Discover Precision

Backed by many years of experience in laser material processing, ROFIN offers you end-pumped laser sources with excellent beam characteristics. The diode-pumped solid-state lasers with a compact laser head integrate easily and require minimum maintenance. Supply and cooling modules are housed in standard 19" modules which can be integrated in a cabinet. To support direct integration even further, compact cooling plates for the PowerLine SL series are available as options. In order to perfectly meet specific application requirements, the laser beam sources are available in different power ranges and wavelengths of 1064, 532 and 355 nm. Specially designed scribers for photovoltaic applications ensure excellent pulse-to-pulse stability at high frequency ranges. The laser beam sources operate in TEM₀₀ mode and offer high beam quality as well as good beam roundness

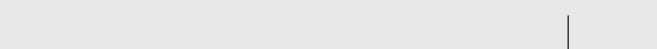
ROFIN's first-class products include adjustable high-accuracy beam splitters, positioning laser, power measurement and pluggable connections. Individual, optimum configurations are achieved with numerous options integrated into the laser rail e.g. back reflection absorber, beam attenuator, beam shaping element, beam expander and scanning head.

Product features and benefits:

for a most accurate removal profile.

- superior beam quality
- excellent pulse-to-pulse stability, even at high repetition rates
- exceptional long-term stability with temperature management system
- integrated shutter and safety circuit
- optional beam expansion built into the laser head
- compact OEM design
- stable 24/7 operation
- easy to integrate





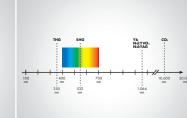




End-Pumped Laser Beam Sources

Discover Precision





ux. +47(0)0131-704-4100 amail: info@rofin-muc da

ROFIN-BAASEL Lasertechnik GmbH & Co. KG Petersbrunner Str. 1b

Berzeliusstr. 87 22113 Hamburg Tel: +49(0)40-733 63-0 Fax: +49(0)40-733 63-4100 email: info@rofin-ham.de

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MACRO

MICRO

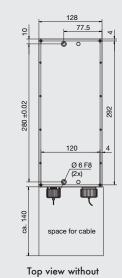
MARKING

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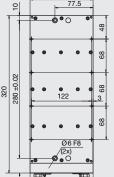
THE MARK OF EXCELLENCE

