Scanning Fiber Mach-Zehnder Interferometer

500 – 2600 nm, 0.01 – 1000 mm

DATASHEET

Return to the Webpage

The MAIM Series Scanning Fiber Optical Mach-Zehnder Interferometer splits incoming light into two paths using a fiber coupler—one reference arm with a fixed fiber length and the other sample arm with a variable length controlled by either a high-speed piezoelectric fiber stretcher or a motor-driven long range delay line. The two beams are is recombined using a second fiber coupler to produce an interference pattern for high-precision measurements. Fast scanning is achieved via the piezoelectric stretcher driven through a front-panel BNC input, while extended-range scanning is enabled by a motorized stage controlled via USB/GUI. Designed for operation across 500 to 2600 nm with matched single-mode fibers, each MAIM unit features a “zero meter” path mismatch baseline, allowing flexible delay customization. The MAIM is a versatile unit with both optical output or 0-5V electrical output (build in amplified detector). Standard and custom fiber lengths are available, including configurations with variable delay in both arms. The unit comes complete with a power supply.

Features

- Non-Mechanical High Reliability
- Accurate and Reproducible Position Control
- Fast Scan Speeds

Applications

- Laser Phase /Frequency Noise Testing
- Interfetometric Sensors
- Heterodyne Interferometer

Specifications

Parameter		Min	Typical	Max	Unit
Center Wavelength		500		2600	nm
Wavelength Range			+- 150		nm
Insertion Loss [1]	1300nm		3	5	dB
	850nm		5	6.5	
	660nm		6	7.5	
Variable Delay Difference	Piezo	0.01		5	mm
	Motor	0.01		500	
Fix Delay Range		1		10000	mm
Path Mismatch (without delay line)				10	mm
Input Power				500	mW
Phase Modulation Speed	Piezo		30		kHz
	Motor		0.01		
Detector Bandwidth (3dB)			DC – 5		MHz
Detector Gain			10^4		V/A
Amplifier Outputs Impedance (SMA)			50		Ω
Power Supply			±12V, 250mA		

Notes:

[1]. Includes connector losses, measured at center wavelength. Shorter wavelength has higher loss

* All accuracy data are valid at 23 ± 5°C and 45 ±15% humidity

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

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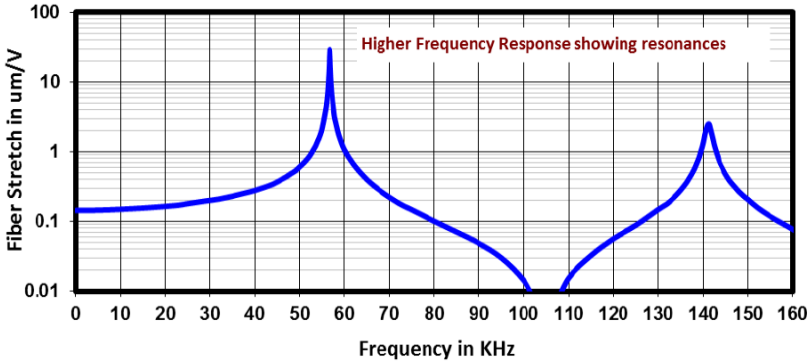
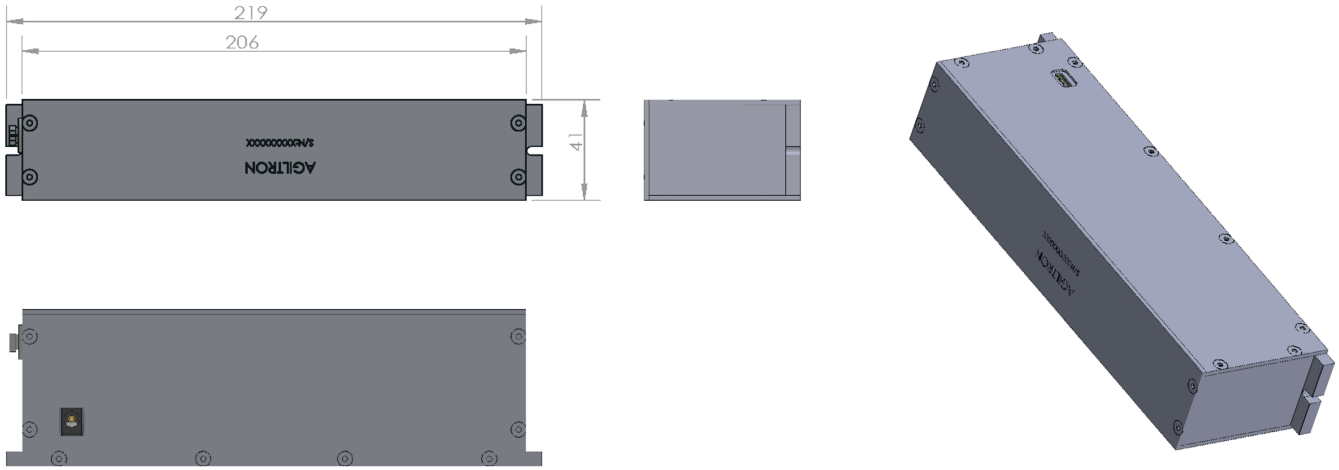
Functional Diagram

