HyperRapid 50
High Power Industrial ps-Laser

The HYPER RAPID 50 is a powerful industrial ps-laser offering pulse-on-demand and burst mode operation at output powers up to 50W for high quality micro-machining at high throughput. With this laser, the total cost per watt ratio for ps-laser pulses is significantly reduced.

The HYPER RAPID 50 provides high pulse energies of typically 10 ps-pulses at high repetition rates up to 1 MHz. This allows the user to split the beam into 2 beams and simultaneously feed 2 work stations with one machine, further reducing the TCO for a production process in micro-machining applications.

The HYPER RAPID 50 ps-laser offers the well-known features of the RAPID series: industrial stability and reliability, high pulse energy, high repetition rates, trigger on demand – optical pulses can be triggered individually by electrical TTL pulses from system control - and low jitter (<20 ns), basically instantaneous even for fast moving beam deflection systems like scanners and rotary polygons.

Burst mode can be selected in the software to directly determine how many 10 ps-pulses with 20 ns separation should be released in an envelope by the laser if triggered by one electrical trigger pulse. These 20 ns-bursts enhance the ablation rate in many materials and increase the process efficiency.

The HYPER RAPID 50 uses an AOM as its process shutter which allows both on/off control and energy attenuation for each individual pulse.

HyperRapid 50 Advantages:
• 1064 nm, 532 nm or 355 nm version
• High throughput at significantly reduced TCO
• High energy at high repetition rates up to 1 MHz
• Pulse on demand trigger with <20 ns jitter
• 20 ns-burst mode capability for increased ablation rate
• Efficient micromachining in multiple beam work stations

HyperRapid 50 Applications:
• Cutting and drilling of glass, sapphire, ceramics and other tough materials, also composites
• Micromachining and structuring of large surfaces with line focusing or multiple beams

www.Coherent.com/HyperRapid50
# HyperRapid 50
High Power Industrial ps-Laser

## System Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>HyperRapid 50</th>
<th>HyperRapid 50 HE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Wavelength (nm)</td>
<td>1064 532 355</td>
<td>1064 532 355</td>
</tr>
<tr>
<td>Maximum Average Power (W)</td>
<td>50 25 16</td>
<td>45 26 12.5</td>
</tr>
<tr>
<td>Maximum Energy (µJ)</td>
<td>125 63 40</td>
<td>210 130 60</td>
</tr>
<tr>
<td>Output Repetition Rate (kHz)</td>
<td>0 to 1000</td>
<td></td>
</tr>
<tr>
<td>Spatial Mode¹</td>
<td>TEM₀₀ (M² &lt;1.4)</td>
<td></td>
</tr>
<tr>
<td>Pulse Duration (ps)</td>
<td>&lt;15</td>
<td></td>
</tr>
<tr>
<td>Pulse-to-Pulse Energy Stability²</td>
<td>&lt;1 &lt;1.5 &lt;1.7</td>
<td>&lt;1 &lt;1.5 &lt;1.7</td>
</tr>
<tr>
<td>Average Power Stability over 8 hours²</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Polarization Ratio</td>
<td>&gt;&gt;100:1</td>
<td></td>
</tr>
<tr>
<td>Beam Diameter 2w (x,y) at Output (µm)(typical)</td>
<td>2400 1350 1650</td>
<td>2400 1100 2000</td>
</tr>
<tr>
<td>Beam Divergence, Full Angle (mrad)</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Beam Circularity°</td>
<td>&gt;85</td>
<td></td>
</tr>
<tr>
<td>Beam Pointing Stability in Full PRF Range (µrad/°K)</td>
<td>±0.5 mm and &lt;5 mrad</td>
<td></td>
</tr>
<tr>
<td>Bore-sight Accuracy</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Warm-up Time (minutes)</td>
<td>&lt;40</td>
<td></td>
</tr>
<tr>
<td>Electric Supply²</td>
<td>230 VAC for 3.5 kW/50 to 60 Hz</td>
<td></td>
</tr>
<tr>
<td>Head Weight</td>
<td>115 kg (253.5 lbs)</td>
<td></td>
</tr>
</tbody>
</table>

## HyperRapid 50

<table>
<thead>
<tr>
<th>Repetition Rate (kHz)</th>
<th>Average Power (W)</th>
<th>Pulse Energy (µJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>500</td>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>800</td>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>1000</td>
<td>50</td>
<td>125</td>
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</tbody>
</table>

## HyperRapid 50 HE

<table>
<thead>
<tr>
<th>Repetition Rate (kHz)</th>
<th>Average Power (W)</th>
<th>Pulse Energy (µJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>42</td>
<td>21</td>
</tr>
<tr>
<td>250</td>
<td>43</td>
<td>21</td>
</tr>
<tr>
<td>400</td>
<td>44</td>
<td>21</td>
</tr>
<tr>
<td>500</td>
<td>45</td>
<td>21</td>
</tr>
</tbody>
</table>

## Operating Specifications

- Temperature: +15°C to 27°C (59°F to 80°F)
- Relative Humidity: <60%, non-condensing

## Shipping Specifications

- Temperature: +5°C to +50°C (41°F to 122°F)
- Relative Humidity: 10 to 90%, non-condensing

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¹ Specified at default repetition rate = 500 kHz for Hyper Rapid 50 and 250 kHz for Hyper Rapid 50 HE.
² Transformer can be provided for 110V or 208V operation.
HyperRapid 50

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Power vs. Repetition Rate

Energy vs. Repetition Rate

Pulse Repetition Rate (kHz)

Power (W)

Energy (µJ)

0 10 20 30 40 50 60

1064 nm (specification)

532 nm (specification)

355 nm (specification)

HyperRapid 50 HE

Power vs. Repetition Rate

Energy vs. Repetition Rate

Pulse Repetition Rate (kHz)

Power (W)

Energy (µJ)

0 10 20 30 40 50

1064 nm (specification)

532 nm (specification)

355 nm (specification)
**HyperRapid 50**

**High Power Industrial ps-Laser**

**Mechanical Specifications**

**Laser Head**

**Front View**

**Side View**

**Top View**

**Rear View**

**For Cables and Fibers**

**Visible and/or Invisible Laser Radiation. Avoid eye or skin exposure to direct or scattered radiation. Power wavelength(s) and pulse width depend on pump options and laser configuration. Class IV Laser Product.**

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**Coherent**

Coherent Inc.
5100 Patrick Henry Drive
Santa Clara, CA 95054

**Phone**
(800) 527-3786
(408) 764-4983

**Fax**
(408) 764-4646

e-mail tech.sales@Coherent.com

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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice.

Coherent offers a limited warranty for all HyperRapid lasers. For full details of this warranty coverage, please refer to the Service section at www.Coherent.com or contact your local Sales or Service Representative.