Visions full of energy

The battery technology revolution starts now

Every day the sun sends around 10,000 times more energy to earth than the world consumes in the same period of time. Only a fraction of it has been used so far. The decisive factor for a climate-friendly world of tomorrow is to use much more of this energy and, above all, to store it. Due to the natural fluctuations in yield when generating renewable energy, storage systems are the key to success, also for the breakthrough in electromobility. However, this can only be achieved if there are storage devices suitable for everyday use with sufficient capacity and fast charging cycles. Manz AG from Reutlingen, has over more than 30 years of experience in this field.

The global high-tech machine manufacturer with a comprehensive technology portfolio is a leading supplier of production equipment for the manufacturing of powerful and efficient lithium-ion battery cells/-modules and sets international standards. With its extensive expertise, the company helps key technologies achieve a breakthrough and, as a provider of turnkey solutions, continuously develops new production solutions and processes across all industries, including in the field of laser processing. Whether as an independent 'stand-alone' system, or as part of a fully integrated production line: laser processing systems from Manz are always the right choice for customer-specific applications or as a standard system.

Competent, innovative and based on partnership

In order to remain marketable as a battery manufacturer, flexibility and vision as well as a strong partner are required. Numerous customer projects from a wide variety of industries speak for Manz AG in this context.

For the pioneer in the development and manufacturing of production systems for lithium-ion battery cells and modules, the customer always comes first. 'We reliably accompany our customers through a rapidly changing world,' emphasizes Andreas Schaal, Sales Manager Energy Storage at Manz AG, 'individual machine or complete production line, and are therefore a trustworthy development partner for innovative products in rapidly growing future markets. In addition, with fully integrated turnkey production solutions, we map the entire value chain, right up to our own new software platform for monitoring production systems, the smartPRODUCTIONKIT. '

The turnkey supplier approach and extensive process experience enable Manz to develop processes from the idea to series production in the shortest possible time. The degree of integration, i.e. the close interlinking of the technologies for each process step such as coating, lamination, laser welding, forming, stacking or winding, is of particular importance.

An integrated approach that can be decisive for the competitiveness of customers with regard to the efficiency, performance and safety of their battery cells and modules.

Newest laser technologies for even more efficiency in battery production

Laser technologies from Manz can be found in numerous process steps in the assembly of cells and modules. Thanks to decades of experience with a wide variety of requirements for laser machining processes, the technology leader can offer numerous processes in this field: lap welding, laser marking, laser cutting, partial removal of materials and coatings or drilling. Likewise, zero-gap welding and micro-welding. Even materials that cannot be joined in any other way can be welded with high precision and quality using the bimetal laser welding process.

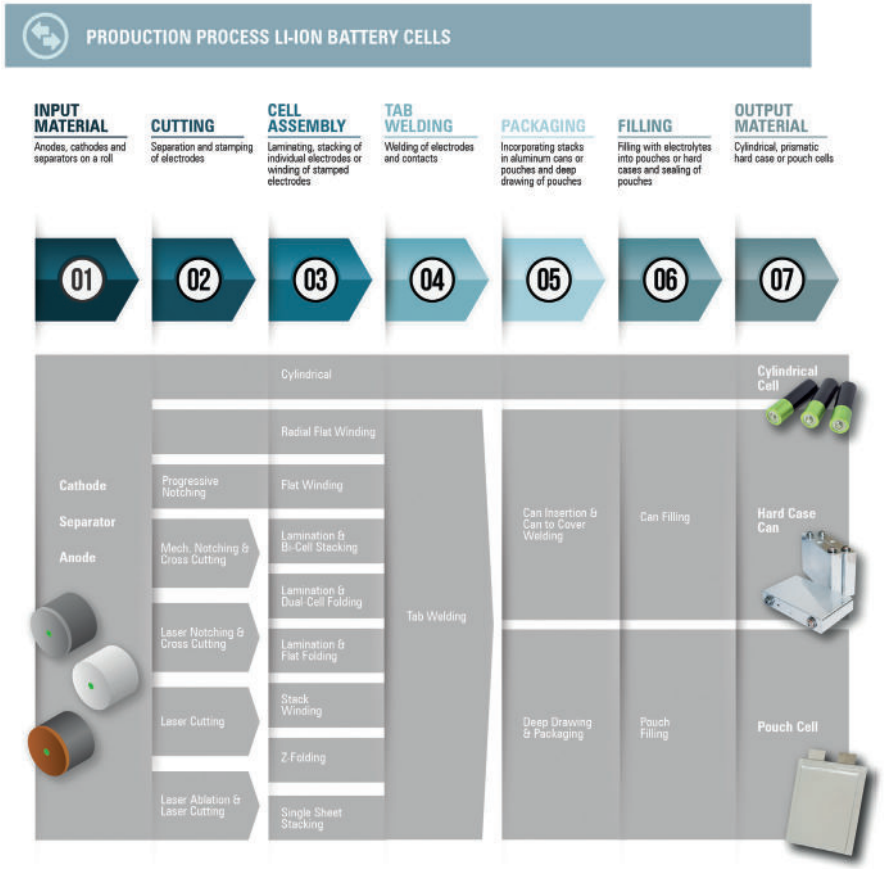
The latest achievement for even more efficiency in the production of battery cells is the latest laser technology 'Laser Tab Welding', which optimizes the welding process of cell arresters, the so-called tabs. The innovative technology reduces the number of steps required by at least one process, pre-welding, and thus significantly reduces the overall cost per battery cell (total cost of ownership, TCO). The new laser tab welding process is an innovative alternative to the ultrasonic technology that has been used up to now, ultra-sonic tab welding. The technology can also be integrated into existing production solutions.

