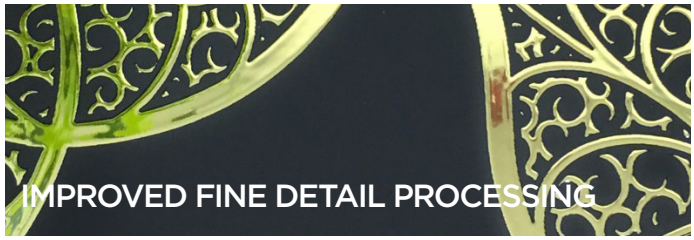
i501 CO_2 LASER DATA SHEET

UNLEASH OVER 500W OF CO_2 LASER POWER FOR FASTER THROUGHPUT AND FINER DETAILS

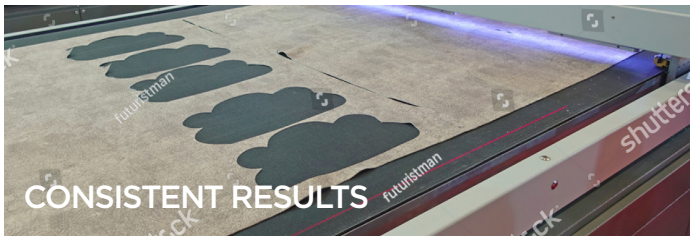
Our new i501 CO_2 laser delivers more than 500 Watts of continuous wave (CW) power enabling faster throughput and precision detail. With the largest dynamic range in its class, the i501 laser switches seamlessly between low power for fine features, and high power for speed. It's compact footprint matches the i401, simplifying upgrades and integration. Stabile divergence and output power ensure consistent, high quality results across demanding applications.

ONE LASER ELIMINATES BOTTLENECKS & ENSURES HIGHER PRODUCT QUALITY

With more than 500 W of continuous power output our i501 enables higher processing speeds for a broad range of material cutting applications.



With the industry's largest dynamic range and true CW operation (1%–100% duty cycle), it switches seamlessly between low power for fine details and high power for fast throughput, enabling a wider range of material transformation capabilities.



Stable power delivery and consistent output across all processing speeds enhance operational efficiency and significantly reduce waste, leading to substantial cost savings.

PERFORMANCE HIGHLIGHTS

- **Process a wider range of materials** with > 500 W continuous power at 10.6 µm and 10.2 µm
- **Fine, consistent processing detail** with 1% - 100% duty cycle for the industry's leading dynamic range
- **Consistent laser processing results** with stable power output and reliable divergence
- **Simplifies integration** with beam delivery systems with 45° linear polarization
- **Fits into compact equipment and tight spaces** with minimized footprint
- **Lowers operating costs** with high thermal efficiency to reduce energy consumption

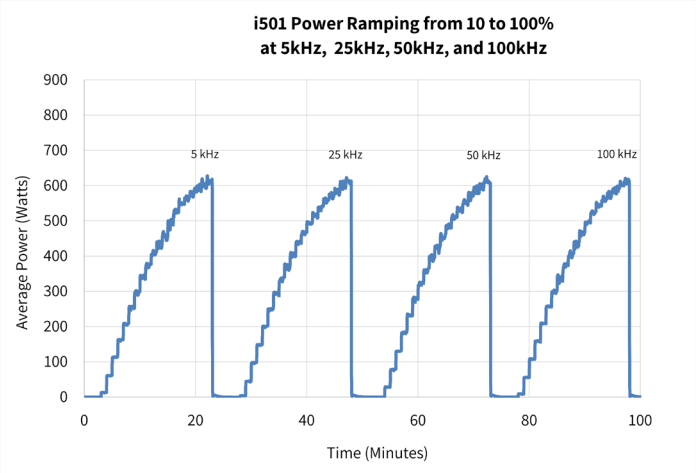
i501 CO_2 LASER

CORE TECHNOLOGY ADVANCEMENTS

Our i501 laser features two (2) core Novanta CO_2 laser breakthroughs that sets it apart from other 500 W CO_2 lasers…