PowerLine SL PV series

PowerLine SL 3 PV / SL 3 SHG PV

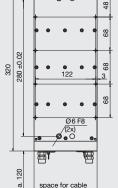


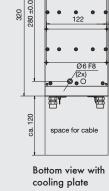
cooling plate

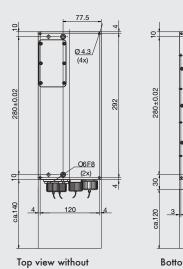


cooling plate

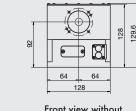
cooling plate

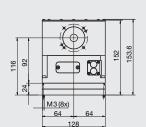






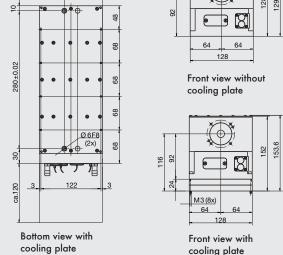
cooling plate





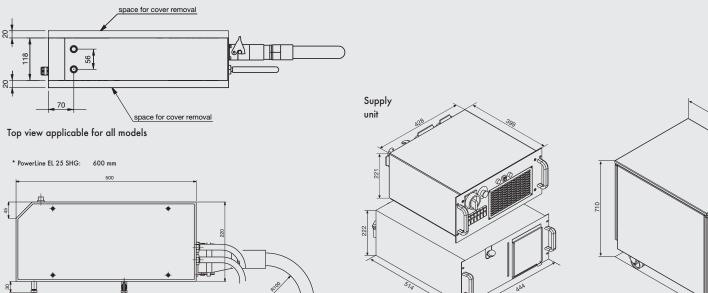
cooling plate

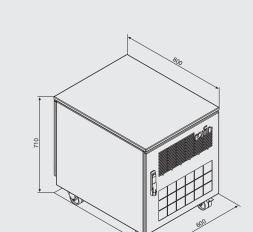
PowerLine SL 20 PV



PowerLine EL (PV) series

Side view of the laser rail PowerLine EL 20, 20 SHG, 20 THG, 25





	PowerLine SL 3 PV	PowerLine SL 3 SHG PV	PowerLine SL 20 PV	PowerLine EL 20 PV	PowerLine EL 25 PV	PowerLine EL 20 SHG PV
Beam characteristics						
Wavelength [nm]	1064	532	1064	1064	1064	532
Average power [W]	3.0 @ 50 kHz	2.0 @ 50 kHz	15 @ 100 kHz	15 @ 100 kHz	20 @ 100 kHz	12 @ 50 kHz
Pulse frequency [kHz]	0 - 400	15 - 400	0 - 400	0 - 200	0 - 200	15 - 200
Pulse width [ns]	16 @ 50 kHz	13 @ 50 kHz	45 @ 100 kHz	30 @ 100 kHz	55 @ 100 kHz	25 @ 50 kHz
Beam quality	TEM	TEM	TEM∞	TEM	TEM	TEM∞
M^2	< 1.3	< 1.2	< 1.2	< 1.3	< 1.3	< 1.5
Beam roundness [%]	95	95	95	> 90	> 90	> 85
Focus symmetry, within +/- 2z _R	90 % with beam expansion	95 % w/o beam expansion 90 % with beam expansion	90 % w/o beam expansion			
Energy per pulse [µJ]	60 @ 50 kHz	40 @ 50 kHz	150 @ 100 kHz	140 @ 100 kHz	200 @ 100 kHz	240 @ 50 kHz
Peak power [kW]	3.75 @ 50 kHz	3.0 @ 50 kHz	3.3 @100 kHz	4.5 @ 100 kHz	4 @ 100 kHz	10 @ 50 kHz
Average power stability over 8 hrs [% rms]	1 @ 50 kHz	1 @ 50 kHz	1 @ 100 kHz	1	1	3
Pulse-to-pulse stability [% rms]	1.5 @ 50 kHz	1.5 @ 50 kHz	1.5 @ 100 kHz	< 1.5 @ 100 kHz	< 1.5 @ 100 kHz	< 3 @ 50 kHz
Beam diameter approx. [mm]	6	1 w/o beam expansion, beam expansion on request	1 w/o beam expansion	2.7	1.9	2.6
Divergence angle full radius, approx. [mrad]	< 1, collimated with beam expansion	2 w/o beam expansion, collimated with beam expansion	4 w/o beam expansion	3.7	2.7	2.7
Polarization	> 100:1 vert.	> 100:1 vert.	> 100:1 vert.	> 100 : 1 horiz.	> 100 : 1 horiz.	> 100 : 1 vert.
Boresight accuracy	+/- 0.3 mm, +/- 0.3 mrad	+/- 0.3 mm, +/- 0.3 mrad	+/- 0.3 mm, +/- 0.3 mrad	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)
Warm up time [min]	10	10	15	< 15	< 15	< 20
Electrical connection						
Voltage	100 - 240 VAC +/- 10 %, 1 P/N/PE 50/60 Hz	100 - 240 VAC +/- 10 %, 1 P/N/PE 50/60 Hz	100 - 240 VAC +/- 10 %, 1 P/N/PE 50/60 Hz	230 VAC ± 10 %; 1P/N/PE 50/60 Hz	230 VAC ± 10 %; 1P/N/PE 50/60 Hz	230 VAC ± 10 %; 1P/N/PE 50/60 Hz
Power consumption max.	0.18 kW	0.18 kW	0.8 kW	1.77 kW 50 Hz/ 1.88 kW 60 Hz	1.77 kW 50 Hz/ 1.88 kW 60 Hz	1.77 kW 50 Hz/ 1.88 kW 60 Hz
Ambient temperature range	15 - 35 ° C	15 - 35 ° C	15 - 35 ° C	15 - 35 ° C	15 - 35 ° C	15 - 35 ° C
Mounting plate temperature	20 - 35 ° C	20 - 35 ° C	20 - 35 ° C			

	PowerLine EL 20	PowerLine EL 25	PowerLine EL 20 SHG	PowerLine EL 25 SHG	PowerLine EL 20 THG
Beam characteristics					
Wavelength [nm]	1064	1064	532	532	355
Average power [W]	16 cw; 12 @ 20 kHz	24 cw; 18 @ 20 kHz	12 @ 50 kHz	18 @ 50 kHz	2 @ 15 kHz
Pulse frequency [kHz]	0 - 200	0 - 200	15 - 200	15 - 200	15 - 100
Pulse width [ns]	10 @ 20 kHz	20 @ 20 kHz	25 @ 50 kHz	40 @ 50 kHz	10 @ 15 kHz
Beam quality	TEM	TEM	TEM	TEM∞	TEM₀₀
M^2	< 1.3	< 1.3	< 1.5	< 1.5	< 1.5
Beam roundness [%]	> 90	> 90	> 85	> 85	> 85
Focus symmetry, within +/- 2z _R					
- Energy per pulse [μJ]	600 @20 kHz	900 @ 20 kHz	240 @ 50 kHz	360 @ 50 kHz	100 @ 15 kHz
Peak power [kW]	60 @ 20 kHz	45 @ 20 kHz	10 @ 50 kHz	10 @ 50 kHz	10 @ 15 kHz
Average power stability over 8 hrs [% rms]	1	1	3	3	2
Pulse-to-pulse stability [% rms]	< 2 @ 20 kHz	< 2 @ 20 kHz	< 3 @ 50 kHz	3 @ 50 kHz	< 5 @ 15 kHz
Beam diameter approx. [mm]	2.7	1.9	2.6	2.4	0.7
Divergence angle full radius, approx. [mrad]	3.7	2.7	2.7	1.9	< 1.0
Polarization	> 100 : 1 horiz.	> 100 : 1 horiz.	> 100 : 1 vert.	> 100 : 1 vert.	> 100 : 1 horiz.
Boresight accuracy	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)	+/- 0.5 mm, +/- 5 mrad (option:+/- 0.2 mm, +/- 2 mrad)
Warm up time [min]	< 15	< 15	< 20	< 20	< 20
Electrical connection					
Voltage	230 VAC ± 10 %; 1P/N/PE 50/60 Hz	230 VAC ± 10 %; 1P/N/P 50/60 Hz			
Power consumption max. [kW]	1.77 kW 50 Hz/ 1.88 kW 60 Hz				
Ambient temperature range	15 - 35 ° C	15 -35 ° C			
Mounting plate temperature					