

STF Series Fiber De-speckler



Our proprietary De-Speckler technology averages the modal noise within an optical fiber. This reduction in speckle is an ideal choice for fiber assemblies used in the Life Sciences, Digital Laser Projection, Interferometry, Laser Beam Homogenization, Lithography, and Metrology. For many fiber coupled applications, modal noise interferes with optimal performance. We have developed a small, simple and integrated de-speckling system which maximizes performance and reliability in illumination, with no optical loss.

Features and Benefits

Speckle is a random granular pattern commonly observed in the output beam of a laser. It is characterized by many dark and light spots of different intensities visible in a given cross section of the laser beam. This effect occurs as a result of interference between various propagation modes of the light.

The reduction of speckle is important for applications where a homogeneous laser output of uniform intensity is ideal, such as laser-scanning microscopy, flow cytometry, and DNA sequencing. By using the De-Speckler to average the modal noise and greatly reduce speckle, maximized performance can be achieved. Other benefits resulting from speckle reduction can include faster integration times, improved signal-to-noise ratios, and higher throughput.

Our speckle reduction solution has a small form factor and is in-line with a customizable fiber assembly. The fiber size, core shape, jacketing, connectors, and length can all be customized to perfectly suit your application. Please view the product specifications for more information.

This product is popularly paired with our square core fiber and RARe Motheye anti-reflection technology.

Applications

- Life sciences: bioanalytical instrumentation, flow cytometry, gene sequencing, microscopy, spectroscopy
- Digital laser projection
- Interferometry
- Laser beam homogenizers
- Lithography
- Metrology



Specifications

- Power supply: +5 Volts
- Power consumption: < 1 Watt
- Wavelength range: 400nm 1550nm
- Fiber core size: 100μm 400μm
- De-speckling rate: up to 5000 Hz

Customization Options

- **Fiber types**: all Silica optical fiber; plastic clad fiber; round or square core fiber; RARe Motheye available.
- Jacket types: acrylate, nylon, polyimide, Tefzel
- Assembly types: single fiber assemblies
- Connector types: 905 SMA; 906 SMA; FC/PC; FC/UPC; FC/APC; ST/PC; ST/UPC; ST/APC; cleaved ends; polished ends; round 2.5mm ferrule; custom connectors



USB Mini-B

Power

Source

Plug-and-Play! USB Mini-B is all

de-speckling.

you need to start



For added ESD/ESA protection during benchtop testing

Reluctance Force-based Laser Speckle Reducer STOT-LSR-4C



A way to reduce speckle noise from a laser-based system is by dynamically diffusing the laser beam. Our STOT-LSR-4C speckle reducer averages multiple speckle patterns by dynamically displacing a diffuser, and by doing so creates a more homogeneous, speckle-free beam. The STOT-LSR-4C has an aperture of 18.5x18.5 mm and is especially suitable for laser-based cinema projectors where high laser powers and large beam diameters are used. The diffusor is mounted in a metallic frame and is set into motion by the reluctance force generated in the oscillating magnetic field of a driving coil.

If required, STOT-LSR-4C can combine two oscillating diffusors rotated by 90°, realizing optimized despeckling in both directions. The compact driving electronics, assembled on a flexible plastic substrate, stabilizes the resonance Frequency in closed-loop mode and includes an error signal.

Clear aperture	18.5 x 18.5	mm
External dimensions	35.2 x 37.9 x 5.8	mm
Housing diameter	30.0	mm
Height	14.5	mm
Weight	Full device: 11.0	g
	Diffuser: 0.29	
Mechanical clamping	2x M2 screws	
Minimal weight of anchor mass	500	g

Mechanical specifications

Performance specifications

Oscillation amplitude (peak to	Min: 0.6	mm
peak)	Typical: 0.8	
	Max: 2.0	
Oscillation frequency	120 ± 10	Hz
Device start-up time	20	S
(typical)		

Optical specifications

Material	Fused silica	
Diffusion angle (FWHM)	8.5 (up to 20 on request)	0
Transmission wavelength	VIS coated: 440-660	nm
	Uncoated: approx. 200-2200	
Transmission	VIS coated: >98	%
	Uncoated: >94	
Depolarization	< 0.1	%
Coating	High power, double-sided	
Damage threshold	> 600	W/cm2
Scratch/dig	60/40	Over full clear aperture of
_		diffuser

Electrical specifications

Power supply (micro-USB or	3.4-5	VDC
solder pads) ¹		
Power consumption (with std.	50 mW	mW
electronics		

Environmental specifications

Operating temperature at fixed	Ts- 5 to Ts+55	D°
startup temperature Ts ²		
Storage temperature	-40 to +85	D° C
Start-up temperature	-30 to +85	D°
Mechanical shock	500	g
Cycle life	>40 000	hours
Overview of available standard products		
Standard Product	Coating	Diffusion angle
STOT-LSR-4C-L-18x18-9-T2-	VIS-coated	8.5°
VIS		
STOT-LSR-4C-L-18x18-9-T2-	uncoated	8.5°
NOC		

Accessories	Description
Bracket kit STOT-LSR-4	Bracket for single and double
	diffusor configuration
STOT-LSR-4C-LL-mounting kit	Mounting kit for double diffusor
	configuration
PS-5V-US	5V DC micro-USB power supply
	with US plug
PS-5V-EU	5V DC micro-USB power supply
	with EU plug

Assemblies	Components to order
STOT-LSR-4C-L (no bracket)	1x STOT-LSR-4C, 1x Power
	supply
STOT-LSR-4C-L (with bracket)	1x STOT-LSR-4C, 1x Bracket-kit
	LSR-4, 1x Power supply
STOT-LSR-4C-LL (double	2x STOT-LSR-4C, 1x Bracket-kit
diffusor configuration with	LSR-4,
bracket)	1x STOT-LSR-4C-LL-mounting kit,
	2x Power supply

Control

The STOT-LSR-4C is driven using a 5V DC power supply. No further driver electronics are needed; the device settles into its optimal trajectory once powered on.