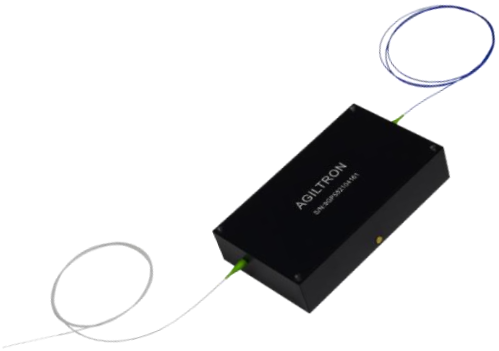
All Fiber Optic Polarization Scrambler

SM, MM, 0.05 to 700KHHz, 450 to 2600nm, <0.5dB optical loss, turn-key module

DATASHEET

BUY NOW



The AFPS series of All-Fiber Optical Polarization Scramblers is designed to randomize the polarization states of fiber with desirable features, including ultralow insertion loss, broad bandwidth, compatibility with all fiber types, and high power handling capabilities. This technology is achieved by applying controlled stresses to the passing fiber using four to six piezoelectric squeezing plates arranged at 45-degree angles sequentially, inducing fiber birefringence phase retardation. Consequently, the device rapidly converts any input polarization state into randomly polarized states, covering the entire Poincaré sphere. The PFPS series is bidirectional. Squeezers within the device operate at various fixed frequencies, with the highest speed reaching 700kHz. This device employs advanced digital circuitry to ensure a uniform State of Polarization (SOP) distribution across a wide operational temperature range, rendering it suitable for demanding sensor field applications. This self-contained module operates without requiring manual adjustments or input controls, simplifying its usability. Installation involves straightforward steps: connect the input and output fibers and plug in the included 12V DC power supply. Users should allow approximately 5 minutes for the module to stabilize thermally after activation.

Features

- No Moving Parts
- Ultra-High Speed
- Low Loss
- High Reliability
- Bidirectional
- Space/Mill Qualification

Applications

- Polarization Elimination
- Instruments

Specifications

Parameter	Min	Typical	Max	Unit
Center Wavelength	400		2600	nm
Operating Wavelength Range		100	150	nm
Insertion Loss [1]		0.2	0.3	dB
Return Loss (without connector)	65			dB
Output Degree of Polarization [2]	5			%
Residual Amplitude Modulation			0.02	dB
Residual Phase Modulation			0.1	π
Optical Power Handling [3]			800	mW
Intrinsic Polarization Dependent Loss		0.05	0.1	dB
Operating Temperature	0		60	˚C
Storage Temperature	-40		85	˚C
Power Supply (DC)		12		V
Power Consumption		12		W

Notes:

[1]. Without connectors. Each Connector adds 0.3dB.

[2]. Tested using Agilent Polarimeter N7781 series with data rate 1MHz

[3]. 800mW for fiber core >9 μm. Smaller core lower the power handling

Rev 04/17/24

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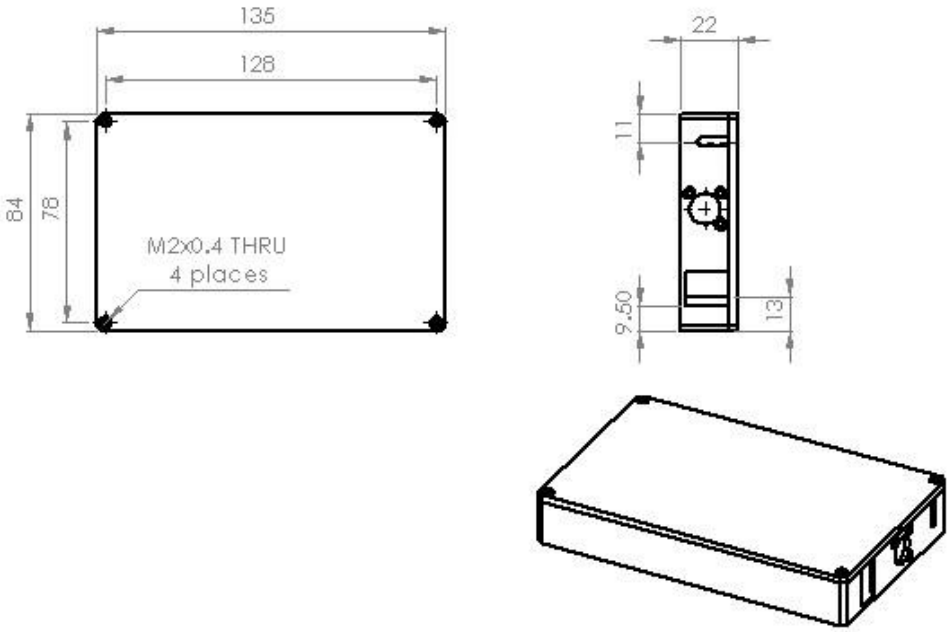
Mechanical Dimensions (mm)



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Ordering Information

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Prefix	**Type**	**Wavelength**	**Package**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
AFPS-		1550nm = 5 1310nm = 3 1060nm = 1 850nm = 8 750nm = 7 2000nm = 2 Special = 0	SM = 1 MM = 2 Special = 0	Select From Table Below Special = 00	0.9mm tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	FC/APC = 3 FC/PC = 2 LC/PC = 7 LC/APC = 9 LC/UPC = U Special = 0

Fiber Type Selection Table:

01	**SMF-28**	34		71	**MM 50/125µm**
02		35		72	**MM 62.5µm**
03		36		73	**105/125µm**
04	**SM450**	37		74	
05	**SM1950**	38		75	
06	**SM600**	39		76	
07	**Hi780**	40		77	
08	**SM800**	41		78	
09	**SM980**	42			
10	**Hi1060**	43			
11	**SM400**	44			
12		45			
13		46			

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.