



Thinking outside the box: trend-setting solutions for the production of lithium-ion battery modules

- **Manz rounds off the portfolio for battery production with solutions for module production**
- **Extensive process know-how ensures high module quantities for all cell formats with the highest quality**
- **Development partnership for growth: innovative, reliable, and efficient**

Reutlingen, September 8th, 2021. The dynamic market development in the production of energy storage systems impressively reflects the rapidly growing demand for battery systems for a wide variety of applications. Numerous battery cell manufacturers want to extend their value chain in the direction of module production. Manz AG, a global high-tech engineering company with a comprehensive technology portfolio and provider of turnkey production solutions in the field of energy storage, is therefore focusing on another part of the production process in the lithium-ion battery sector together with its partner network: the manufacturing of lithium-ion battery modules.

As a development partner with extensive process know-how, Manz supports its customers not only in production solutions for battery cells but also in setting up their own module production facilities, thus responding to the market's desire to combine production steps with one supplier and get everything from a single source. The resulting efficiency advantages strengthen the customers' competitiveness and encourage them to open up new business areas.

The scope of services of the production lines for module manufacturing is maximally flexible and ranges from single machines for laboratory production over systems for small series up to fully integrated series production. They are suitable for the production of all common formats and produce efficiently and reliably high quantities with consistent high quality and little waste.



Performance parameters of Manz systems in lithium-ion battery module production

- **Speed and a large scope of services** – Numerous trend-setting processes for handling, cleaning, and testing of battery cells are integrated in Manz's systems. The high number of battery cells (up to 300 pieces) that can be inserted into a housing in a pick and place work step by robot leads to a very fast processing time per battery cell – this is 0.5 seconds. Especially in mass production, this is a benchmark that stands for maximum cost efficiency and increased throughput. Manz also has extensive experience in end-of-line testing (EoL) and tests the battery modules not only for their electrical properties, but also for their ability to communicate.
- **Maximum flexibility** – All common battery cell formats can be configured to customer-specific modules on the Manz systems. If necessary, the configuration can be adapted quickly, and third-party solutions can be integrated without any problems. There is also maximum flexibility with the required capacity of the production line. Small series as well as mass production can be mapped on Manz's module production lines.
- **Full traceability for maximum quality and safety** – Efficient inspection and measuring systems ensure the consistently high quality of the battery modules. Seamless quality, process parameter and parts tracking are carried out via barcode on each battery cell. The code also guarantees fewer rejects in the ongoing production process: defective parts are sorted out directly. As a result, these processes significantly reduce the total cost of ownership (TCO).
- **Highest quality through maximum precision** – Extremely precise processes can be implemented on Manz systems. For example, connections between battery cells and busbars or electrical components of the module are welded using ultrasound and/or laser processes. This production step is particularly demanding for cylindrical cells and is based on the established BLS 500 laser platform.

The market potential to produce lithium-ion battery modules is enormous. Andreas Schaal, Sales Manager Energy Storage at Manz, sees great growth potential in the Indian market in particular, in addition to the target markets of Europe and North America:

"In addition to Europe and North America, India is becoming a very attractive new target market for our plant concepts due to the enormous demand for energy storage systems, for example



for two- and three-wheelers, power tools and heavy-duty equipment in the construction industry. The reason for this is the Indian government campaign, which will subsidize its own production and make battery imports more expensive in the future."

Joint product development for new potential

Many years of know-how and competence in the design and manufacture of module lines for all battery cell formats are pooled at Manz's location in Slovakia. Around 30 engineers work in research and development here, specifically for the further development of battery module production for round formats. In addition to Manz's development expertise, the extensive implementation experience also means security for customers' investments and a faster time-to-market.

With its innovative strength in battery module production, Manz supports its customers in actively shaping the growth market in the long term: Manz's team of experts already has extensive experience with simultaneous engineering projects for well-known OEM's and tier 1 suppliers in complex, dynamic assembly automation and in battery technology equally. Funded by the European Commission, Manz is also setting itself the ambitious goal in battery module production with the recently launched European Battery Innovation (EuBatIn) sub-project "Lithium-ion Battery Factory of the Future" of developing new technologies and processes that go far beyond the current state of the art and enable major improvements in terms of performance, safety, and environmental protection.



Picture 1:



Key visual Turnkey Solutions li-ion battery module assembly

Picture 2:



Module assembly of wound cells



Company profile: Manz AG

Manz AG is a globally active high-tech engineering company.

With a focus on the automotive industry and electromobility, battery production, electronics, energy, and medical technology, Manz develops and builds innovative and efficient production solutions: From customized single machines for laboratory production or pilot and small series production, to standardized modules and systems, to turnkey lines for mass production.

Technologically, Manz's production equipment is based on many years of experience in automation, laser processing, inspection systems, and wet chemistry.

With currently around 1,400 employees, the Manz Group develops and produces in Germany, Slovakia, Hungary, Italy, China and Taiwan. Sales and service subsidiaries also exist in the USA and India.

Manz AG was founded in 1987 and has been listed on the Frankfurt Stock Exchange since 2006. In fiscal year 2020, the Group generated revenues of around 237 million euros.

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