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HIGH RESOLUTION MOTORIZED POLARIZATION CONTROLLER

PRELIMINARY

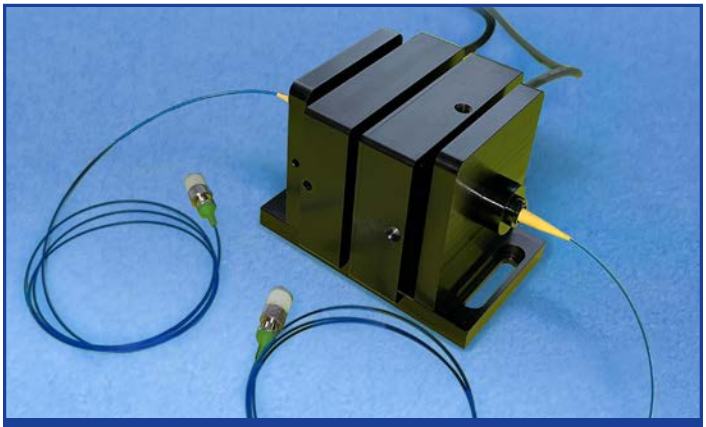
Features

- Precision rotation of half wave plates, quarter wave plates and polarizers to manipulate polarization
- Built-in encoder for closed loop operation
- Compact handheld plug-and-play device with touch screen control or with a computer via a USB port
- User-friendly software with an intuitive GUIs
- Can be pigtailed with single-mode, polarization maintaining or multimode fibers
- Customizable software and GUI upon request
- Interchangeable optics, holders and receptacles

Applications

- Automation of multi-polarization state analysis
- Quantum state tomography
- Polarization calibration
- Polarization state analyzer and controller
- Polarized fiber optic source
- Polarization extinction ratio controller and PM fiber axes conversion
- Optical Interferometric systems
- Laser to fiber coupling and coherent detection

A single rotation stage along with a control unit and built-in touch-screen is powered up using 5V DC power supply.



A dual-stage rotation stage coupled to optical fibers at the input and output ports

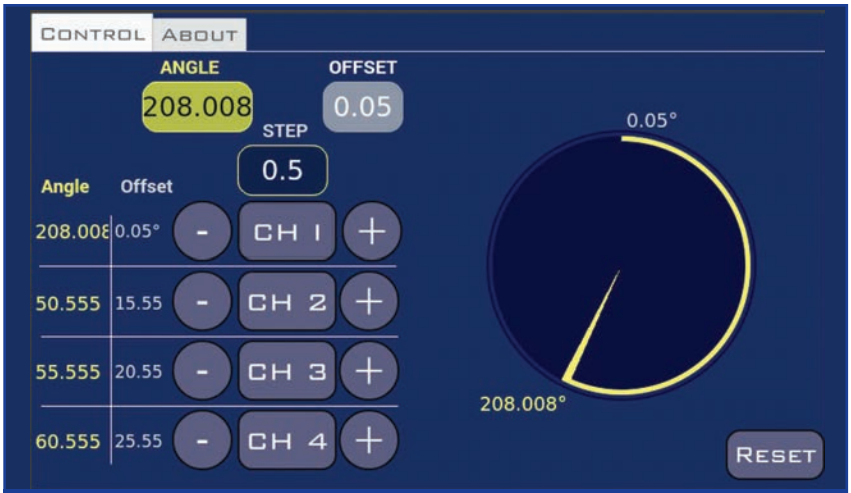
Product Description

OZ Optics handy and cost-effective motorized rotators enable precise control of the polarization states of a single optical stage or multi-stage system with multiple optical paths. These rotators can be controlled and synchronized to perform precise rotations sequentially or in parallel using a single compact control unit. The control unit is incorporated along with a processor and touch screen in a palm-sized enclosure to control multiple motors via an intuitive graphical user interface (GUI). Plug-and-play features are realized and enabled via a customizable GUI regardless of the system complexity for demanding applications.

The input and output ports of a given stage can be fiber-connector receptacles, pinholes for free-space applications, or pigtailed with single mode, polarization maintaining or multimode fibers. The light beam is directed through one or more rotators, where the polarization state (the electric field of the propagating wave) is manipulated via rotating waveplates, polarizer plates, polarizer prisms or polarization beam splitters with sub-degree resolution.

High power optics, connectorized fibers for wide ranges of operating wavelengths are available.

The software and the associated GUI can be modified upon request and a Python library is available.



Four-rotation stage graphical interface that is fully controllable using a touch screen placed on top of the control unit enclosure.

