

Single Mode Trident Generator

Overview:

The PowerPhotonic Trident Generator is designed to transform a collimated single mode beam into small ring + core at the focus of a focusing lens.

Our Trident Generators are thin glass windows with a precision freeform surface, designed to easily integrate into your existing laser system.

In remote welding, the Trident Generator can be used to control the melt pool, while keeping the keyhole intact. This can lead to a less viscous melt pool, reducing spatter and porosity of the weld.

By upgrading your laser head with a Trident Generator, you can experience the benefits of improved process quality, increased throughput, and reduced operating costs.

The PowerPhotonic Effect:

>95%

Shaping Efficiency

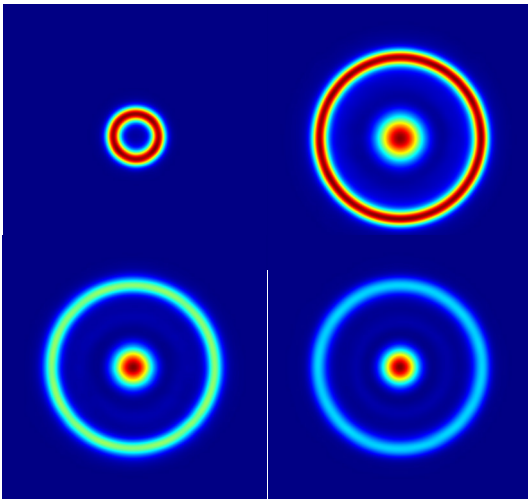
>10:1

Extinction Ratio (Gaussian: Ring)

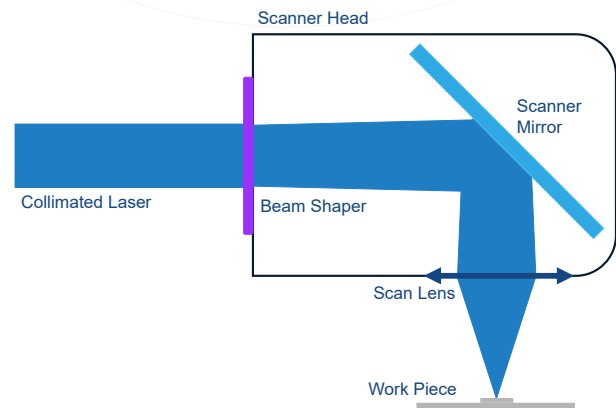
>100kW

CW Power Handling Capability

Output Profiles:



Optical Layout:



Key Features:

- Efficient Beam Conversion
- High Power Handling
- Optional Extinction Ratio
- Easy Integration

Target Applications:

- Remote Welding
- Additive Manufacturing
- Laser Micro Machining
- Ultrafast Material Processing



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Standard Part:

Part Number	Input Beam Diameter, $1/e^2$ (mm)	Ring Diameter, Peak to Peak (μm)*	Central Spot : Ring Maximum Intensity	Central Spot Diameter
PP-SM-RNG-1070-V1-AR	5	100	N/A	N/A
PP-SM-TRI-1070-V1-AR	5	350	1:1	6.4 x diffraction limit
PP-SM-TRI-1070-V2-AR	5	350	2:1	5.5 x diffraction limit
PP-SM-TRI-1070-V3-AR	5	350	3:1	5.0 x diffraction limit

* when a 100mm focal length lens is used. All parts designed for 1070nm

General Specification:

Parameter	Value
Part Diameter (mm)	25.4 +0/-0.1
Part Thickness (mm)	1.01 +/- 0.01
Part Clear Aperture, Diameter (mm)	15
Coating Reflectance, Per Side ¹ (%)	<0.5

Performance:

Parameter	Value
Ring Diameter (P2P), (%)	± 3
Max Intensity Ratio, (%)	± 5
Power in the Bucket ⁺ , (%)	>95

+ Fraction of Power within the primary spot

* As defined in ISO 13694:2018

¹ Reflectance per side

Custom Options:

The PowerPhotonic Trident Generator can be readily modified for specific laser systems and applications upon request.

Some of the custom options available include:

Different input beam diameter, different wavelength (in the window between 450nm and 2 μm), different ring diameter, different intensity ratio, different optic diameter & thickness.

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