

# Manual Polarization Controller

2 and 3 paddles, all fiber types, all wavelengths



DATASHEET

BUY NOW



The manual polarization controller utilizes stress-induced birefringence to alter the polarization in a single-mode fiber. The fast axis of the fiber, which lies in the plane of the spool, is adjusted concerning the transmitted polarization vector by manually rotating the paddles to twist the fiber. We offer two and three independent spools to create two or three independent fractional wave plates. This configuration simulates a combination of two paddles (a quarter-wave plate and a half-wave plate) or three paddles (a quarter-wave plate, a half-wave plate, and a quarter-wave plate) to transform an arbitrary input polarization state into an arbitrary output polarization state, theoretically. The amount of birefringence induced in the fiber is a function of the fiber diameter, paddle diameter, the number of fiber loops per spool, and the wavelength of the light. For shorter wavelengths, we recommend winding 3 to 4 loops of the fiber on each paddle to create sufficient retardance. However, in practice, their ability to achieve certain polarization states is limited due to the imperfection of the waveplates. They are typically utilized by actively rotating the paddles while measuring the output polarization state. Once the desired state is achieved, the device will maintain the status for a while, allowing one to complete a measurement. For a polarization controller that can achieve all the desired polarization states and lock to the selected polarization state, one can order our waveplate-rotating-based Manual Mini Polarization Controller version. The base is made of aluminum metal for ruggedness, while the paddles are made of Delrin plastic for fiber protection. We offer fully wound units with all types of single-mode fiber and FC/APC or FC/PC connectors

## Features

- Low Loss
- High Reliability
- Compact

## Applications

- Polarization Control
- Instrument
- Lasers

## Specifications

Parameter	Min	Typical	Max	Unit
Center Wavelength	480		2400	nm
Wavelength Bandwidth*	$\pm 15$		$\pm 40$	nm
Insertion Loss (include connectors)	0.1	0.2	0.6	dB
Return Loss (FC/APC Connectors)	55			dB
Retardation			10	$\pi$
Optical Power Handling **			0.5	W
Operating Temperature	0	20	60	$^{\circ}\text{C}$
Storage Temperature	-40	-	70	$^{\circ}\text{C}$

### Notes:

\*Short wavelengths have narrow bandwidth.  $\pm 40\text{nm}$  for wavelength  $>1310\text{nm}$ .

\*\*Short wavelength, the power handling of the connectors reduced.

**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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P +1 781-935-1200

E [sales@photonwares.com](mailto:sales@photonwares.com)

W [www.agiltron.com](http://www.agiltron.com)

