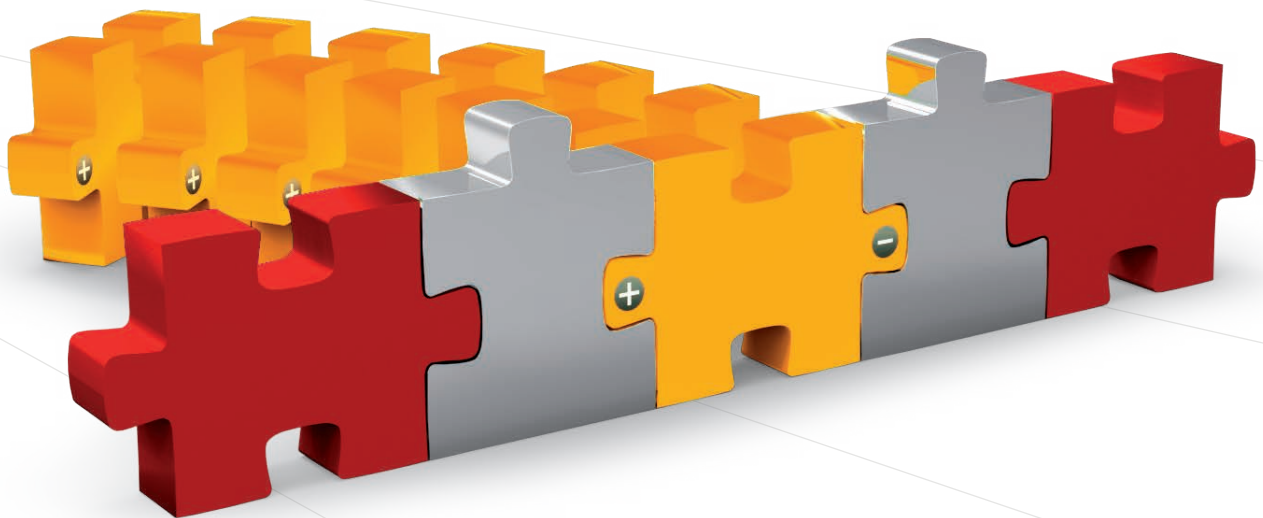
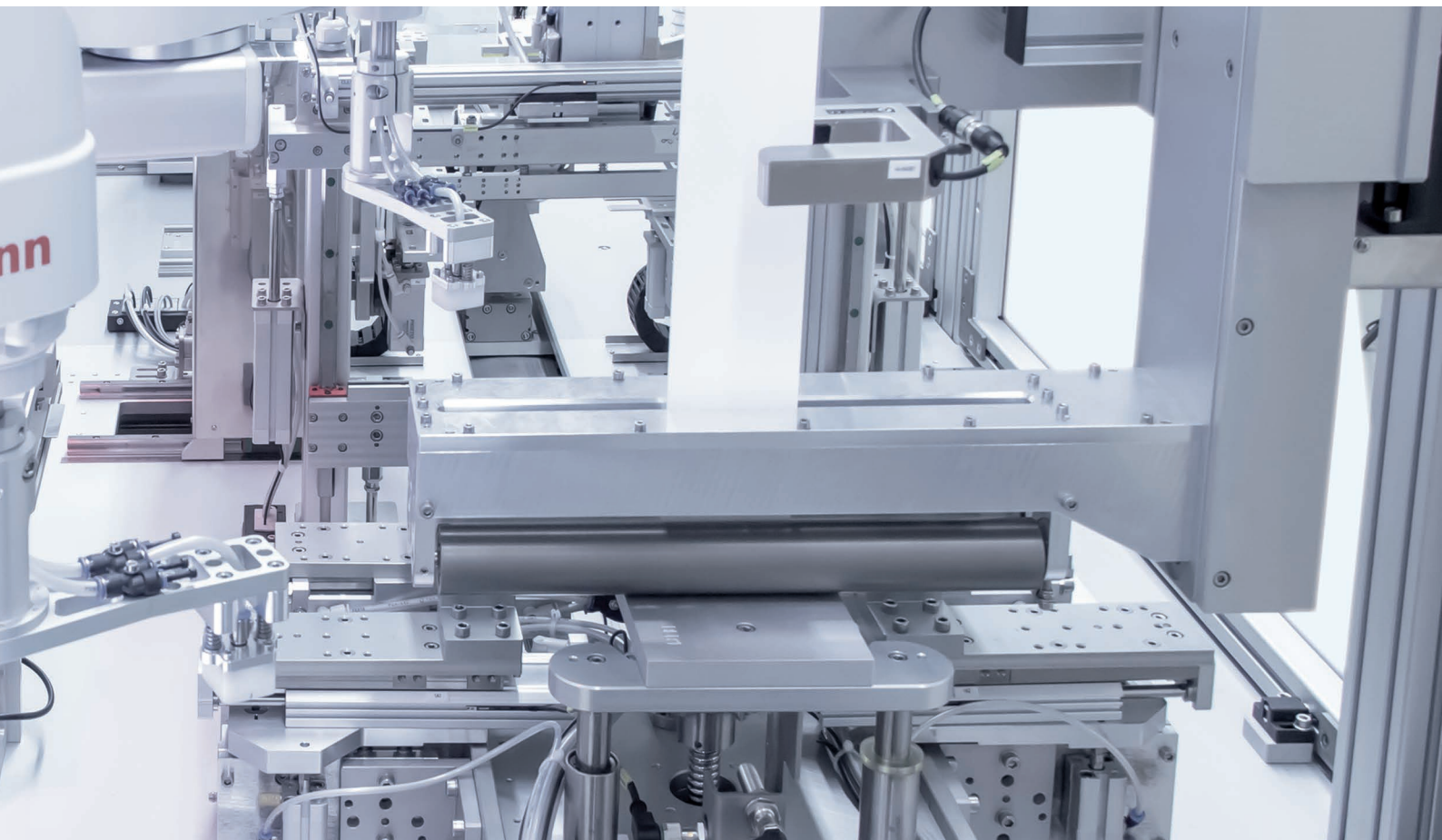


