All Fiber Optic Polarization Scrambler/Depolarizer

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

DATASHEET

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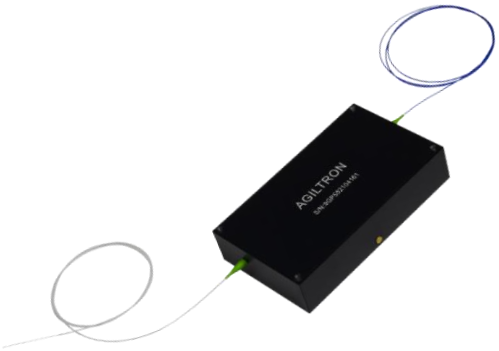

The AFPS series All-Fiber Optical Polarization Scramblers effectively randomize the polarization states of optical fibers while offering ultralow insertion loss, broad bandwidth, compatibility with all fiber types, and high power handling. This is achieved through precise, sequential stresses applied by four to six piezoelectric squeezing plates positioned at 45-degree angles, inducing birefringence phase retardation. The scrambler rapidly converts any input polarization into randomly distributed states across the entire Poincaré sphere and is bidirectional in operation. With squeezer frequencies up to 700 kHz and advanced digital circuitry, the device ensures uniform State of Polarization (SOP) distribution across a wide temperature range, making it ideal for demanding sensor applications. The self-contained module requires no manual adjustments or input controls, simplifying usage. Installation is straightforward: connect the input/output fibers, plug in the 12V DC power supply, and allow approximately 5 minutes for thermal stabilization.