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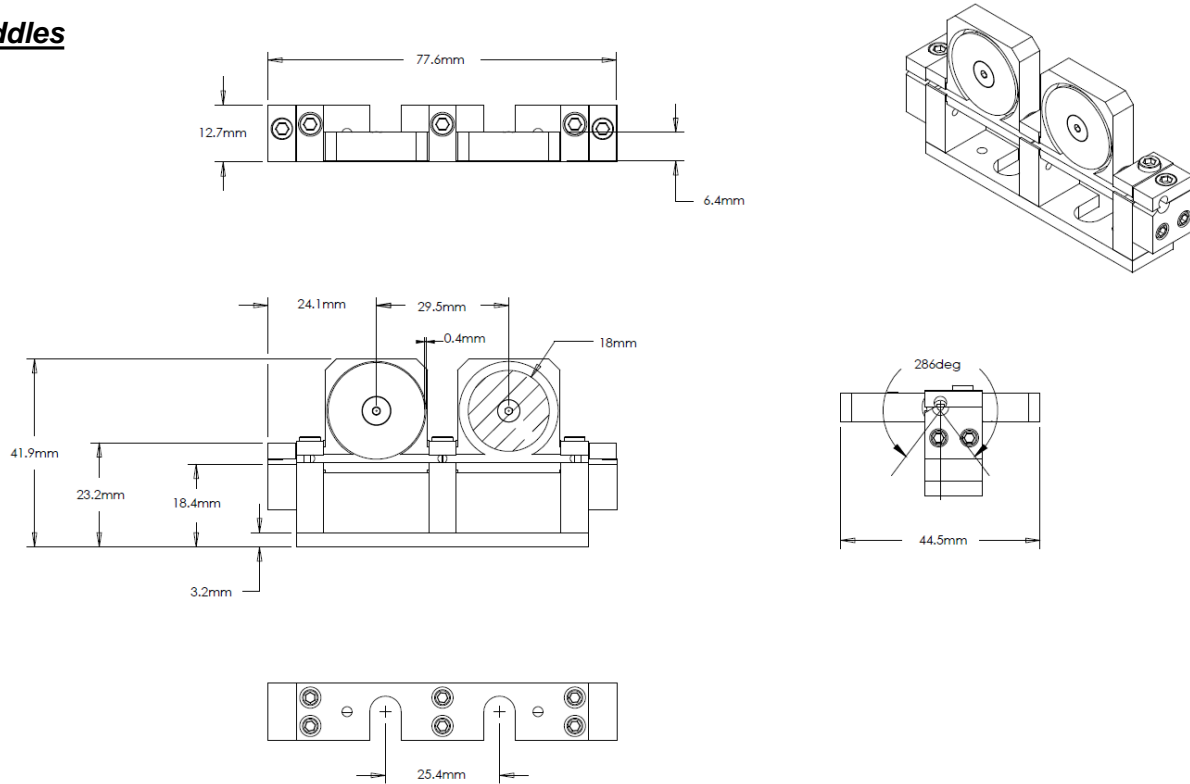
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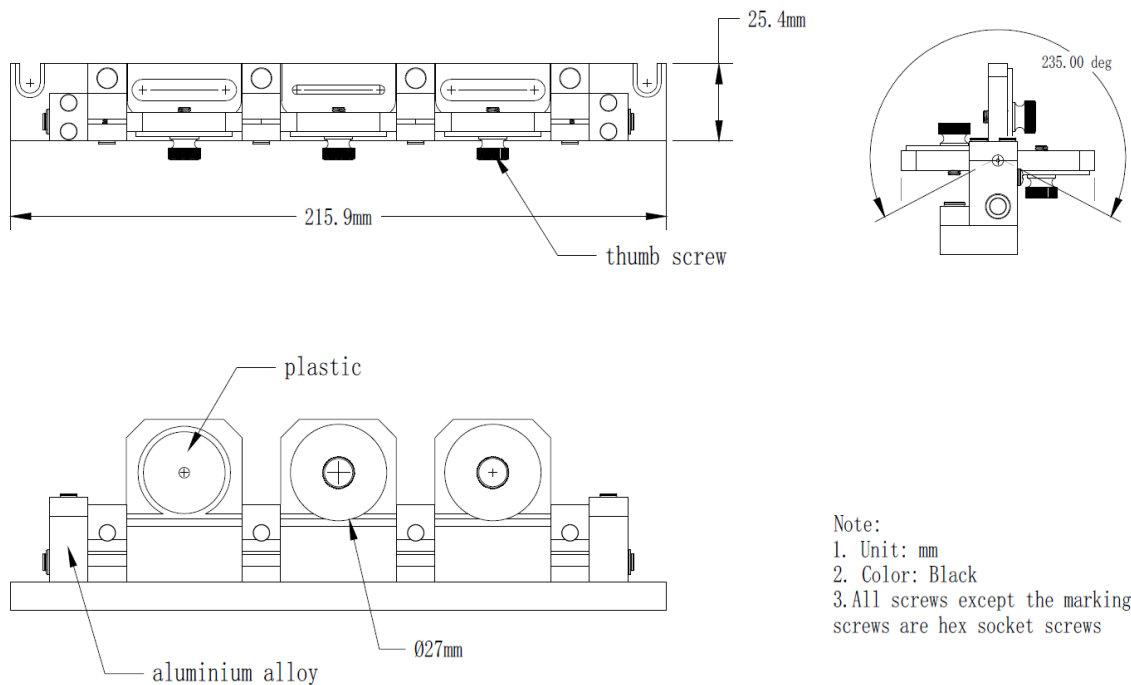
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### Dimensions For Package 5 (mm)

#### 2 Paddles



#### 3 Paddles



Note:  
1. Unit: mm  
2. Color: Black  
3. All screws except the marking screws are hex socket screws

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

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### Ordering Information

	2 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prefix	Type	Number of Paddles	Package	Fiber Type	Fiber Cover	Fiber Length	Connector
PMCM-		2 = 2 3 = 3	Standard = 5 Special = 0	Select from below table	0.9 mm tube = 3	0.25 m = 1 0.5 m = 2 1.0m = 3	None = 1 FC/PC = 2 FC/APC = 3 Special = 0

#### Fiber Type Selection

01	SMF-28
02	SMF-28e
03	Corning XB
04	SM450
05	SM1950
06	SM600
07	SM780
08	SM800
09	SM980
10	Hi1060
11	SM400
12	
13	

### 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.

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### Typical Retardance Per Paddle vs Fiber Winding Loop Numbers