Typical Piezo Stretcher Modulation Frequency Response



Mechanical Dimensions (mm)



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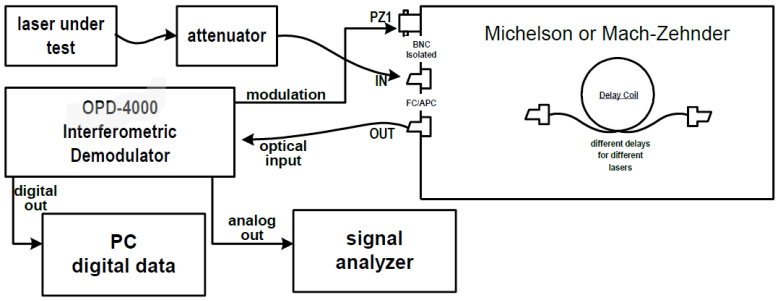
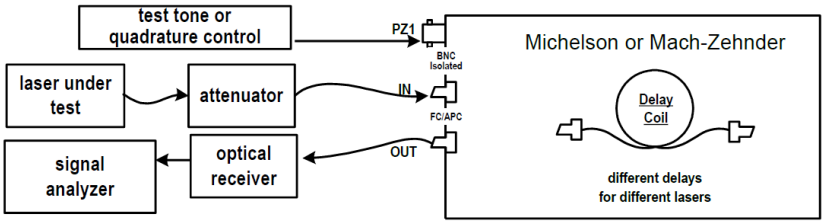
Application Examples

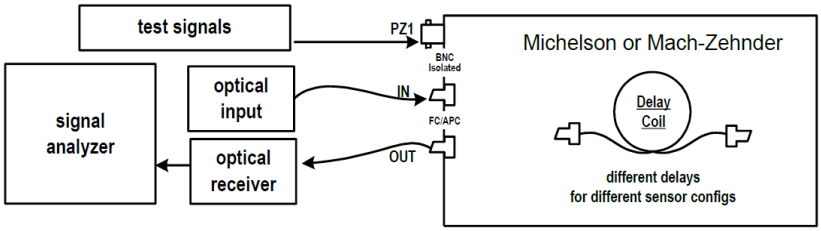
LASER PHASE / FREQUENCY NOISE TESTING



LASER PHASE / FREQUENCY NOISE TESTING 2



FIBER INTERFEROMETRIC SENSOR SIMULATOR



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DATASHEET

Ordering Information

	☐	☐	☐☐	☐☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Variable Range ***	**Fix Range**	**Fiber Type**	**Fiber Cover**	**Detector ****	**Connector**
MAIM-	Standard = 1 Special = 0	488 = 4 532 = 5 650 = 6 780 = 7 850 = 8 980 = 9 1060 = 1 1310 = 3 1550 = C 2000 = 2 Special = 0	0.5mm = 0A 1mm = 01 10mm = 10 20mm = 20 30mm = 30 40mm = 40 50mm = 50 Special = 00	0.05m = 0A 0.5m = 05 1m = 10 10m = 20 100m = A1 200m = A2 Special = 00	*Select below*	0.9mm Tube = 1 Special = 0	Non = 1 Yes = 2	FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = 8 LC/UPC = U Special = 0

** <1mm use high speed piezo actuator, >1mm use motor*

****** when detector selected the output is electrical 0-5V, when none selected, the output is optical fiber

Fiber Type Selection Table

1	**SMF-28**	5	**PM1550**	M	**MM 50/125µm**
		D	**PM1950**	N	**MM 62.5µm**
		3	**PM1310**		
4	**SM450**	E	**PM400**		
A	**SM1950**	F	**PM480**		
6	**SM600**	G	**PM630**		
7	**Hi780**	H	**PM850**		
8	**SM800**	I	**PM980**		
9	**SM980**	J	**PM780**		
B	**Hi1060**	K	**PM460**		
C	**SM400**	L	**PM405**		

Typical InGaAs Detector Response