SHORT-PULSE LASERS

PowerLine Pico Series for Marking and Micro Processing
Short-pulse lasers from ROFIN offer high pulse peak power. This improves the quality of material removal, reduces surface roughness and increases the precision of selective layer removal. In addition, the thermal penetration depth in highly sensitive material-removal processes such as the marking of certain metals and semiconductor materials can be significantly reduced with shorter pulses.

**MATERIAL-FRIENDLY PROCESSING**
- Low thermal penetration depth (HAZ)
- Structural changes reduced
- Maximized process control with very thin substrates
- Virtually no material accumulation

**YOUR BENEFITS**
- Outstanding processing quality at high speed
- Optimal solution for applications involving sensitive materials and miniaturized components
- Ease of integration thanks to compact dimensions
- Low operating costs

**OVERLAP MAXIMIZED**
- Extremely high, variable pulse frequency
- High pulse-to-pulse overlap thus maximized
- Time-efficient material processing
- High-precision selective layer removal

**LOW OVERLAP**
- Typical result with nanosecond lasers

Suitable for different application fields

**SHORT-PULSE LASER**

Why ROFIN?

To cover customer-specific fields of application to optimum effect, ROFIN offers lasers in the femtosecond, picosecond and nanosecond range. The PowerLine Pico lasers are suitable even at high frequencies for demanding marking applications – semiconductor or medical applications, for example – as well as for microprocessing such as thin-layer removal and structuring.

Result of material processing with short-pulsed lasers

Result of material processing with nanosecond lasers

Result of material processing with femtosecond lasers
MARKING UNIT

From laser source to laser marker

The extremely high, variable pulse frequency of our short-pulse lasers ensures rapid processing and allows the pulse-to-pulse overlap to be maximized, as in case of the thin-film structuring of solar cells, for example. The laser can be operated quickly and easily via the TCP/IP, USB and RS 422 interfaces.

PRODUCT FEATURES
- Wavelengths of 1064 nm, 532 nm and 355 nm
- Easily integrated, compact 19” plug-in for the laser control unit
- Comprehensive marking software included with the product
- Beam expansion included
- Configurable marking area size

LASER BEAM SOURCE

In addition, ROFIN offers the laser at double and triple frequency with a wavelength of 532 nm or 355 nm and in different power classes. The PowerLine Pico is also available as a beam source in an enhanced configuration level as a marking laser. Thanks to its extremely compact dimensions and all-in-one design, the PowerLine Pico can be integrated easily.

PRODUCT FEATURES
- Wavelengths of 1064 nm, 532 nm and 355 nm
- Flexible laser configuration for specific purposes
- Software for parameterization included with the product
- Compact all-in-one design
TECHNICAL DATA POWERLINE PICO 10

Laser Beam source

<table>
<thead>
<tr>
<th>Wavelength (nm):</th>
<th>PowerLine Pico 10-1064</th>
<th>PowerLine Pico 10-532</th>
</tr>
</thead>
<tbody>
<tr>
<td>1064</td>
<td>532</td>
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</tbody>
</table>

Average power (W): 8 @ 400 kHz 3 @ 400 Hz

Pulse width (ps): 550 @ 400 kHz 450 @ 400 kHz

Beam quality: TEM00 TEM00

M²: < 1.6 < 1.5

Energy per Pulse (µJ): 20 @ 400 kHz; 10 @ 800 kHz 7.5 @ 400 kHz; 3.5 @ 800 kHz

Peak power (kW): 20 @ 400 kHz 7.5 @ 800 kHz

Beam diameter (mm): approx. 2 approx. 2

Divergence angle full radius (mrad): collimated collimated

Polarization: random; > 100:1 linear; > 100:1

Power supply (V DC): 15 – 240 +/-10, 50/60 Hz 15 – 240 +/-10, 50/60 Hz

Operating temperature (°C): 15 – 35 15 – 35

Laser Marker

<table>
<thead>
<tr>
<th>Wavelength (nm):</th>
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<td>532</td>
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</tbody>
</table>

Pulse frequency (kHz): 200 – 800

Pulse width (ps): 550 @ 400 kHz 450 @ 400 kHz

Focus distance (mm): 193 (+/- 7) or 432 (+/- 25) 193 (+/- 7) or 432 (+/- 25)

Supply unit dimensions (W x D x H, mm): 19”, 2 rack units 19”, 2 rack units

Software: VLM VLM

Air flow 19” supply unit (m³/h): approx. 80 approx. 80

Power supply (V): 115 – 240 +/- 10, 1 P/N/PE 115 – 240 +/- 10, 1 P/N/PE

Operating temperature (°C): 15 – 35 15 – 35

Supply unit

TECHNICAL DATA POWERLINE PICO 50

Laser Beam source

<table>
<thead>
<tr>
<th>Wavelength (nm):</th>
<th>PowerLine Pico 50-1064</th>
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<td>1064</td>
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</tbody>
</table>

Average power (W): 40 @ 250 kHz

Pulse frequency (kHz): 200 – 800

Pulse width (ps): 300 @ 250 kHz

Beam quality: TEM00

M²: 1.5

Energy per Pulse (µJ): 160 @ 250 kHz

Peak power (kW): 500 @ 250 kHz

Beam diameter (mm): 3

Divergence angle full radius (mrad): < 1

Polarization: linear; > 100:1

Power supply (V DC): 15 – 240 +/-10, 50/60 Hz

Operating temperature (°C): 15 – 35

Laser Marker

<table>
<thead>
<tr>
<th>Wavelength (nm):</th>
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<tr>
<td>1064</td>
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</table>

Pulse frequency (kHz): 200 – 800

Pulse width (ps): 300 @ 250 kHz

Focus distance (mm): variable

Supply unit dimensions (W x D x H, mm): 19”, 3 rack units

Software: VLM

Air flow 19” supply unit (m³/h): 105

Power supply (V): 115 – 240 +/- 10, 50/60 Hz

Operating temperature (°C): 15 – 35

Supply unit