

Allegro all the way

PES talks to Dr.-Ing. Marc Hüske, Senior Vice President Strategic Product Management & Technology Development of LPKF SolarQuipment GmbH, about the latest advances in thin-film scribing and 24/7 customer service ...



Marc Hüske

PES: Welcome to PES Solar. Would you like to introduce your company and explain a little about how you serve the solar industry?

Marc Hüske: LPKF SolarQuipment GmbH is a member of the LPKF group. LPKF Laser & Electronics AG is a specialist in micro material processing by laser. The business units and subsidiary companies work on laser systems for PCB production, PCB development, laser plastic welding and laser direct structuring, a method which generates circuitry on 3D parts. LPKF SolarQuipment itself so far has focused on supplying laser scribing equipment to thin-film manufacturers. Our major aim is to support our customers in further optimising the energy yield of their thin film solar modules.

Laser scribing is used in thin-film module manufacturing to separate the large area photo diode into individual cells approximately 5 to 10 mm wide, connected in series thus ensuring a viable division of current and voltage values. The more accurately these cells are scribed and the less space the three scribes P1 to P3 use the more output power the solar module will deliver.

LPKF SolarQuipment's Allegro series uses several methods to optimise the solar module's efficiency. The Allegro's scribing head tracks predecessor tracks to the current pattern to the previous one during scribing minimising the dead zone down to

150 microns and less depending on the scribe widths needed. This technology leads to a higher yield and more powerful solar modules. Innovative optical and laser configurations enable the Allegro to minimise tracks widths.

Aside from this it is essential that the Allegro systems are able to provide today's production line takt times without the need to double the system numbers as well as to provide high technical availability above 98%. Allegro laser scribes are designed to be robust, low-maintenance and easy to service. The systems feature maintenance-free air bearings for feeding glass and the movement of the machining head as well as long-life laser sources. This effectively increases system availability.

Optimised machine dynamics, precision laser scribing and the minimum-cost machine concept make Allegro laser scribes an exceedingly cost-effective solution for producing thin-film solar modules.

PES: We see that LPKF has launched several new products already this year; please can you explain the improvements and the benefits to customers?

MH: LPKF group is a specialist for micro material processing with laser. At the end of 2015 and in the first quarter of 2016; we launched several laser systems, especially for processing PCBs. One very interesting system uses a new ultra-short-pulse laser source – and that makes the bridge to solar



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Marc Hüske:

cell production: we see interesting opportunities in PV technology.

Furthermore LPKF SolarEquipment leads a consortium within a joint European research project (SurLas), which develops and tests a very economical and robust ultra-short-pulse fibre laser based laser sources for PV cell and module production. This will help our customers to produce even finer isolation tracks with a reduced heat affect to further reduce the so called dead zone at significantly lower capex costs. This leads to higher module performance with additional cost advantages.

PES: How important is it to have a 24/7 service for your customers and how do you implement this?

MH: Without a reliable international service we would not sell a single system. This is as true for our solar business as for our PCB production systems as well. In highly automatised thin-film production lines utilisation is a key performance parameter to achieve low production cost levels.

To ensure our Allegro's > 98% technical uptime LPKF provides support by highly skilled service engineers wherever high volume production is in the world. Fast availability of spare and worn parts is another key to achieve the required uptime levels. Because our service teams are located in different time zones, we can ensure a 24/7 service all over the world.

PES: Geographically speaking where are LPKF's key markets?

