



Press Release

TRUMPF lasers make battery production more efficient

TRUMPF lasers in action along the entire process chain // Focus on battery production // Johannes Bührlé, head of industry management Automotive: “More than every second euro comes from electromobility.”

Ditzingen, November 30, 2021 – Industrial laser technology and smart solutions from TRUMPF are making battery production more efficient for the electromobility sector. At the *Battery Show* in Stuttgart, the high-technology company is showcasing solutions for use by battery component manufacturers right along the process chain. These include processes for cutting, welding and drying battery films, for connecting up battery cells to form battery modules, and for performing seal welds on complete battery housings. “The production of lithium-ion batteries is a very complex and demanding process. Batteries have to meet the stringent requirements of the automotive industry – in areas such as safety and service life. The laser is the only tool that that can meet all these requirements efficiently and economically,” says Johannes Bührlé, head of industry management Automotive at TRUMPF.

Full order books in the electromobility sector

Business with the electromobility sector is extremely buoyant at TRUMPF right now, with the company supplying laser systems to all major battery manufacturers. Compared to three years ago, production capacity and demand have more than trebled. “We’re set to deliver more than 500 lasers to battery manufacturers in the first half of 2022 alone. In the past fiscal year, more than every second euro in sales to the automotive industry came from electromobility. That’s the equivalent of business worth hundreds of millions of euros,” says Bührlé.

Faster production using less energy

A battery is a complex product, manufactured in several stages. It consists of three main components: the battery cell, battery module and battery pack. Battery



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cells are made up of several extremely thin carrier foils of copper – for the anode – and of aluminum – for the cathode. These so-called electrode foils must first be dried before they can be joined together to form a battery cell. Conventional equipment for this process, such as a drying kiln, requires a lot of space on the factory floor. As an alternative, TRUMPF is marketing a special VCSEL technology that uses semiconductor lasers to irradiate and thereby heat and dry large surfaces very quickly. This consumes considerably less energy than a conventional drying kiln.

Green laser welds copper efficiently

In the next step, the electrode foils must be cut to size. These foils are typically between 6 and 14 micrometers in thickness. Ideal for this purpose are the short-pulse lasers from the TruPulse nano product range. In combination with an optical scanner system, these lasers are able to rapidly cut the foil to the required shape. A battery cell is formed by connecting a stack of connected copper and aluminum electrode foils – a job that can be done with a laser, for example. However, standard industrial lasers are only of very limited use in this area, as copper is highly reflective. TRUMPF has therefore developed a special TruDisk laser that operates at a short wavelength in the visible green spectrum. Using this green laser beam, copper foils for battery cells can be welded reliably and efficiently.

As a rule, a battery module is made up of many battery cells. These are connected to one another by means of busbars made of copper or aluminum. Material combinations and metal thicknesses can vary significantly, depending on the type of cell and its specific application. As a result, many different laser types are used for this purpose. These vary in wavelength, beam quality and power – but they are always in combination with an optical scanner system. The latter automatically guides the laser to the correct position and ensures it follows the required welding path.

Safe battery packs

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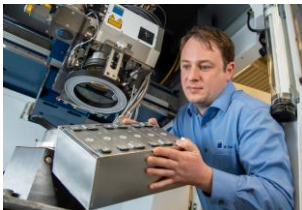
The battery pack comprises the complete battery system, including power electronics and temperature management. This is what is installed in an electrical vehicle. This pack must remain perfectly sealed, so that no chemicals can escape, even in the event of a crash. In order to satisfy these stringent safety requirements, steel or aluminum sheet is welded together to form an airtight battery housing. By using a disk laser for this purpose, manufacturers are able to comply with these exacting standards while still maintaining high productivity.

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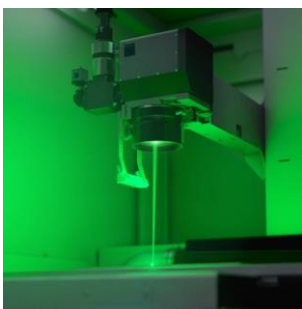
Busbar welding

Laser welding creates highly conductive and mechanically robust busbar connections.



Battery module

As a rule, a battery module is made up of a large number of battery cells. These are connected to one another by means of busbars made of copper or aluminum.



Green laser

Using this green laser beam, copper foils for battery cells can be welded reliably and efficiently.





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About TRUMPF

TRUMPF is a high-tech company offering manufacturing solutions in the fields of machine tools and laser technology. The Company drives digital connectivity in the manufacturing through consulting, platform products and software. TRUMPF is a technology and market leader in highly versatile machine tools for sheet metal processing and in the field of industrial lasers.

In 2020/21, the company employed some 14,800 people and generated sales of about 3.5 billion euros. With over 80 subsidiaries, the TRUMPF Group is represented in nearly every European country as well as in North America, South America and Asia. The company has production facilities in Germany, France, the United Kingdom, Italy, Austria, Switzerland, Poland, the Czech Republic, the United States, Mexico and China.

Find out more about TRUMPF at www.trumpf.com

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