Press Release

TRUMPF Group
Laser Technology Division
Press/Public Relations

TRUMPF at PRODUCTRONICA
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Precise pulses when machining solar cells

TRUMPF focusing on laser applications in photovoltaics

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Laser micromachining – used in manufacturing solar cells, for instance – is one domain of TRUMPF Group's laser technology division. Offering customized laser applications and a variety of product lines, the world's market leader in laser technology is appearing at this year's PRODUCTRONICA in Munich. The exhibits show the quality and productivity lasers can achieve when working crystalline wafers or thin-film solar cells.

The first example: the new lasers in the TruMicro series. Regardless of whether they are used to insulate edges or to drill holes – TRUMPF lasers provide appropriate pulse durations for every situation associated with crystalline solar cells, offering average power that can be scaled as needed. The **TruMicro 3140**, for instance, operating at pulse duration of between 15 and 80 ns, creates a groove along the edge, electrically isolating the front and rear faces of the cell. The insulation groove, typically up to 80 µm wide and from 10 to 20 µm deep, is created by vaporizing the material. The laser is also the tool of choice when front contacts have to be passed through the silicon wafer and to the rear surface Depending on the thickness of the wafer, TRUMPF offers with the **TruMicro 7050** ways to drill several thousand holes at the required cycling rates. In MWT processes, for example, these might be up to 200 µm in diameter.

TRUMPF has also solutions for thin-film pholtovoltaics. Whenever film needs to be removed at the border, the new **TruMicro 7050** is the right solution for maximum productivity. Based on a Q-switched disk laser, it can achieve an average power of more than 500 W. With the TruMicro 7050 the areas at the border of the modules are

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removed to prepare for lamination with a second glass substrate and to protect the layer system against short circuits and environmental effects. When deleting borders, the TruMicro 7050 can achieve ablation rates as high as 20 to 50 cm² per second, depending on the layer system involved.

The **TruMark Series 6000** lasers are also suited for use in thin-film solar technology. Generating a beam at 532 nm (average laser power > 6.5 W) or 1064 nm wavelength (average power > 20 W), their specifications match those needed for P1-P3 texturing.

Finally, TRUMPF is featuring the diode-pumped, picosecond disk lasers in the **TruMicro 5000** series whenever high productivity is required – but without thermal damage. If pulses in the nanosecond range are used, then fused material, fissuring, and delamination are typically found at the border of the ablated track especially on the molybdenum layer. These phenomena can be avoided completely by using picosecond pulses for patterning. The TruMicro 5050 offers peak pulsed powers output of up to 50 MW at pulse durations of less than 10 ps and features a pulse repetition rate of 200 kHz. With its picosecond pulses it augments the TruMicro 3040 and 3140 and the TruMicro 7050, all operating in the nanosecond and microsecond range.

TRUMPF supplies application-oriented micromachining lasers delivering mean powers of between 40 and 500 W, with pulse durations beginning in the picosecond range and continuing into the microsecond range. Maximum quality and reliable customer care, all around the world, are major factors at TRUMPF. Thus worldwide support and remote maintenance by way of a telepresence portal are just as much a matter of fact as the comprehensive range of training courses available.

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TRUMPF is a high-tech company focusing on production, laser and medical technology. Further information on the company can be found at www.trumpf.com, about the laser technology business field at www.trumpf-laser.com.

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