Features

- 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

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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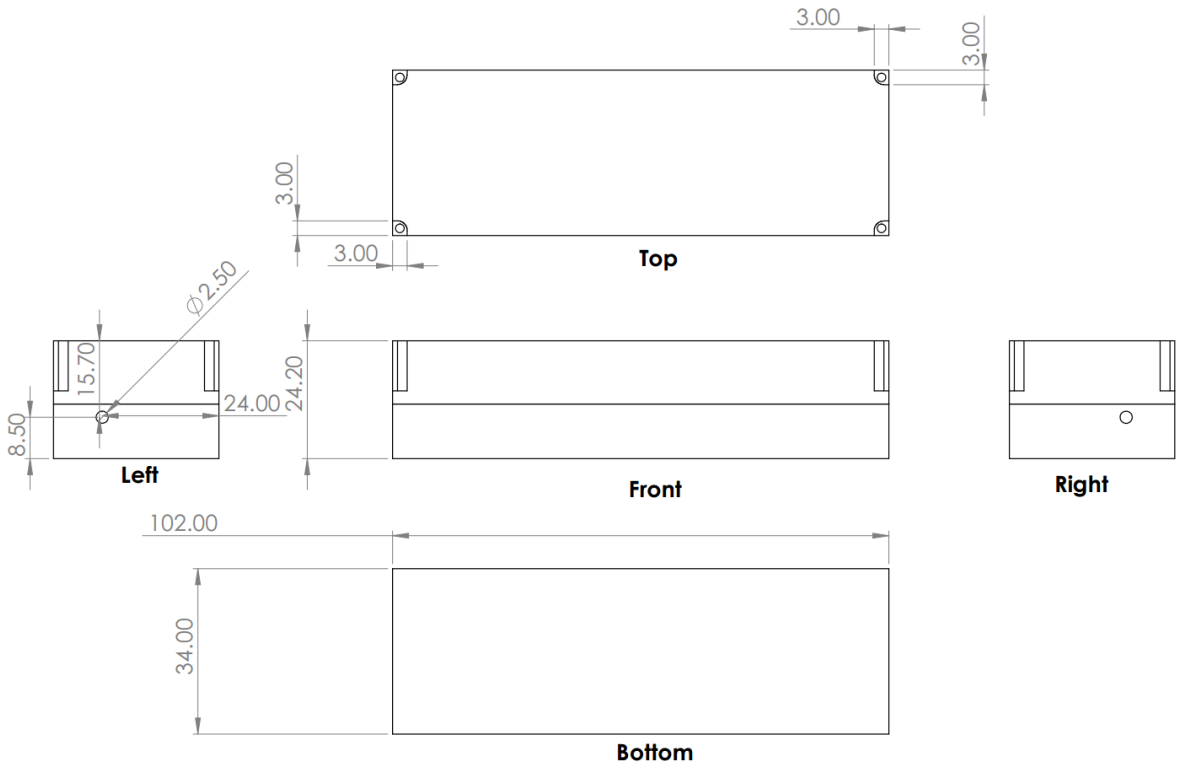
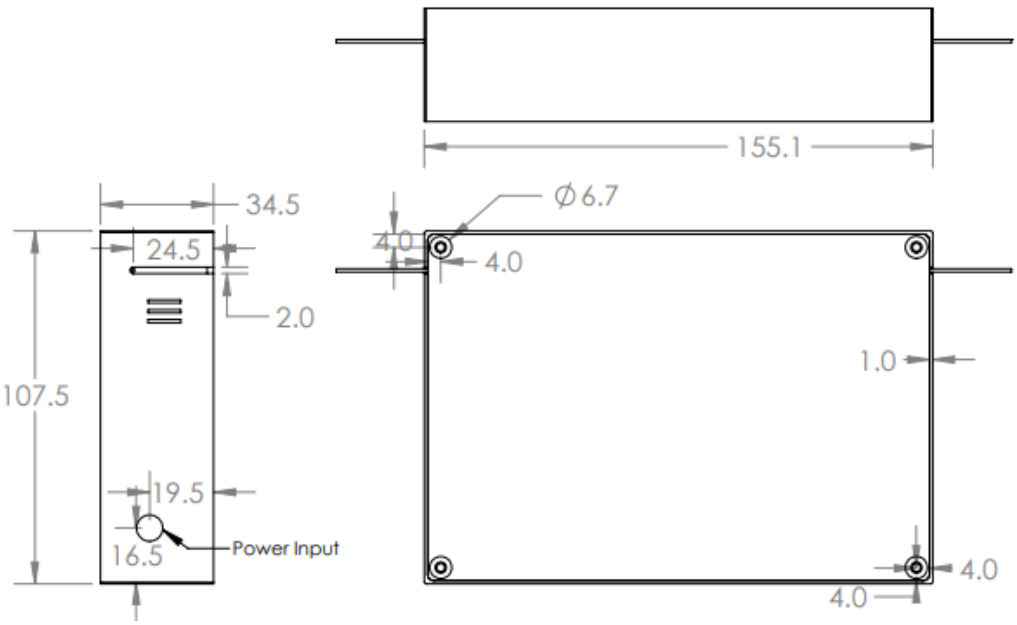
Mechanical Dimensions (mm)





*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

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Ordering Information

	☐	☐☐	☐☐	☐☐	☐	☐	☐
Prefix	**Test Wavelength**	**Type**	**Input Fiber**	**Output Fiber**	**Fiber Cover**	**Fiber Length**	**Connector**
AFPS-	360 nm = A 430 nm = B 488 nm = 4 532 nm = 5 630 nm = 6 780 nm = 7 850 nm = 8 980 nm = 9 1060 nm = 1 1310 nm = 3 1550 nm = C 2000 nm = 2 2.3-4.1 µm = F	Standard = 11 Special = 00	*Select From Below* Special = 00	*Select From Below* Special = 00	0.9mm tube = 3 Special = 0	1m = 1 0.5m = 2 Special = 0	FC/APC = 3 FC/PC = 2 LC/PC = 7 LC/APC = 9 Non = 1 Special = 0

Fiber Type Selection Table:

01	**SMF-28**	34	**PM1550**
02	**SMF-28e**	35	**PM1950**
03	**Corning XB**	36	**PM1310**
04	**SM450**	37	**PM400**
05	**SM1950**	38	**PM480**
06	**SM600**	39	**PM630**
07	**780HP**	40	**PM850**
08	**SM800**	41	**PM980**
09	**SM980**	42	**PM780**
10	**Hi1060**	43	
11	**SM400**	44	**PM405**
12		45	**PM460**

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.