamping finger

OPTION

Automated loading & unloading



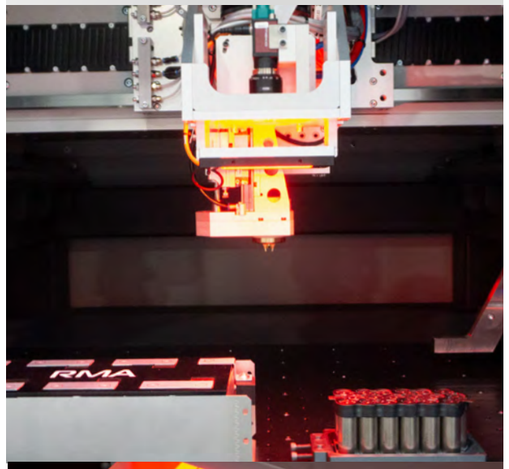
OPTION

Integration with automatic conveyors

TECHNICAL SPECIFICATION OF BW SPOT*

MACHINE DIMENSIONS (LxWxH)	1800x2350x2600 mm 70.87 x 92.52 x 102.36 in
WORKING PRESSURE	min. 5 bar
MACHINE POWER	15 kW
WEIGHT	3600 kg 7,936.64 lbs
WORK AREA**	max. 600x400 mm max. 23.62 x 15.75 in

* Subject to change without notice; non-binding for AIC S.A.
** Work area customizable; final dimensions depend on machine configuration.



FULL AUTOMATION

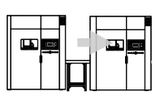
Battery Welder Max

Full automation, highest throughput — the production-scale platform in the series, built for continuous high-volume welding with full traceability.

Designed for lines running at full volume, Max integrates the same strategy process control validated on smaller machines in the series into a fully automated solution — automatic loading, in-line inspection and continuous monitoring, with no manual intervention between cells.

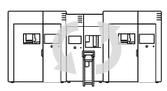
FULL AUTOMATION | HIGHEST THROUGHPUT | PER-CELL TRACEABILITY | 24/7 OPERATION

DEFINING FEATURES



Integration with automatic conveyors

Clamping unit designed for the specific product



Compatible with automatic flip-over station

OPTION

Rotary clamping finger

TECHNICAL SPECIFICATION OF BW MAX*

MACHINE DIMENSIONS (LxWxH)	2350x3400x2700 mm 92.52 x 133.86 x 106.30 in
WORKING PRESSURE	min. 5 bar
MACHINE POWER	15 kW
WEIGHT	> 3600 kg >7,936.64 lbs
WORK AREA**	max. 1000x800 mm max. 39.37 x 31.50 in

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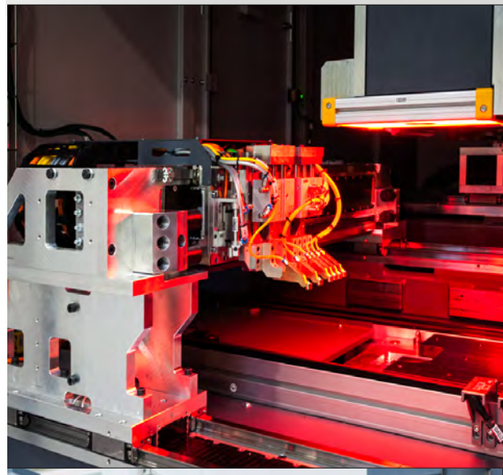
** Work area customizable; final dimensions depend on machine configuration.

Engineered for process stability. Built for production reality.



MIXED PRODUCTION

Battery Welder Flex

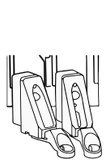
High customization for mixed production - configurable tooling and process recipes for lines running multiple pack or module formats.

Flex brings the series' full process-control architecture to mixed-model production, where format and fixture changeovers happen often. Tooling and welding recipes are configurable per job, so switching between products doesn't mean re-validating the process from scratch.

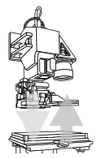
It sits between Spot and Max in the series: automated enough for real production volume, flexible enough for lines that don't run a single part all day.

