

PowerLine SL PV Series

Laser beam sources for photovoltaic applications

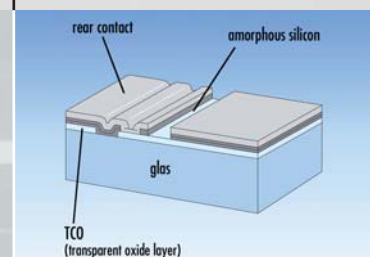
The PowerLine SL PV product series was especially developed for use in automation and production systems in the field of photovoltaics. Laser scribing processes place high demands on the beam quality, especially on the symmetry within two Rayleigh ranges. In addition, pulse-to-pulse stability has to be high at high frequencies. Specially designed for these requirements, the PowerLine SL PV beam sources optimally cover current and future demands in the production of modern PV thin-film systems.



The laser beam sources are available in wavelengths of 532 nm (PowerLine SL 3 SHG PV) and 1064 nm (PowerLine SL 20 PV). With the integration of a motor-controlled beam expansion in the laser head, the laser beam can be used directly.

The new temperature management system of the PowerLine SL PV series provides for excellent long-term stability in regard to high performance: self-actuating thermal monitoring, stabilization of all relevant optical components using Peltier elements and heat dissipation using an air-cooled or water-cooled cooling plate.

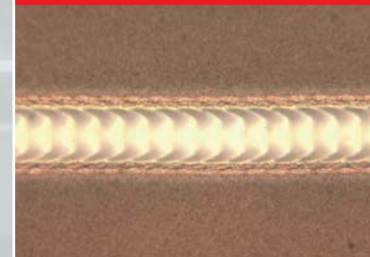
The pump diode and the RF generator are located in the compact laser head. This facilitates integration and makes great distances between the location of use and the supply unit possible as required. The supply unit of the laser covers three height units in the 19" industrial standard. With integrated shutter and safety circuit, the laser system is accordingly designed in compliance with EN-954-1/EN 13849-1, which also facilitates direct integration.



Structure of a thin film cell



α -Si/ μ -Si, P2/P3 scribing with 532 nm laser

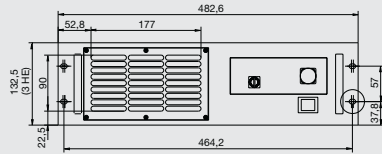
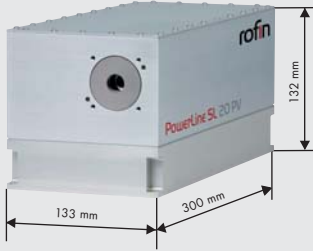


TCO scribing with high pulse-to-pulse stability

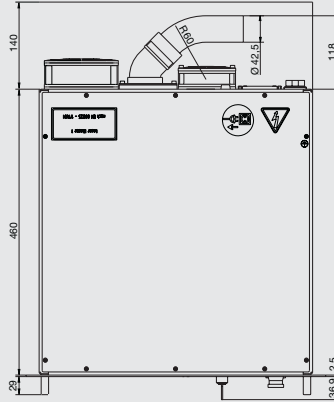
Your Benefits

- superior beam quality and pulse-to-pulse stability
- excellent long-term stability with temperature management system
- perfect integration with beam expansion and safety circuit inside the laser head

Drawings



Supply unit: Front view



Supply unit: Top view

Technical Data

	PowerLine SL 3 SHG PV	PowerLine SL 20 PV
Beam Characteristics		
Wavelength:	532 nm	1064 nm
Average power:	1.5 W	15 W
Pulse frequency:	15 - 400 kHz	0 - 200 kHz
Pulse width:	16 ns at 50 kHz	45 ns at 100 kHz
Beam quality:	TEM ₀₀	TEM ₀₀
M ² :	< 1.2	< 1.2
Beam roundness*:	95%	95%
Focus symmetry , within +/- 2z:	95% w/o beam expansion 90% with beam expansion	90% w/o beam expansion 90% with beam expansion
Energy per pulse:	30 µJ @ 50 kHz	160 µJ @ 100 kHz
Peak power:	1.9 kW @ 50 kHz	3.6 kW @ 100 kHz
Power stability during 8 h [rms,1σ]:	1% @ 50 kHz	1% @ 100 kHz
Pulse-to-pulse stability [rms,1σ]:	1.5% @ 50 kHz	1.5% @ 100kHz
Beam diameter approx.*:	1 mm w/o beam expansion default 6 mm with beam expansion	2.5 mm w/o beam expansion beam expansion: on request
Divergence, full angle, approx.*:	4 mrad w/o beam expansion collimated with beam expansion	3.5 mrad w/o beam expansion collimated with beam expansion
Polarization:	> 100:1 vert.	> 100:1 vert.
Boresight accuracy*:	+/- 0.3 mm, +/- 3 mrad	+/- 0.3 mm, +/- 3 mrad
Warm up time:	10 min.	15 min.
* value measured at beam aperture		
Electrical connection		
Voltage:	100 - 240 VAC +/- 10%; 1P/N/PE 50/60Hz	100 - 240 VAC +/- 10%; 1P/N/PE 50/60Hz
Power consumption max.:	140 VA	700 VA
Ambient temperature range:	15 - 35°C	15 - 35 °C
Mounting plate temperature	20 - 35°C	20 - 30 °C
Heat dissipation, mounting plate:	< 60W	< 250 W

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