Systems for Research Production and Small-Series Production

ENERGY STORAGE





SOLUTIONS FOR ENERGY STORAGE

Jonas & Redmann has been delivering innovative technologies since its founding in 1989. For energy storage, we can provide machines for a wide range cell sizes and production volumes. We can provide individual machines with low volume and high flexibility for use in research and development. We can further integrate and customize these systems as R&D turns into pilot and start-up production. All of our systems include advanced technologies and features including:

- Process and product research
- Demonstration of prototypes and sample series
- Optimization of components, technologies and process parameters
- Feasibility studies

Our solutions for labs, universities and process evaluation at manufacturers of lithium-ion batteries increase the quality and safety of lithium-ion batteries, lower production costs and optimize near-series production processes with automation technology.

Configuration:

- Modular set-up to exchange tools or measuring equipment quickly and precisely
- Tabletop systems or compact, stand-alone systems (with wheels)
- Simple operating concepts and clear documentation of process parameters
- Integrated measuring equipment upon customer request
- Input of process parameters or recipe generation via external PCs or a control panel
- Regular recording of process parameters, including optional backup in individual files or transmission to a subordinate data collection system – backup frequency can be set individually for each parameter

Advantages:

- Shorter time-to-market
- Flexibility, speed and lower costs in the production of prototypes
- Maximum reproducibility of process parameters



RESEARCH TOOLS FOR PRODUCTION OF LITHIUM-ION BATTERIES

We are providing flexible and compact cell, module and system assembly equipment for pilot and small-scale production as well as the assessment of product design suitable for series production. Our portfolio covers the automation of essential steps in the manufacturing of prismatic cells and battery cells in pouch format.