CONFIGURABLE TOOLING | MIXED-MODEL READY | VISION-VERIFIED

DEFINING FEATURES



Clamping unit designed for the specific product



Automatic height table adjustment

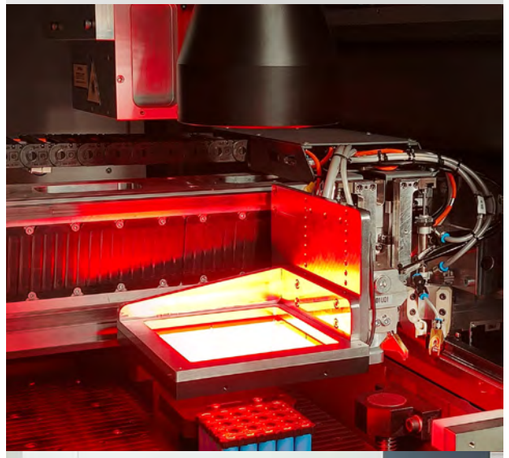
OPTION
Automated loading & unloading

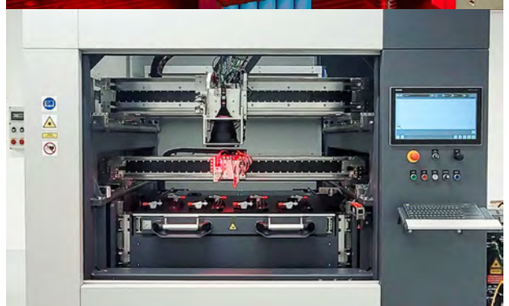
OPTION
Rotary clamping finger

TECHNICAL SPECIFICATION OF BW FLEX*

MACHINE DIMENSIONS (LxWxH)	2350x2800x2800 mm 92.52 x 110.24 x 110.24 in
WORKING PRESSURE	min. 5 bar
MACHINE POWER	15 kW
WEIGHT	5000 kg 11,023.11 lbs
WORK AREA**	max. 1200x800 mm max. 47.24 x 31.50 in

* Subject to change without notice; non-binding for AIC S.A.
** Work area customizable; final dimensions depend on machine configuration.





TURNTABLE-FED

Battery Welder Turntable

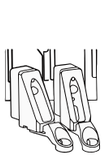
Flexibility and efficiency, turntable-fed — continuous part presentation for steady, high-utilization welding cycles.

A rotary turntable keeps parts continuously staged and presented to the weld head, minimizing idle time between cycles while an operator or automated feeder loads and unloads at other side of the table.

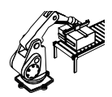
It's the balance point in the series for teams that want near-continuous throughput without committing to a fully automated Max platform.

TURNTABLE-FED | HIGH UTILIZATION | VISION-VERIFIED

DEFINING FEATURES



Clamping unit designed for the specific product



OPTION
Automated loading & unloading

OPTION
Rotary clamping finger

TECHNICAL SPECIFICATION OF BW TURNTABLE*

MACHINE DIMENSIONS (LxWxH)	2100x2350x2600 mm 82.68 x 92.52 x 102.36 in
WORKING PRESSURE	min. 5 bar
MACHINE POWER	15 kW
WEIGHT	4600 kg 10,141.26 lbs
WORK AREA**	max. 600x400 mm 23.62 x 15.75 in

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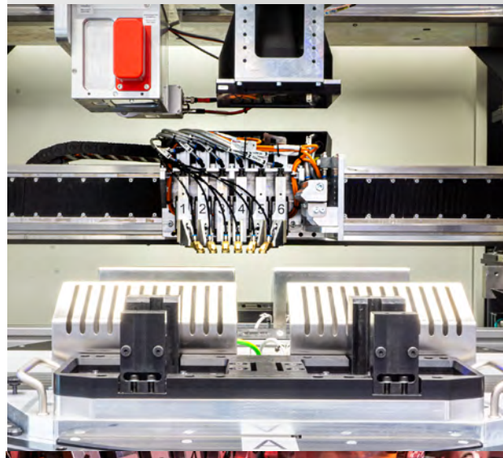
** Work area customizable; final dimensions depend on machine configuration.

Engineered for process stability. Built for production reality.



HMI & SOFTWARE

One interface.
Every machine in the series.

The software that runs your Battery Welder — integrated with WinCC, built for configuration and control of battery pack welding in production.

Software structure.

Production functions

- Welding sequences — process and live visualization
- Rework — operator-guided joint repair
- Teach & Weld — process development
- Module programming — BWI editor, pack wizard
- MES integration — tailored to customer need

Technical functions

- Tool calibrations — camera, laser, clamp, focus, power
- Work-area calibrations — across the full field
- Verifications — force, focus, vision, power stability
- Manual operation — direct control, on-screen feedback

KEY CAPABILITIES

Maximizing efficiency and quality in welding.

01 Welding sequences

Module frame found automatically from characteristic points — XY origin and skew corrected. Vision and welding zones run asynchronously: detection in the background, head keeps welding. Joints aligned to the real position of connector and terminal.

- MATCHING
- ASYNC VISION
- MULTI-MODULE

02 Rework

NOK joints pulled from production logs and shown on the module map. The gantry positions itself; the operator sets clamping and weld point on the HMI and confirms. Dedicated rework weld programs.

- LOG DRIVEN
- SEMI-AUTOMATIC
- MES REPORTING

03 Teach & Weld

Process development on one screen — gantry jog, clamping, vision preview. Sequence recipes saved and recalled. Runs step by step, in laser simulation, without vision or clamping, in a loop, or with operator pauses for connector assembly.

- STEP-BY-STEP
- LASER SIMULATION
- LIVE VIEW
- SEQUENCE RECIPES

04 Process monitoring & traceability

Integrated with OCT and photodiode systems. Live view of detected cells, welded connectors and the monitoring result per joint. Data to MES for the module and every individual weld.

