Laser Types

**CO₂ (standard)**

CO₂ lasers are the most common laser type used to through-cut, kiss-cut, score, etch or perforate substrates. CO₂ lasers are best suited for processing non-metallic materials such as plastics, papers, polymers, textiles, foams and adhesives. Lasers are available in 9.4µ, 10.25µ, and 10.6µ wavelengths. Typical power output range is 40W to 1000W. Common applications include:

- Commercial print: greeting cards, folding cartons, brochures, business cards, stencils, and labels
- Flexible packaging: easy-open and breathable packaging features
- Industrial: gaskets and adhesive spacers
- Medical: adhesive and plastic materials for medical components

**Fiber (f)**

Fiber lasers are ideally suited for ablating thick conductive coatings that would typically slow a UV laser. They are also capable of metal and plastic welding. Lasers are available in 1070nm laser wavelength in pulsed or continuous wave energy outputs. Typical power output range is 20W to 100W. Common applications include ablating and cutting materials used in electronic and medical markets.

**Ultraviolet (uv)**

UV laser systems are suitable for the fine ablation of very thin (<1μm) conductive coatings or thin non-conductive coatings which would otherwise be transparent to different laser wavelengths. Lasers are available in 355nm wavelength. Typical power output range is 10W to 20W. Common applications include ablating and cutting electronic components, biosensors, and precise electrode patterns.

**How lasers are used in digital converting**

Digital converting is a process in which a focused laser beam is directed to cut, kiss-cut, perforate, score or etch patterns into materials as specified in a customer’s vector file. This non-contact functionality achieves extremely tight tolerances (approximately 50µm or 0.002”) while processing materials at high speeds. Digital laser converting is a fast, clean and cost-effective production solution which consistently delivers an exceptional standard of quality – ideal for applications with feature locations, tolerances, size or material characteristics that are typically difficult or impossible to process using traditional metal dies.
Laser Modules & Configurations

<table>
<thead>
<tr>
<th>Laser Type</th>
<th>Power</th>
<th>LDM</th>
<th>LPM Dual Mode</th>
<th>LPM Standard</th>
<th>LPM Flex</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(standard)</td>
<td>40W</td>
<td>LDM40</td>
<td>LPM40</td>
<td>LPM40</td>
<td>LPMflex40</td>
</tr>
<tr>
<td></td>
<td>70W</td>
<td>LDM70</td>
<td>LPM70</td>
<td>LPM70</td>
<td>LPMflex70</td>
</tr>
<tr>
<td></td>
<td>100W</td>
<td>LDM100</td>
<td>LPM100</td>
<td>LPM100</td>
<td>LPMflex100</td>
</tr>
<tr>
<td></td>
<td>250W</td>
<td>LDM250</td>
<td>LPM250</td>
<td>LPM250</td>
<td>LPMflex250</td>
</tr>
<tr>
<td></td>
<td>400W</td>
<td></td>
<td>LPM400</td>
<td>LPMflex400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000W</td>
<td></td>
<td>LPM1000</td>
<td>LPMflex1000</td>
<td></td>
</tr>
<tr>
<td>Fiber (f)</td>
<td>40W</td>
<td>LDM40f</td>
<td>LPM40f</td>
<td>LPM40f</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100W</td>
<td>LDM100f</td>
<td>LPM100f</td>
<td>LPM100f</td>
<td></td>
</tr>
<tr>
<td>Ultraviolet (uv)</td>
<td>10W</td>
<td>LPM10uv</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20W</td>
<td></td>
<td>LPM20uv</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

dm = Dual Mode; flex = Flex Mode

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Laser Processing Modules (LPM)

Laser score and micro-perforate flexible packaging films at high speeds. The versatile LaserSharp LPM Series offers all the advantages of the LDM but adds crossweb laser cutting, scoring, perforating, etching or ablating any pattern or shape into the material. Several LPMs can be configured in a single system for multiple line processing.

LPM Unique Features
- Laser power outlet range: 40W to 1000W
- Multiple pattern processing with high speed crossweb and downweb contour patterns.
- Run intermittent patterns by print registration or distance.

LPMs are available as standard modules or in the following options:
- Dual-Mode (LPMdm) – combines the best of the LDM with the best of the LPM. This module excels at precise, accurate, contoured downweb scores and slits as well as the high speed processing of small crossweb patterns less than 170mm (6.7") in size.
- Flex* (LPMflex) – increases processing options with the ability to automatically adjust the processing area of view between two different sizes ranging from 140mm x 140mm (5.5" x 5.5") to 600mm x 600mm (23.5" x 23.5").
- GT Option – uses optimized beam steering motors with lighter mirrors for faster processing speeds. The GT option can be applied to any LPM.
- LPM multid – Designed for high-performance laser drilling or micro-perforating – ideal for breathable packaging in the flexible packaging industry at rates 3x higher than standard LPM modules.

LPMflex Modules

Designed for versatility. The LPMflex module combines variable laser process areas with automated optics to increase your processing options while minimizing setup. The modules offer the advantages of localized laser processing, including patterned micro-perforation, as well as crossweb and downweb straight line and contour processing. Continue to build your business with a laser system flexible enough to produce various products for differing markets.

To create this flexibility, an adjustable roller assembly allows operators to quickly switch from one field of view to another. After switching to a different field of view, the system automatically refocuses the laser beam to a precise spot size for the new process. Process areas as small as 140mm x 140mm (5.5" x 5.5") to as large as 600mm x 600mm (23.6" x 23.6") are available. The system’s auto-focus and adjustable work support eliminate costly downtime required to refocus the laser beam and calibrate variable process areas.

<table>
<thead>
<tr>
<th>Process Method</th>
<th>Process Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Crossweb</td>
<td>600mm x 600mm (23.62&quot; x 23.62&quot;)</td>
<td>Large, detailed patterns across the entire web width at high production speeds.</td>
</tr>
<tr>
<td>Small Patterns</td>
<td>140mm x 140mm (5.51&quot; x 5.51&quot;)</td>
<td>Highly accurate small feature or pattern processing and micro-hole drilling.</td>
</tr>
<tr>
<td>Downweb</td>
<td>Straight line</td>
<td>High-speed, downweb scoring. Narrow, consistent score depths are maintained through the entire range of speeds during production.</td>
</tr>
</tbody>
</table>

LPMflex combines up to three different processing modes into one.

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LPMflex Features

Using the power of LasX’s industry-leading, patented laser digital processing, the LPMflex delivers both pattern mode (LPM) and downweb mode (LDM) to suit varying applications.

- The LPM mode excels at crossweb processing of larger patterns or packaging features in precise registration to printed features. Additional advantages include:
  - Crossweb scores across wide webs for easy-open packaging applications.
  - Larger depth of focus to better track and minimize web “flutter” or lateral movement.
  - Faster process speed for higher production rates.
- The LPM mode also adds flexibility in feature sizes. Operating at the smaller process area excels at high-speed drilling and pattern perforating with tight tolerances. Benefits include:
  - Smaller laser beam spot sizes for smaller micro-holes and score widths that prevent leakage or bacterial spoilage in breathable packaging applications.
  - Superior accuracy.
  - More efficient processing of small features.
  - Higher production speeds for greater throughput.

- The LDM mode fixes the laser module’s motion system in place, effectively turning the LPM module into an LDM by creating a narrow beam optimized for downweb scoring.
- Increases processing options with the ability to automatically adjust the processing area of view between two sizes ranging from 130mm to 600mm (5.1” to 23.6”).
- Automated focus assembly.