Manual Mini
Polarization Rotator/Controller Lockable

High Precision with Three Waveplates or Polarizers

DATASHEET

Return to the Webpage

The POCM Manual Mini Polarization Controller features a novel design that combines high precision, compact size, low loss, high extinction, and reliable lockability. Unlike traditional fiber strain-based controllers, the POCM utilizes three rotatable waveplates positioned between collimators, enabling precise and repeatable access to all possible polarization states. Key features include: Rotatable waveplates controlled via finger or screwdriver adjustment; Magnetic locking mechanism to secure polarization settings without drift, maintaining stability for years; and Superior to conventional strain-based controllers, which degrade over time.

Polarization Control Configuration:

- First Half-Wave Plate: Adjusts the initial polarization angle.
- Quarter-Wave Plate: Converts linearly polarized light to elliptical or circular polarization.
- Second Half-Wave Plate: Fine-tunes the polarization angle to achieve the desired output state.

An optional configuration includes rotatable polarizers to ensure the output is strictly linearly polarized. For enhanced polarization purity, a dual-stage configuration is available, with the output provided through a PM fiber aligned to the slow axis. The POCM is specifically designed for integration into modules or systems with limited space while offering robust performance and long-term reliability.

Features

- Low Loss
- High Reliability
- Compact

Applications

- Polarization Control
- Instrument
- Lasers

Specifications

Parameter		Min	Typical	Max	Unit
Center Wavelength		750		2400	nm
Wavelength Bandwidth [1]		± 15		± 40	nm
Wavelength Bandwidth		750	850	900	nm
Insertion Loss [1]	1250nm-1620nm	0.5	0.6	0.8	dB
	750nm-1100nm	0.8	1	1.3	
	450nm-700nm	1.2	1.5	2.5	
Return Loss		50			dB
Extinction Ratio (PM fiber)			26	32	dB
PMD		-	-	0.05	ps
Driving Voltage		3	4	4.5	V
Driving Current (@35 dB for each channel)				60	mA
Optical Power Handling				0.5	W
Operating Temperature		0	20	60	°C
Storage Temperature		-40	-	70	°C

Notes:

[1]. Short wavelengths have narrow bandwidth. ±40nm for wavelength >1310nm.

[2]. Without connectors, each connector ads 0.3dB

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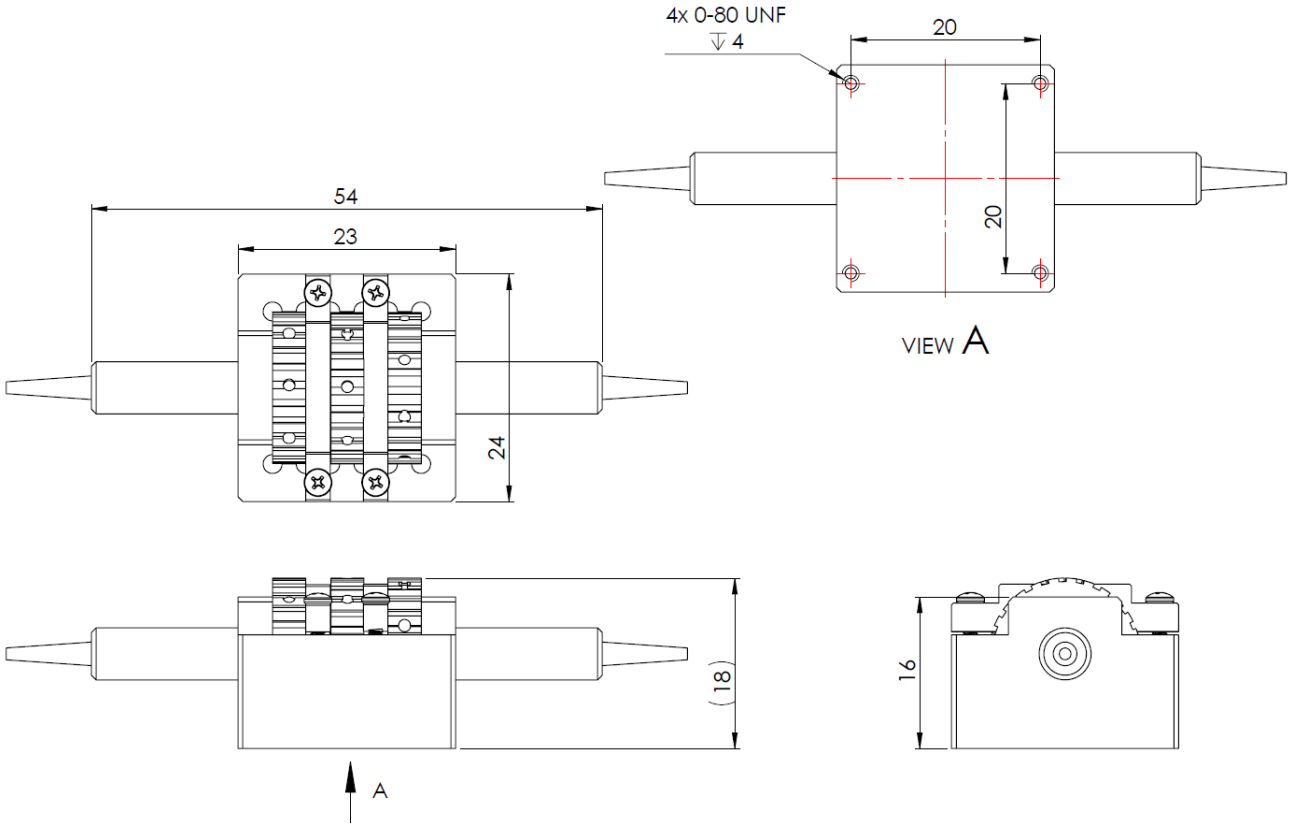
DATASHEET

