**F Duo Series**

**INDUSTRIAL FIBER LASER**

High precision 2D and 3D marking on metals

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>242x242</th>
<th>560x560</th>
<th>212x212</th>
<th>100x100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>554</td>
<td>888.5</td>
<td>551</td>
<td>68</td>
</tr>
<tr>
<td>Height</td>
<td>420</td>
<td>815</td>
<td>1601</td>
<td>1101</td>
</tr>
<tr>
<td>Depth</td>
<td>555</td>
<td>132</td>
<td>146</td>
<td>1101</td>
</tr>
<tr>
<td>Weight</td>
<td>2752</td>
<td>731</td>
<td>292</td>
<td>1101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Density</th>
<th>68</th>
<th>2752</th>
</tr>
</thead>
</table>

**Accessories**
- Hand Held Terminal
- Touch Screen Terminal
- Bar code reader
- Printer
- Air Cooling Kit
- Mounting support
- Mounting Bracket U-ARM
- Marking paper
- Protection goggles
- Laser module

**System**
- Optical isolator and collimator of the laser source, galvanometric scanners built into the marking head. Control and power electronics, drivers of the scanners, CPU, power supplies and laser source built into the control rack.
- Working Distance (WD): The distance between the laser system base and the surface to be marked.
- Focal Length (FL): The distance between the center of the lens and the surface to be marked.
- Marking Area (MA): The area over which the laser can mark.
- Spot Beam Diameter (BD): The diameter of the laser spot at the surface to be marked.
- Power Density (PD): The power delivered to the surface per unit area.

**Software**
- Marca Lite Software: includes Marca™ software, dongle and Ethernet cable (TCP/IP).
- Marca Full Graphics Interface: includes Marca™ software, dongle and Ethernet cable (TCP/IP).

**IMPORTANT NOTE**
- Approximate values: These values are an approximation, and they are different for each laser system, due to the different optical paths.

**Environmental Conditions**
- Temperature: +15ºC (59ºF) at 40ºC (104ºF) external temperature with 50% Duty Cycle or 36ºC(100ºF) external temperature with 100% Duty Cycle.
- Humidity: Between 5% and 95%, without condensation.

**Environmental Conditions (Continued)**
- Altitude: Up to 2000m (6562 ft) above sea level in the absence of internal temperature and 105% Duty Cycle.

* Approximate data that may have small variations in reality.
INDUSTRIAL FIBER LASER

F DUO Series

A family of powerful and reliable industrial fibre lasers.

F DUO lasers are designed for high-speed on-line integration and for use in standalone workstations.

They are ideal for demanding metal marking applications, but are also effective with other materials such as plastics and composite materials.

F DUO lasers are long life, low maintenance lasers with very low cost of ownership.

The F DUO pulsed fiber laser product range has been extended to include MOPA lasers.

F MOPA

For high precision marking

MOPA technology allows the shape and duration of the waveform to be controlled and selected by the user in order to optimize the conditions for high precision marking and micro machining applications.

- Shorter pulse widths are ideal for marking delicate substrates such as plastics or thin materials. An extended frequency range enables higher repetition rates with shorter pulse widths to be used which leads to higher productivity.

- Longer pulse widths are ideal for deep engraving and other bulk material removal applications.

The key to high precision marking applications is precise thermal management and with 8 selectable and programmable pulse widths, F MOPA laser is the perfect tool for those demanding, high value add applications.

3D marking

2D marks can be mapped to regular 3D geometries such as cylinders, spheres and cones. Additionally, irregular geometries can be loaded as 3D CAD files in to Marca software enabling 2D marks to be mapped to irregular 3D surfaces. The Macsa 3D scan head greatly simplifies the mechanical handling of 3D geometries and can eliminate the need for rotary and robotic handling devices. This can significantly increase productivity.

DUO by Macsa

Dual Processor Technology Lasers by Macsa allows high precision marks to be produced even with variable data with no loss of performance. This technology dedicates one processor to data processing and the other to controlling the laser.

Macsa lasers are very easy to use thanks to our powerful proprietary marking software. Marca makes it simple to code and mark precisely and consistently. A user-friendly software to create text, 1D and 2D codes, 3D graphics, graphical files, etc...

The modular software to control, manage and optimize the production line.

The modular software to control, manage and optimize the production line.