Standard Specifications[1]

Performance	
Travel	360° Continuous[2]
Bidirectional Repeatability[3]	0.05°
Homing Repeatability	0.1°
Bidirectional Accuracy[4]	0.4°
Backlash	0.013°
Encoder Resolution	143360 counts/360° typical (0.0025°/count)
Minimum Incremental Motion	0.05°
Axis Wobble[5]	0.014°
Maximum Total Load[6]	50 g
Minimum Lifetime[7]	>600 000 Revolutions (100 km)

Note:

1. Performance specifications with a load of 64 g and a moment of inertia of 6600 g·mm2.
2. A duty cycle of 15 sec running should be followed by 20 sec cooling down. A shorter running time requires a shorter cool down time.
3. Maximum difference between clockwise and counter clockwise movement to the same position
4. Maximum deviation from true
5. Maximum deviation from the center of rotation
6. Must be centered in the mount.
7. This rotation stage is not designed for continuous operation

Electrical	
Motor Type	Resonant Piezo
DC Voltage Input	4.5 to 5.5 V
Current Consumption	800 mA typical
Standby Current Consumption	50 mA typical
Communications	
Bus	TTL RS232
Speed	9600 baud
Data Length (1 Stop Bit, No Parity)	8 bit
Protocol Data Format	ASCII HEX

Mechanical	
Mounting Thread	¼-20 UNC-2B TAP
Dimensions	7.4 x 8.8 x 2.3 cm
Weight	230 g
Environmental Operating Conditions	
Temperature Range	15 to 40 °C
Maximum Relative Humidity	<80% at 31 °C (Non-Condensing)
Maximum Altitude	2000

Part Numbers

Receptacle Style Motorized Fiber to Fiber Polarization Rotator: *MFPR-0A-XY-W-I-O-R*

Size: 1 = Standard housing
2 = Miniature housing

Input and Output Receptacle Codes:
3 = Super, Ultra, or Standard FC/PC
3A = Angled NTT-FC/PC†
8 = AT&T-ST
SC = SC
SCA = Angled SC†

See Table 6 of the Standard Tables data sheets for other receptacles
† **Only available in standard housing and for wavelengths > 1060 nm.**

Polarization Optics Installed
1 = Plate polarizer
2 = Half wave plate
3 = Quarter wave plate
Use 1 & 2 & 3 for multiple polarization optics

Output Fiber type: M = Multimode Input
Input Fiber type: S = Singlemode
P = Polarization maintaining

Wavelength: Specify in nanometers

Pigtail Style Motorized Fiber to Fiber Polarization Rotator: *MFPR-1A-11-W-a/b-I-O-R-LB-XY-JD-L*

Size: 1 = Standard housing
2 = Miniature housing

Wavelength: Specify in nanometers

Fiber core/cladding sizes, in microns
9/125 for 1300/1550 nm SM fiber
See Tables 1 - 5 of the Standard Tables data sheet for other standard fiber sizes

(***I***) Input Fiber type: M = Multimode
(***O***) Output Fiber type: S = Singlemode
P = Polarization maintaining

Polarization Optics Installed
1 = Plate polarizer
1G = Glan-Thompson polarizer
2 = Half wave plate
3 = Quarter wave plate
Use 1 & 2 & 3 for multiple polarization optics

Backreflection level: 25, 40, 50, or 60dB
60dB for 1300 and 1550 nm only

Fiber Length, in meters, on each side of the device Example: To order 1 meter of fiber at the input and 7 meters at the output, replace "L" with 1,7

Fiber Jacket Type:
1 = 900 Micron OD hytrel jacket
3 = 3 mm OD Kevlar reinforced PVC cable
See Table 7 of the Standard Tables data sheets for other jacket types

Input and Output Receptacle Codes:
3S = Super NTT-FC/PC
3U = Ultra NTT-FC/PC
3A = Angled NTT-FC/PC
8 = AT&T-ST
SC = SC
SCA = Angled SC
See Table 6 of the Standard Tables data sheet for other connectors

Add "-ER=25", "-ER=30" to the part number for 25dB and 30dB extinction ratios, available at some wavelengths only.

Receptacle Style Motorized PFOSS: *MPFOSS-02-X-W-P(-ER=YY)(-LD)*

X = Connector code:
3 = Standard, Super or Ultra NTT-FC/PC receptacle
3A = Angled NTT- FC/PC
SC = SC
SCA = Angled SC
8 = AT&T-ST
MU = MU type connector
LC = LC type connector

LD = Laser Diode type.
Add SLD for SLD type
None for Fabry-Perot type.

YY = Extinction ratio. Add this only for ER > 30 dB. Specify 35 or 40 dB. If not specified, the extinction ratio is greater than or equal to 30 dB. ER = 35 dB or 40 dB is only available for 980 nm, 1064 nm, 1290-1625 nm.

P= Output power, in mW 1 mW is standard

W = Wavelength in nm: 635, 650, 685, 780, 830, 850, 980, 1064, 1310,1480,1550,1625, 2050

Notes:

1. For Highly Stable Polarized Sources **(HIPFOSS)** which include an isolator and Peltier cooler circuit please refer to the Highly Stable Polarized Source data sheet
2. Add **-BL** to the part number to have blocking style attenuator added to the PFOSS
3. Add **-ISOL** to the part number for an isolator. For wavelengths less than 1290 nm, order a HIPFOSS instead