F-THETA SCAN LENSES FOR 1 µm

APPLICATIONS

Coherent introduces scan lenses designed for 1 µm wavelengths that combine optics based on zinc sulfide multispectral and fused silica materials to enable faster micro materials processing for many applications, including high power laser welding and laser cutting.

COHERENT

High Power Laser Welding and Laser Cutting

- Lenses made from zinc sulfide multispectral material can be incorporated into the design, taking advantage of it's excellent thermal conductivity, reduced thermal focus shift, and relatively high index of refraction allowing a reduction in the number of required optics.
- Aspheric capabilities for zinc sulfide multispectral, fused silica, and other optical glasses to provide enhanced performance and minimal aberrations.
- Ultra low absorbing Ion-Beam Sputtered (IBS) oxide coatings available to handle the most demanding high power applications.

Scan Lenses for 1 µm Applications

In addition to high power welding scan lenses, Coherent also offers single or multi element scan lenses designed for laser marking, engraving, and cutting applications below 1kW. These lenses are optimized for wide angles and long focal lengths, making them ideal for applications where large scan fields are required.

- Spot sizes ranging from 10 µm to 40 µm with spot size variation of ≤5%.
- Designs can be telecentric leading to a perpendicular beam incident onto the image plane for minimum spot distortion.
- Square field sizes ranging from 20 mm to 350 mm.
- Singlet lenses can be unmounted or mounted, with custom mounts available upon request.
- Custom scan lens designs available upon request. Contact a Coherent sales representative for more information.

1 µm Scan Lens Specifications

	SL4-1.03-1.08-123-90-165-DW	SL2-1.03-1.08-62-142-275-DW	SL2-1.03-1.08-74-200-400	SL2-1.03-1.08-87-400-650-DW	Comments
Laser Information					
Wavelength (µm)	1.03-1.08	1.03-1.08	1.03-1.08	1.03-1.08	
Laser Power (w)	8 kW	8 kW	8 kW	8 kW	
CW or Pulse	CW	CW	CW	CW	
Beam Diameter at $1/e^2$ pts. (mm)	15.0	15.0	20.0	20.0	
Minimum CA for Full Beam (mm) at Galvo Input	15.0	15.0	30.0	20.0	
Galvo Mirror Specifications					
Dist. Between X & Y Scan Mirror (mm)	19.7	18.0	16.0	21.0	
Dist. From Y Scan Mirror to Edge of Lens Housing (mm)	16.0	15.0	26.0	26.0	
Clear Aperture (mm)	15.0	15.0	20.0	20.0	
Input Scan Angle (optical angle in degrees)	16 x 16.4	14.4 x 15	13.5 x 14.1	18 x 17	
Scan Lens Specifications					
EFL (mm)	163.0	277.0	400.0	650.0	
Working Distance (mm)	197.0	302.0	430.0	700.0	
Telecentric Error (deg)	< 4	< 11	< 11	< 14	
Square Field Size (mm)	90 x 90	142 x 142	200 x 200	400 x 400	
Lens Materials	FS + ZnS (MS)	FS + ZnS (MS)	FS + ZnS (MS)	FS + ZnS (MS)	
Number of Elements (if restricted)	4	2	2	2	Plus Debris Window
Theoretical Focused Spot Quality Calculated Using Above Parameters #					
Spot Size (µm at $1/e^2$ power points)	21.0	33.0	35.0	57.0	$M^2 = 1$
Beam Size Variation Across Field (%)	6.0	12.0	13.0	13.0	
Circularity (shortest/longest width)	> 0.94	> 0.88	> 0.9	> 0.9	
Field Sag (µm)	< 40	< 300	< 300	< 1600	

Focused spot diameter and shape is based on theoretical computer calculations. These values will not accurately predict feature or hole size made by laser processing.

Capabilities and Quality

- High power lab for testing up to 6 kW
- Primes laser beam diagnostic software focus measurement and testing
- Camera based metrology equipment
- Non-contact 3D metrology capabilities
- PCI absorption measurement capabilities

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