EXPANDED DYNAMIC RANGE

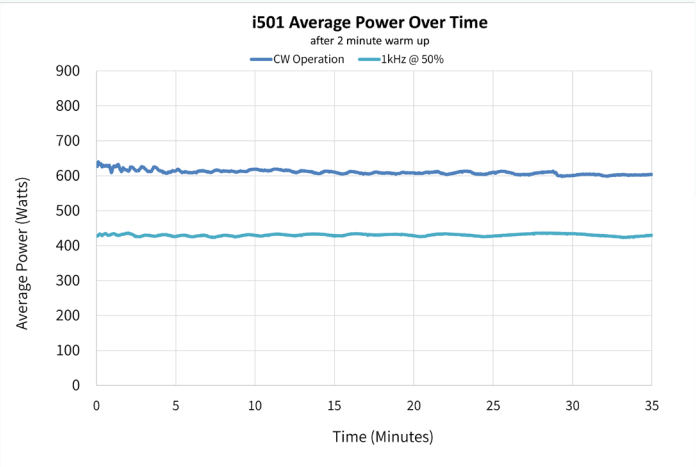
Our i501 CO_2 laser features fast switching between low power for fine detail processing, and high power for faster throughput. The 1 - 100% duty cycle for true continuous wave operation is unique among CO_2 lasers. When coupled with the excellent power linearity the i501 delivers consistent processing results at high-volume production speeds.



The chart above shows the wide dynamic range of the i501 using 4 power ramping tests at 4 different frequencies: 5 kHz, 25 kHz, 50 kHz, and 100 kHz.

TRUE POWER STABILITY

A laser's ability to process materials consistently is dependent not only on power stability, but it also requires exceptional divergence to ensure that the beam stays tightly focused to deliver stable power to the target material. Our i501 features reliable divergence and power stability that ensures near zero power dilution for optimal high-speed, high-volume applications.



The chart above shows the high, stable power of the i501 recorded over 35 minutes for continuous wave operation at 100% duty cycle, and pulsed operation at 1 kHz and 50% duty.

KEY FEATURES

- > 500 W continuous power output optimized for high-volume production
- 10.2 µm and 10.6 µm wavelengths for a wider range of processing capabilities and broad range of applicable materials
- True continuous wave operation with 1% - 100% duty cycle and excellent power linearity for fine detail processing and fast throughput
- Compact size, same dimensions as our i401 400 W CO_2 laser for easy power upgrade
- High processing quality results with reliable divergence and power stability
- Lower operating costs with low energy consumption and high thermal efficiency
- Lower integration expenses with 45° linear polarization that simplifies integration and reduces secondary component requirements

SPECIFICATIONS

Output Output	
Wavelength	10.2 µm, 10.6 µm
Output Power[1]	> 500 W
Power Stability (typical, after 3 min.)	± 5%
Power Stability (cold start)[2]	± 7%
Beam Quality (M^2)	< 1.2
Beam Diameter[3]	6.7 mm ± 0.7 mm
Divergence (full angle)	2.5 mrad ± 0.3 mrad
Ellipticity	< 1.2
Polarization	Linear, 45°
Rise Time	< 100 µs
Operating Frequency	DC- 100 kHz
Duty Cycle	1% - 100% (CW)
Power Supply	
DC Voltage Input	48 VDC
Maximum Current	175 A
Cooling	
Maximum Heat Load	8.5 kW
Coolant Temperature	18 - 22°C (water)
Minimum Flow Rate	4.0 GPM, < 60 PSI
Environmental	
Operating Ambient Temperatures	15 - 40°C
Maximum Humidity	95%, non-condensing
Physical	
Dimensions (LxWxH) mm (inches)	1227 x 208 x 300 (48.3 x 8.2 x 11.8)
Weight kg (lbs.)	59.0 kg (130 lbs.)
Standard Warranty	2 years

1 - Power level guaranteed for 1 year from date of shipment, regardless of operation hours, within recommended coolant flow rate and temperature range.
2 - Measured from cold start as $\pm(P_{max}-P_{min})/(P_{max}+P_{min})$
3 - Measured $1/e^2$ diameter at laser output.
Please see the manual for the full list of specifications and associated measurement conditions.

