Laser welding in the solar boom

The Dresden-based specialist contract manufacturer CooolCase is now combining its many years of expertise in case construction with new welding power in three versions for aluminum. This is because the solar industry is booming and needs masses of inexpensive inverters to convert the electricity from the solar panels for power grids. Melinda Krusemark, Sales Manager at CooolCase, is delighted: “Enclosures for inverters are an important quality and cost factor. These are particularly complex components made from various aluminum alloys. The laser is the ideal tool and we have found a particularly productive way to use it.”

CooolCase GmbH

https://www.cooolcase.com/

The Saxon family business CooolCase has a 30-year tradition of manufacturing mechanical housing solutions for electronic components. With its 100 employees, CooolCase supports its customers from product development to production. Now, with Melinda Krusemark and Marvin Michel, the motivated new generation is joining the management team - and is joining the solar industry directly with a major order.

INDUSTRY
Contract manufacturer

NUMBER OF EMPLOYEES
100

SITE
Dresden (Germany)

TRUMPF PRODUCTS

- TruLaser Weld 5000
- TruMatic 7000
- TruLaser Cell 7020
- TruBend 5130
- TruBend 7036
- Truma Bend V 85
- TrumaBend V130

APPLICATIONS

- Laser welding

Challenges

The energy transition requires the mass use of solar systems. The required inverters house sensitive electronics and are exposed to wind and weather all year round. To ensure that no moisture gets inside and nothing happens to the technology, the housings must be absolutely leak-proof. This is another reason why the housings are usually cast. However, their costs play an increasingly important role as the number of units increases. That's why a major German inverter company sought - and found - expertise for a large-scale alternative at CooolCase. Melinda Krusemark, Head of Sales at CooolCase, says: “With

around a hundred employees, we're actually too small for something like this." But the family business only hesitated for a moment - and then got on with it. Marvin Michel, Chief Financial Officer at CooolCase, is delighted: "We are one of the few companies in Europe that can seal-weld aluminum cases to meet this requirement."

"We never thought that our courage to invest in a new technology would pay off like this!"

MELINDA KRUSEMARK

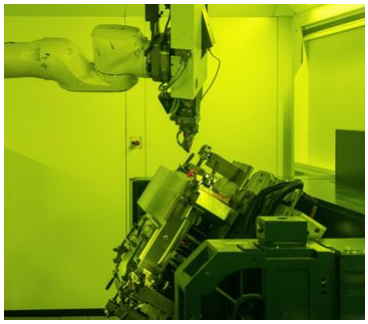
HEAD OF SALES AND MARKETING AT COOOLCASE

Solutions

"Only with laser technology can we free the manufacturing process from its old hurdles and make the product ready for mass demand," says Marvin Michel. "Welding is extremely cost-effective compared to the casting process. This means we use around 50 percent less material per housing, as we can manufacture the housing walls much narrower."

Implementation

All this is only possible because CooolCase opted for the TruLaser Weld 5000, which masters all the steps required in the process. Because despite all the economic advantages of laser welding and the unspectacular appearance: Welding an inverter housing is anything but simple. Making the component involves three tricky welding tasks for which CooolCase has to use all of its expertise. Firstly, there are the seams on the sides as i-seams and the rounded corner joints. Here, CooolCase relies on precisely dosed heat conduction welding, which introduces as little energy as possible into the component: "Otherwise, hot cracks form on the weld seams and they start to leak," says Michel. Secondly, a stiffening plate must be welded onto the housing. To do this, the laser system switches the welding process to deep penetration welding: The laser light welds through two millimeter thick aluminum and ensures a reproducibly tight seam that does not allow any H_2O molecule can pass through. Now comes the welding highlight: CooolCase attaches a heat sink to an opening on the housing roof, which later ensures that the inverter does not overheat. For production reasons, this heat sink - a so-called continuous casting profile - is only available in 6000 aluminum alloy. "It is particularly hard and susceptible to hot cracking. This is exactly what we must prevent at all costs. And if that wasn't exciting enough, here we have a situation where we have to weld a challenging 6000 series aluminum to another aluminum alloy. Absolutely leak-proof, of course." This is why the TruLaser Weld 5000 switches the welding method again and now uses a supplementary wire via FusionLine. "It has to be similar enough to both alloys. And just finding the right welding parameters was a tightrope act. Fortunately, we had a strong partner in TRUMPF," says Michel. The feat succeeds and the TruLaser Weld 5000 processes one housing after the other on a rotary table.



Forecast

CooolCase has increased its productivity enormously in a short space of time: "When we started developing the process for the inverters, we were producing just two components a day. Together with TRUMPF, we have optimized our production to such an extent that we can now produce 100 a day! The welding time per component also exceeds our expectations. We have calculated around seven and a half minutes per component. But after our adaptations with TRUMPF, we need just five minutes for an enclosure." For siblings Melinda Krusemark and Marvin Michel, the large order for the inverters is a particular excitement, as they have just taken over the management of the company from their father. And this one order alone gives them solid growth prospects. Melinda Krusemark puts it this way: "The hard work and investment has paid off."

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