- OCT
- LWM
- PER-WELD LOGS
- MES

05 Calibration & verification

Guided routines for machine zero, clamp Z and force, camera-to-laser, focus and power map — across the whole working field. Verification confirms force, focus, vision and power stability before production resumes.

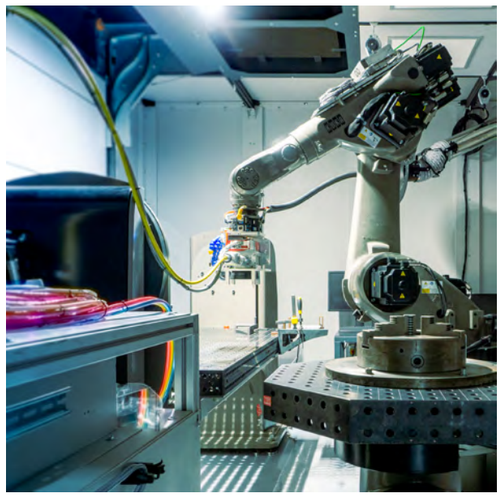
- FOCUS FINDER
- POWER MAP
- WHOLE FIELD

TECHNOLOGY · LABORATORY

Laser Application Center

RMA's Laser Application Center (LAC) is a one-of-a-kind facility for laser process development, testing and expert consultation. Bring your parts — our applications engineers run trials on modern laser sources, dedicated processing heads and instrumentation, so you can validate a process before committing to a machine.

The LAC operates under RMA's ISO 9001:2015 certification, with specialists who continuously develop new, innovative laser process solutions — backed by the wider engineering resources of the AIC S.A. group.



Develop — where every process begins.

- Process development for battery modules and battery packs
- Battery and busbar design optimization for laser welding (Design for Manufacturing)
- Feasibility studies and Proof of Concept (PoC)
- Laser welding parameter optimization
- Prototype manufacturing and sample production
- Material and joint design optimization
- Process documentation and industrialization support

Validate — proving process quality and production readiness.

- Metallographic analysis (penetration, fusion and weld area measurement)
- Material analysis
- Pull-off and tensile strength testing
- Process repeatability assessment
- Validation reports and test documentation

Customer value:

VERIFIED PROCESS PERFORMANCE

OBJECTIVE QUALITY CONFIRMATION

COMPLIANCE WITH CUSTOMER QUALITY REQUIREMENTS

REDUCED PRODUCTION RISK

WHY VALIDATE BEFORE YOU COMMIT

Prove the process on your own parts.

Real Cells, Real Fixtures

Validation runs on your own cells and pack geometry, not generic samples.

Same Standard, Both Sides

Gdynia and Greer share one process control methodology and documentation format.

Transferable Parameters

Recipes validated in the lab move directly onto any machine in the series.

No Overseas Delay

US customers validate locally, on their own manufacturing timeline.

Two labs. One validation standard.

Process validation isn't limited to Europe. RMA's Laser Application Center is mirrored by a dedicated facility in the United States — so North American customers validate a process on real parts, locally, under the same process control standard.

EUROPE

Laser Application Center, RMA

UL. RDESTOWA 41, 81-577 GDYNIA,
POLAND

The primary facility — full range of laser sources, processing heads and instrumentation, run by RMA's own applications engineers.

NORTH AMERICA

Li10 Laser

55B CONCOURSE WAY, GREER, SC 29650,
UNITED STATES

RMA's North American sales and service partner, with a Battery Welder on-site for demos and validation. Local support for cylindrical, prismatic and pouch modules, from workstations to complete lines.

BOOK A VALIDATION SESSION

MATERIALS & DISSIMILAR-METAL JOINTS

A wide range of materials, including challenging dissimilar-metal joints.

Laser welding addresses a wide range of mixed-metal module assembly requirements — copper to aluminum, plated to bare, and thin foils to thick busbars — through a single process validated for each material pair.

- STEEL
- STAINLESS STEEL
- COPPER (NICKEL-PLATED)
- COPPER ALLOYS
- NICKEL
- ALUMINUM
- LAYERED MATERIALS

01

Cell types

- Cylindrical — single-sided
- Cylindrical — double-sided
- Prismatic
- Pouch
- Blade

02

Joint types in the module

- Connectors
- Busbars
- Enclosures
- Measurement taps
- Fuses

Production & quality — why laser

Every Battery Welder is built and validated at RMA's own facility in Gdynia. Machines are engineered for stable, repeatable welding performance, with every process validated before it leaves the factory: efficient validation and revalidation, full traceability across production, and reliability built for continuous manufacturing.

- MINIMAL HEAT—AFFECTED ZONE (HAZ) — UP TO 80% REDUCTION[1]
- 2–6 M/MIN CONTINUOUS WELDING SPEED[2]

[1]Significant heat-affected zone (HAZ) reduction compared to conventional resistance spot welding — confirmed through metallographic testing at RMA's Laser Application Center.

[2]Represents the optimal process window for continuous fiber laser seam welding (1–3 kW) on EV battery interconnects and casing joints to achieve spatter-free penetration.

Validate your process before you commit to a machine.

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