Dimensions For Package 5 (mm)



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

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DATASHEET

Ordering Information

	☐☐	☐	☐	☐☐	☐☐	☐	☐	☐
Prefix	**Type**	**Wavelength ***	**Package**	**Input Fiber**	**Output Fiber**	**Fiber Cover**	**Fiber Length**	**Connector**
POCM-	3 waveplates = 11 1 polarizer = 22 2 polarizer = 33	1550 ± 40nm = 5 1367 ± 40nm = 3 810 ± 20nm = 8 780 ± 20nm = 7 1060 ± 40nm = 9 450nm ± 40nm = 4 530nm ± 40nm = A 650nm ± 40nm = 6 850nm ± 40nm = B 950nm ± 40nm = C 2000nm ± 40nm = 2 Special = 0	Standard = 5 Special = 0	*Select from below table*	*Select from below table*	Bare fiber = 1 900 µm tube = 3 Special = 0	0.25 m = 1 0.5 m = 2 1.0 m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Duplex LC/PC = 8 LC/APC = A LC/UPC = U Special = 0

***** The listed wavelength bands have components made already. Other wavelength band (Red Color) requires a NRE of $490

Fiber Type Selection Table:

01	**SMF-28**	34	**PM1550**	71	**MM 50/125µm**
02	**SMF-28e**	35	**PM1950**	72	**MM 62.5µm**
03	**Corning XB**	36	**PM1310**	73	**105/125µm**
04	**SM450**	37	**PM400**	74	**FG105LCA**
05	**SM1950**	38	**PM480**	75	**FG50LGA**
06	**SM600**	39	**PM630**	76	**STP 50/125**
07	**Hi780**	40	**PM850**	77	**IRZS23**
08	**SM800**	41	**PM980**	78	**IRFS32**
09	**SM980**	42	**PM780**	79	
10	**Hi1060**	43		80	
11	**SM400**	44	**PM405**	81	**UV180nm**
12		45	**PM460**		
13		46			

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DATASHEET

Operation Instruction

To adjust the wave plates to achieve the desired polarization state

- **Initial Setup**: Align the wave plates such that the first half-wave plate is at 0°, the quarter-wave plate is at 45°, and the second half-wave plate is at 0°.
- **Fine-Tuning**: Rotate each wave plate individually to adjust the polarization state at the output. Adjustments allow you to cover a full range of states:
  - Rotate the first λ/2 plate to set the initial linear polarization angle.
  - Rotate the λ/4 plate to introduce elliptical or circular polarization.
  - Rotate the second λ/2 plate to achieve the final desired linear polarization angle.

To adjust the polarizers to achieve the desired polarization state

- **Initial Setup**: Rotate the fist polarizer to have the highest output intensity. Then rotate the second polarizer to have the highest output intensity
- **Fine-Tuning**: Rotate each polarizer individually to maximize the output.

Application Notes

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.