Central element of Manz's laser expertise is the modular Battery Laser System BLS 500, which has proven itself in numerous customer processes and was developed for the various laser processes involved in the manufacturing of lithium-ion batteries. A machine base that combines the advantages of a standard system with those of an individual solution based on the modular principle. In just a few steps, a scalable machine configuration that fits the desired application is created. The BLS 500 can be used as a machine for short runs and pilot projects, but can also be integrated into an (existing) automation system as a system for mass production. By using standardized components, however, the laser process can also be adapted to new requirements at a later point in time or the housing can be converted. The BLS 500 thus offers customers a basis with many options: BLS standard components can be configured into a powerful laser system that is perfectly tailored to individual customer needs and process requirements. In this way, Manz AG guarantees maximum flexibility, performance and precision.

The innovative clamping system of the BLS 500, which replaces the previous fixed device and enables tool-free clamping, is also flexible. The system fits all applications with different product variants (one fits all), an exchange of the clamping device is no longer necessary. The BSL 500 is part of the established modular assembly platform LightAssembly.

Outsourcing in process development

Continuous product developments ensure the competitiveness of energy storage providers in the highly dynamic market, but often require a high investment. Outsourcing can help here to bring visionary ideas into production as quickly and efficiently as possible. Customers can hand this process step over to Manz. In Manz AG's laser laboratory, Manz engineers and developers research the latest laser machines and develop solutions for customer-specific processes and products. In addition, the first samples are produced for customers in this test environment.



Production process of lithium-ion battery cells

Manz AG's early involvement in the customer's development process begins with checking the feasibility of an idea and leads to concrete production planning with preliminary tests on product behavior through to the pilot product or a small series. In this way, the customer not only receives the production equipment itself, but also the entire process development as a consulting service from Manz. This is an invaluable advantage for automobile manufacturers, for example, because the change to e-mobility must take place in parallel with ongoing operations, with a minimum of friction losses.

E-mobility as a motor for battery cell production in Europe

The complexity of building an electric car is significantly less than that of manufacturing a combustion engine. The battery alone still accounts for a third of the purchase price; It is therefore crucial to improve the battery cells of the e-car quickly and significantly and to reduce their production costs.

Manz works on this as a competent technology and process expert for the automotive industry and bundles its competencies from all areas into tailor-made and customer-specific production solutions. Over 500 engineers, a large number of patents, numerous collaborations with renowned research institutions and strategic partnerships stand for Manz's innovative strength on the one hand and ensure the innovative strength of its customers on the other.

A strategic cooperation with GROB-WERKE GmbH & Co.KG. was recently concluded. As part of the partnership, the companies plan to set innovative machine standards 'Made in Europe'. The common goal of Manz and GROB is to establish themselves as a leading European provider of production solutions in the field of lithium-ion battery systems with a clear focus on the upcoming needs of e-mobility.

The lithium battery factory of the future

Manz received a very special confirmation of its importance to the further development of lithium-ion battery technology at the end of April 2021: The Federal Ministry for Economic Affairs and Energy (BMWi) and the Baden-Württemberg State Ministry of Economics presented the mechanical engineering company with the official notification for funding of around 70 million EUR. The award took place within the framework of the important project of common European interest ('IPCEI') to promote research and innovation in the battery value chain. In total, projects from eleven German companies are supported, with Manz AG playing a central role as a mechanical engineering company. With the project known as 'European Battery Innovation' (EuBatIn), twelve EU member states will provide a total of up to EUR 2.9 billion in funding for companies in the respective countries in the coming years. Manz Italy is also being funded with a mid-double-digit million-euro amount.

The Reutlingen-based mechanical engineering company entered the race for the funding millions with the 'Lithium battery factory of the future' project. The project aims to develop highly efficient machines and processes for the fully automated production of next-generation lithium-ion batteries. These are urgently needed, especially for e-mobility.

According to a current analysis by the Boston Consulting Group (BCG), vehicles with electric or hybrid drives, will already account for more than half of the cars sold worldwide by 2026. The potential for the lithium-ion batteries required for this is correspondingly huge. Manz AG is in an outstanding position with the processes and machines required for this: 'All of our know-how from the last three decades can be found in our production solutions,' says Andreas Schaal, Sales Manager Energy Storage at Manz, confirming the position of battery production pioneer.

The manufacturing processes and the associated systems are based on a new, digitized and cost-effective business model. Manz will thus make an effective contribution to building a sustainable and competitive battery industry in Europe.

Key player in global competition

Two key findings from a current study by management consultant Roland Berger together with the PEM of RWTH Aachen University on the global development of lithium-ion battery production: Through optimization processes, the production costs of energy storage devices can be reduced by over 40 percent by 2025, which is almost even more important. If the European producers manage to come on par with other manufacturers worldwide in terms of costs and technology, including the Far East.

The current announcements by German and European OEMs to invest in production capacities for battery cells in order to reduce the dependency on Asian memory producers and to build up their own know-how in the field of memory technology also fit this.

As a pacemaker for e-mobility, companies like Manz also make an important contribution to the economic success of European automobile production. In an unprecedented race to catch up, the manufacturers are now banning the combustion engine from the engine compartment in series at breathtaking speed. And the time pressure sits on their necks like never before. Only one development cycle time to reinvent the car, so far just four years and that is only possible with strong innovation drivers like Manz. The world of tomorrow needs a lot of sustainable energy and know-how for a future in which the Reutlingen-based pioneers in the development of battery technology have been at home for over 30 years.

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