THE FUTURE OF SOLAR CELL MANUFACTURING
LASER SOLUTIONS FOR THE PV INDUSTRY
Take advantage of our experience and forward-thinking. Backed by 40 years of experience in laser material processing ROFIN provides innovative solutions for the photovoltaic industry. Processing of solar cells like drilling, cutting, scribing, doping and ablation of dielectric layers are the key competences as well as thin film applications, edge isolation and marking of silicon wafers. Working closely with our clients and partners we have established great expertise for laser application in PV manufacturing. ROFIN is the only supplier worldwide offering the complete range of lasers and laser systems for processing solar cells.
R&D and low volume systems

EasyMark
- Low cost marking/scribing system
- Very easy handling
- Ideally suited for scribe and break applications
- Various types of 1064 nm laser sources available

MPS (Modular Processing System)
- Medium-sized modular laser workstation
- High precision processing for thin film and c-Si applications
- Granite base available
- Various motion systems with up to +/- 1 µm accuracy

CombiLine Advanced
- RT version with fast turning 800 mm rotary table, throughput up to 700 wafers/h
- WT version with flexible fixture arrangements and optional x/y table
- 300 mm motorized z-axis
- Optional vision system for wafer recognition

Precision R&D System
- Integration of up to 3 laser sources
- Suitable for thin film and c-Si applications
- Accuracy of NC axes: ± 5 µm, repeatability ± 1 µm for x/y-axis
- Max. travel 300 x 600 mm

ROFIN
- Leading manufacturer for lasers and laser solutions for material processing
- Sales and service teams in 40 countries around the world
- Widest range of laser sources, laser systems and customized solutions
- Large application lab for a wide spectrum of pv material processing
The DUAL LINE c-Si is a modular machine platform designed for high throughput solar cell manufacturing with multiple installations at leading PV manufactures worldwide. The core of the machine is a high precision granite base to support laser optics and rapid wafer handling units. It is equipped with two independently operating lines for cell transport and one laser process chamber each. In general the machine can be placed in-line with other processing machines or configured with stack and/or cassette handling systems for batch type operation. The machine can be configured with a wide range of ROFIN laser sources in 1064, 532 and 355 nm wavelengths. Various pulse length regimes from continuous wave to femtosecond are also available. In particular this machine is addressing high cell efficiency processes as MWT cell drilling, laser doping and opening of dielectric layers on the cell front or back side.

‘On the fly’ processing for elimination of handling and transfer times

The Dual Line c-SiTM system also features the inclusion of ‘on the fly’ processing, a new system that virtually eliminates wafer handling and transfer times between laser processing cycles, improving productivity by providing processing speeds of up to 4000 UPH (Units-Per-Hour).
Benefits

- Compliance with highest safety standards and CE signed
- Excellent laser expertise
- High-precision laser processes
- Low breakage rate and total cost of ownership

Features

- Throughput range: up to 4000 UPH (Units-Per-Hour)
- 'On the fly' processing
- Standardized HMI software and advanced Beckhoff PLC control
- Automatic self-calibrating high speed scanner systems
- High precision wafer alignment with up to 5 CCD cameras
- QC-system with laser power control and multiple wafer sensors
- Optional MES host interface according to SEMI PV standard
- Integrated exhaust and filter system suitable for clean rooms
- Inline, cassette or stack handling for all common standards and degrees of automation
One supplier - all technologies

**PowerLine F 30 LP**
- Compact setup
- Excellent pulse-to-pulse stability
- High pulse energy
- Air cooling

**PowerLine F 20 -100**
- Different power ranges for various applications
- Completely air-cooled
- Low operating costs
- Single and double scanner

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PowerLine L 100 SHG
- High average power and high pulse energy
- Round, square and rectangular fiber beam delivery possible
- Top hat beam profile
- Excellent pulse-to-pulse stability

PowerLine E SHG/THG
- Different power ranges
- Several wavelengths
- Single and double scanner configuration
- Various scanning head options

PowerLine SL 3/20
- Exceptional beam quality
- Excellent pulse-to-pulse stability
- High long term stability with temperature management system
- Integrated shutter and safety circuits

StarPico and StarFemto
- High precision processing and high pulse peak power
- Cold laser ablation of thin layers
- Multiple wavelength options 1064 nm, 532 nm, 355 nm
- Ideal for 24/7 production in industry