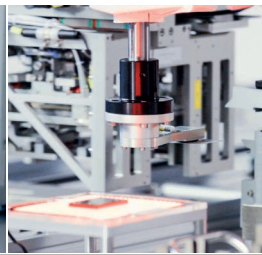




	ELECTRODE CUTTING		MANUFACTURE OF CELL COMPOSITES		
	LASER CUTTER	BLANKING UNIT	Z FOLDER	WINDER	SPLICER
FUNCTION	The manufacture of any desired electrode geometries with consistent cutting performance and quality	Economic solution for small-scale series	Manufacture of the electrode separator components		
CONFIGURABLE PROCESS PARAMETERS	Cutting performance, cutting speed, processing field size, protective gas	Blanking force Pressing force	Number of final separator windings, stack precision, tension (separator)	Process speed, tension, diameter, number of final separator windings	Process speed, tension, diameter, number of final separator windings
INTEGRABLE MEASUREMENT OPTIONS	Pyrometer, visual geometry measurement, customer-specific	Load cell	Visual measurement, tensile force measurement, customer-specific		

PACK, MODULE & SYSTEM ASSEMBLY

Our years of experience with relevant key technologies – precise positioning, joining, pressing, welding and handling – allow us to provide our customers with support early on in the development of an assembly-grade battery module and efficiently accompany them well into the release of the product on the market.

Our battery assembly tools combine technologically proven manufacturing methods with individual detailed processes. The compact, modular tools are tailored for use in labs or pre-series production.

For example, we offer tools for bending tabs and for joining cells (e.g. with liquid or solid adhesives) for semi-automated module pre-assembly. To connect cells in a series with a highly-precise electrical connection of the metal contacts/tabs, Jonas & Redmann has developed an automatic laser welding tool. The tool can be used for various welding activities in product development and is equally suitable for industrial-scale production.

					
	INTERNAL CELL CONNECTION	DEEP DRAWING	SEALING	ELECTROLYTE FILLING	CELL SEALING
ANGLE SHEET STACKING	ULTRASONIC WELDING UNIT	DEEP DRAWING UNIT	SEALING UNIT	ELECTROLYTE FILLING	SEALING UNIT
Composite	Welding of the electrode composite to the arrester tabs	Creation of cavities in the composite foils	Welding of housing halves made of composite foils	Filling of the cells with electrolytes	Creating a vacuum in the cell and final sealing
Process speed, number of compartments, placement accuracy	Pressure, frequency, anvil geometry, number of compartment tabs	Maximum deep drawing strength and speed, deep drawing depth, pressing force, hold time, tool temperature optional	Temperature, sealing force, holding force at a temperature, hold time	Electrolyte volume, pressure profile before cell sealing, number of filling steps, number of filling needles	Temperature, sealing force, holding force at a temperature, hold time
Parameter-specific	Measurement of electric parameters, visual check of the welding pattern	Inspection after transmitted light procedure	Leak test	Precision scale, flow sensor	Leak test, visual measurement

Tab bending unit



Cell Glueing unit



Laser welding system



Development partner:



Federal Ministry
of Economics
and Energy



Fraunhofer



BATTERY
LABFACTORY
BRAUNSCHWEIG

EINE EINRICHTUNG IM **NFF**

Consortium leader of the technology consortium Production Engineering
for the Manufacture of Lithium Cells and Batteries

ProTrak

Jonas & Redmann Group GmbH
Kaiserin-Augusta-Allee 113
10553 Berlin
Germany

phone: +49 30 23 08 66-0

fax: +49 30 23 08 66-5099

e-mail: info@jonas-redmann.com

www.jonas-redmann.com



ISO 9001:2008
ISO 14001:2004
ISO 50001:2011

TÜV certified:

■ quality Management

■ environment Management

■ **China**

Jonas & Redmann China Co. Ltd.
Unit 05/06, 3rd Floor,
Building B, No 5 Xing Han Street
SIP, Suzhou City, Jiangsu Province,
China Postcode: 215021, China

■ **USA**

Jonas & Redmann USA, Inc.
5035 NE Elam Young Parkway
Suite 100
Hillsboro, OR 97124, USA

■ **Taiwan**

Jonas & Redmann Taiwan Ltd.
3F-3, No. 1, Taiyuan 1 St.,
Chu-Pei City,
Hsinchu County, 30288, Taiwan

■ **Korea**

Jonas & Redmann Korea Co. Ltd.
503 Venture Plaza, Gangni 1 gil 7,
Ochang-eup, CheongWon-gu,
Cheongju-si,
Chungbuk 363-885, Korea