i501 CO_2 LASER - OUTLINE & MOUNTING ILLUSTRATIONS

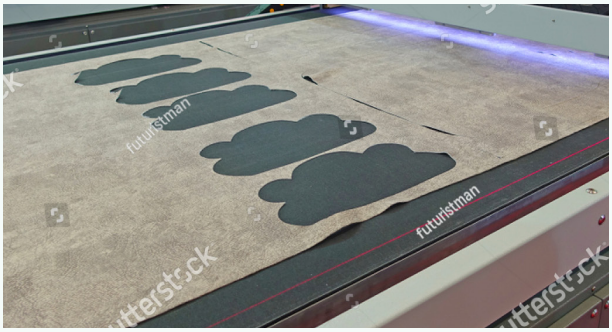
KEY INDUSTRY APPLICATIONS

Rigid Packaging

Our i501 CO_2 laser excels at converting flat stock into dimensional packaging by delivering crisp, clean cuts, perforations, and holes in an infinite number of patterns. Designed for integration into high-volume converting machines and systems, our i501 CO_2 laser features truly stable power for consistent laser processing results. The highly thermally efficient design ensures low energy consumption to lower operating costs. Simplified integration with advanced beam delivery systems lowers secondary component requirements to reduce integration costs and shortens integration time.

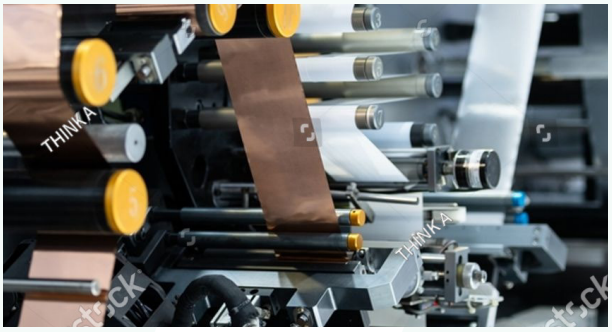
Flexible Packaging

The high > 500 W output power, extreme dynamic range, and 10.2 µm and 10.6 µm wavelength options are standout features that make the i501 an optimal solution for flexible packaging applications. Unlike competitors, the i501 maintains full power at 10.2 µm, expanding material compatibility without sacrificing throughput. Designed for high-volume throughput, with the ability to create detailed cuts, perforations, ventilation holes, and unique scoring patterns on a broad range of materials. The 45° linear polarization simplifies integration with advanced beam delivery systems to deliver circular beam shape for consistent processing results. The compact size enables easier integration into smaller equipment and tight spaces to reduce equipment footprint.



Textiles

High precision cuts through thin and thick materials, automatically sealed edges for synthetics, and high output power optimized for high-volume production are the hallmarks of the i501 laser for textile processing applications. The 10.2 µm and 10.6 µm wavelength options broadens the range of material types that can be processed with the i501. 45° linear polarization simplifies circular beam shaping for uniform cuts through thick and sensitive synthetic materials. Cutting, ablating, texturing, and marking a broad range of natural and synthetic materials make the i501 a uniquely versatile laser processing tool for textiles.

