

# Manual Mini Polarization Rotator/Controller Lockable

High Precision with Three Waveplates or Polarizers



DATASHEET

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## Features

- Low Loss
- High Reliability
- Compact

## Applications

- Polarization Control
- Instrument
- Lasers

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.

## Specifications

Parameter	Min	Typical	Max	Unit
Center Wavelength	750		2400	nm
Wavelength Bandwidth <sup>[1]</sup>	± 15		± 40	nm
Wavelength Bandwidth	750	850	900	nm
Insertion Loss <sup>[1]</sup>	1250nm-1620nm	0.5	0.6	0.8
	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 adds 0.3dB

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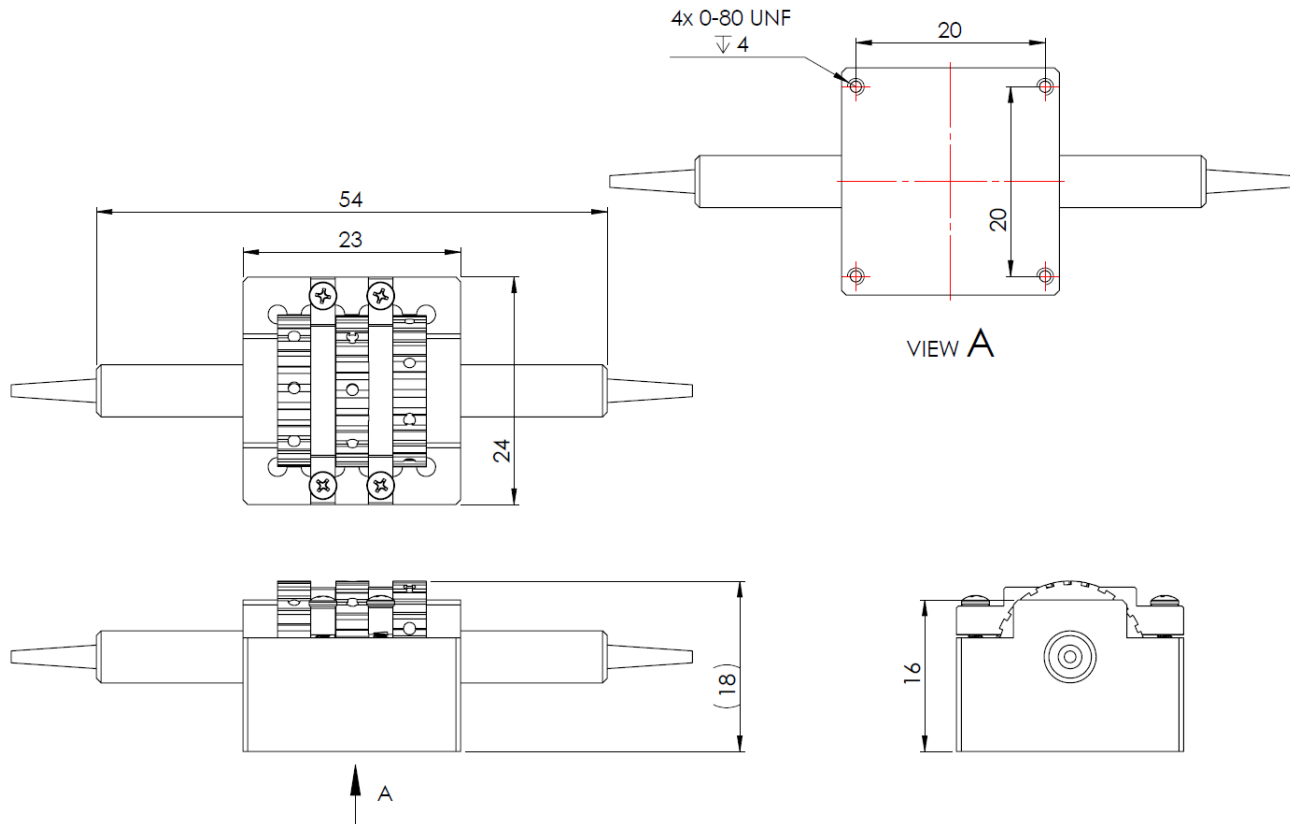
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## Dimensions For Package 5 (mm)



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

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### Ordering Information

Prefix	Type	Wavelength *	Package	Input Fiber	Output Fiber	Fiber Cover	Fiber Length	Connector
<b>POCM-</b>	3 waveplates = 11 1 polarizer = 22 2 polarizer = 33	1550 ± 40nm = 5 1367 ± 40nm = 3 810 ± 20nm = 8 780 ± 20nm = 7 1060 ± 40nm = 9 430nm ± 40nm = 4 530nm ± 40nm = A 630nm ± 40nm = 6 850nm ± 40nm = B 980nm ± 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	780HP	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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## 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  $0^\circ$ , the quarter-wave plate is at  $45^\circ$ , and the second half-wave plate is at  $0^\circ$ .
- **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  $\lambda/2$  plate to set the initial linear polarization angle.
  - Rotate the  $\lambda/4$  plate to introduce elliptical or circular polarization.
  - Rotate the second  $\lambda/2$  plate to achieve the final desired linear polarization angle.

### To adjust the polarizers to achieve the desired polarization state

- **Initial Setup:** Rotate the first 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 ( $<5 \mu\text{m}$ ) 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.