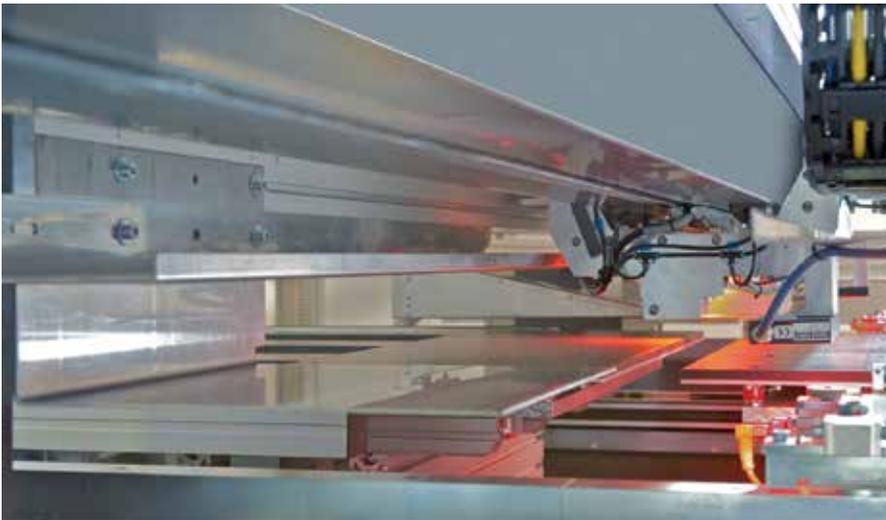
MH: LPKF lead our own subsidiaries in Europe, North America and Asia – China, Korea, Japan and Malaysia. Although all R&D is located in Germany, our systems are shipped all over the world. Very often, we have to ship the system to China and send the bill to the United State for example. LPKF on the whole makes approximately 40 percent of its revenue in Asia, followed by 35 percent in Germany and the rest of Europe and 25 percent in USA.

PES: How are you serving or intending to serve the solar industry in China?

MH: For more than a decade now LPKF has been running sales and service subsidiaries in China. LPKF set up trained sales and service personnel in China at the beginning of our thin-film business a couple of years ago,. Furthermore our Chinese subsidiary runs a Presto laboratory scribe in their lab to be able to support special application requests from customers in Asia.

PES: How are things progressing on the thin-film module side of the business?

MH: Thin-film has shown to be very competitive compared to multi- and mono-crystalline photovoltaic modules. Record cell efficiencies of CIGS and CdTe cells are in the same region as multi-crystalline ones, as well as production module efficiency. Due to the fact that low light response, temperature coefficient and spectral response are superior to silicon based cells the overall energy yield during the year is higher for thin-film modules, not only in the earth's sun-belt. At the same time thin-film manufacturers have been able to significantly lower production costs. As a result we have seen new opportunities coming up already this year, with more to follow in the coming years. Chinese companies have started to establish new production plants, especially with CIGS modules based on well-proven technology from Germany.



PES: We note that The LPKF SolarMaster graphical user interface has been specifically developed for the Allegro and Presto laser scribers and is installed on both systems – tell us more?

MH: The Allegro system series for production was developed first, followed by the Presto system for the lab. We saw that there was a need for a small versatile scribing system for universities and laboratories and wanted to provide the same look and feel as the Allegro with an enhanced versatility to explore and optimise laser scribing. As a consequence we provided the Presto with the same axis speeds as the Allegro offers and gave the user the choice which kind of lasers source and optical beam train he wanted to use. Having the same basic parameter options and GUI, with the SolarMaster, the transfer from using a Presto to going into production is easy and fast.

PES: Which aspect of the solar industry provides the most satisfaction for you right now?

MH: We backed the right horse. In a phase of market consolidation LPKF was able to achieve good income. We improved technology and know-how along with our customer base. Furthermore we established high-level 24/7 service support around the world, not only helping SolarQuipment but also enhancing the group's service capabilities. We have learned how to install and commission a large number of scribing systems in a short period of time providing production quality from the start. Hence, LPKF has been able to acquire technological

and market leadership in the area of thin-film laser scribing.

PES:And conversely, what presents you with the biggest challenges?

MH: The biggest challenge is to stay ahead of competition in terms of technology. Therefore LPKF as a group is investing around 10% of its revenue in R&D.

PES: What are your predictions for the coming year both as a company and for the market as a whole?

MH: As I said before due to the fact that we see thin-film having picked up with crystalline modules in terms of module efficiency and costs and as it is still superior in terms of energy yield, we see new opportunities coming up over coming years. New thin-film projects have already been started and we see even more coming up over the next years. LPKF SolarQuipment is furthermore developing a new laser based digital printing technology to extend our product portfolio. The Laser Transfer Printing (LTP) technology utilises a laser beam to remove a defined amount of ink from a carrier and transfers it to the substrate medium. This enables use of inks with compositions and especially pigment sizes that make them unsuitable for use with other digital printing techniques. LTP can process highly filled inks, precisely controls the amount of ink applied, and can print each part differently. Applications are functional and decorative printing on automotive or architectural glass, printed circuit boards or even crystalline solar cells. This technology does not only open up new markets, revenue and growth potential, it also makes LPKF SolarQuipment less sensitive to fluctuations in the photovoltaic market. ■

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