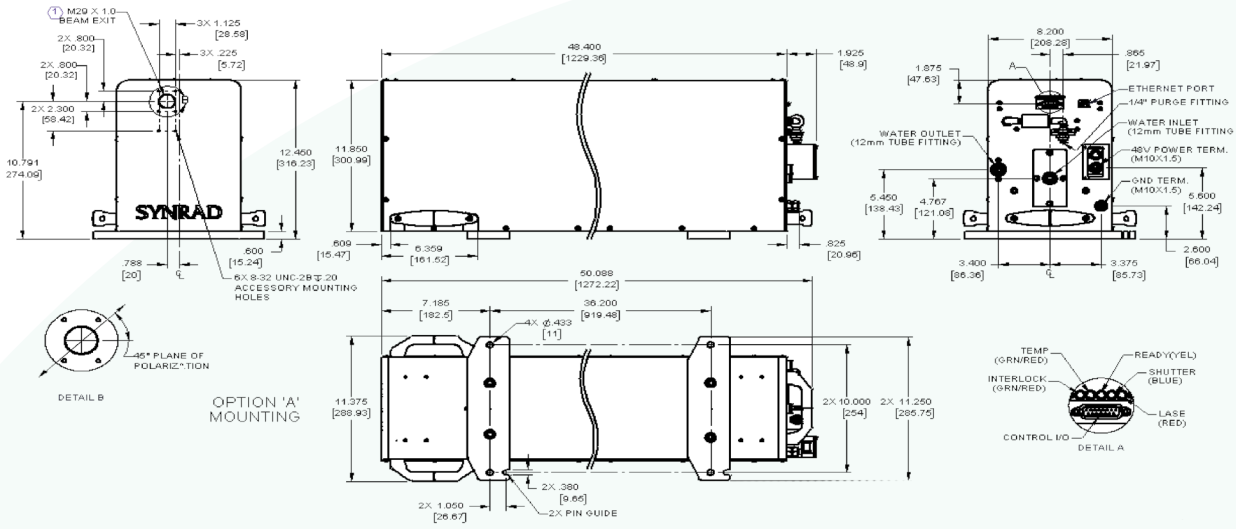


Modern Battery Manufacturing

Higher laser power for faster throughput coupled with fast switching to low power for fine processing features make our i501 CO_2 laser the optimal choice for modern battery production. Stable divergence and fast power switching support precision processing of sensitive, multi-layer battery materials. The 10.2 µm and 10.6 µm wavelength options broaden the range of material types, an absolute requirement when working with new battery designs and technologies. Designed for high-volume production, our i501 CO_2 laser increases processing speed, optimizes efficiency, and reduces waste, all while enabling high-precision processing of sensitive, multi-layer materials.

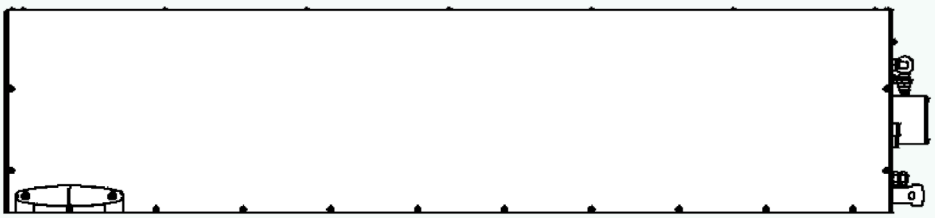
i501 CO_2 LASER - OUTLINE & MOUNTING ILLUSTRATIONS

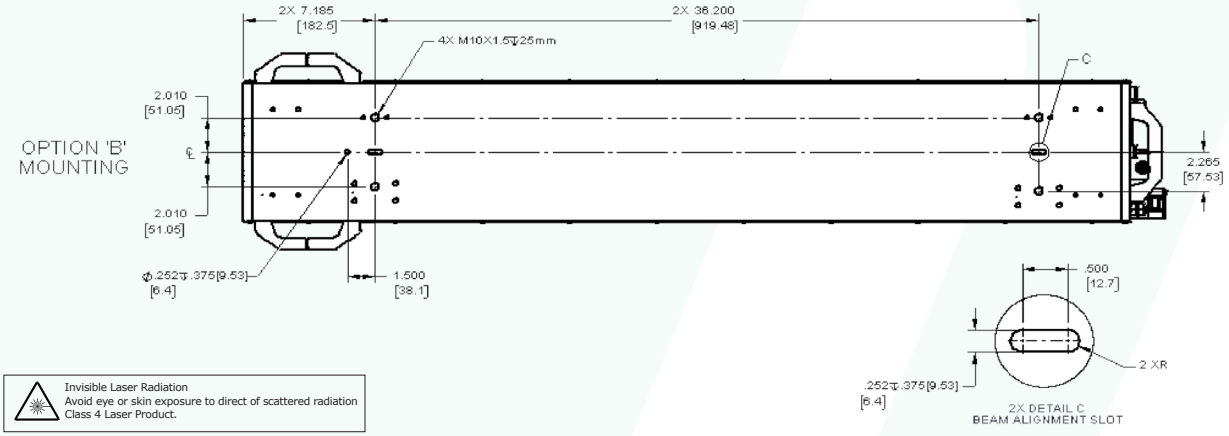
Dimensions are in mm (inches)



NOTES:

1. BEAM CENTERED IN APERTURE WITHIN ±1.0mm
2. THIS MOUNTING HOLE PATTERN USED FOR BOTTOM ACCESS FASTENING.





Invisible Laser Radiation
Avoid eye or skin exposure to direct of scattered radiation
Class 4 Laser Product.

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