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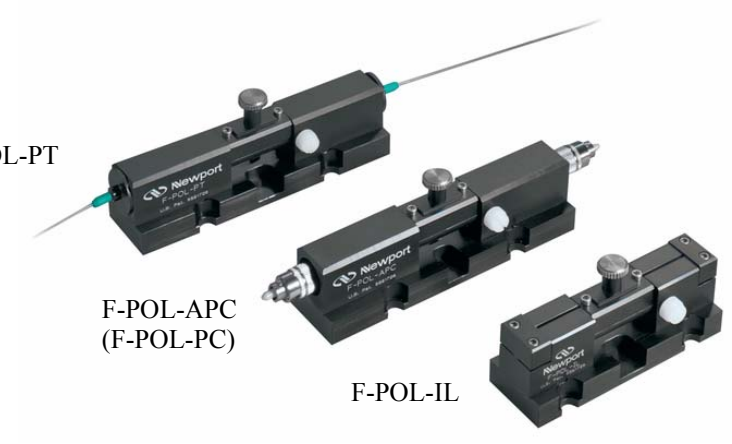
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Operating Instructions for F-POL Series Polarization Controllers



Overview

Newport's F-POL series Polarization Controllers use a mechanical fiber squeezer mechanism which can be rotated about the fiber to convert an arbitrary input polarization to any desired output polarization. Tightening the knob on the fiber squeezer applies pressure to the fiber in the center portion of the device, producing a linear birefringence in this portion of the fiber with its slow axis in the direction of applied pressure. The retardation between the slow and fast axes can be varied between 0 and 2π by changing the applied pressure. In addition, the induced birefringent axes can be varied from 0 to more than $\pi/2$ by rotating the fiber squeezer about the fiber. This creates an all fiber Babinet-Soleil compensator.

Three types of polarization controllers are available:

1. The F-POL-IL is the in-line version of the polarization controller. It can be inserted into a fiber optic system to control the polarization state of light without disconnecting any part of the system. It can be used by simply inserting a length of fiber into the slot located on top of the device.

2. The F-POL-PT is a fiber pigtailed polarization controller that includes a length of specially coated fiber already incorporated in the device. The end-user can integrate the F-POL-PT into a system either by fusion splicing, or by ordering the device with optional fiber optic connectors.

3. The F-POL-PC and F-POL-APC include a connector-terminated length of specially coated fiber already incorporated in the device, enabling the end-user to attach connector terminated fibers to their input and output ports.

Operating Instructions

Setup:

Caution: Each F-POL-IL has four (4) screws on the center cap, as shown in the drawing below. Please do not tighten or loosen the two small (#0-80) screws. They hold in place a pressure plate inside the cap which applies pressure to the fiber. Any adjustment of these two small screws may adversely affect the performance of the controller.

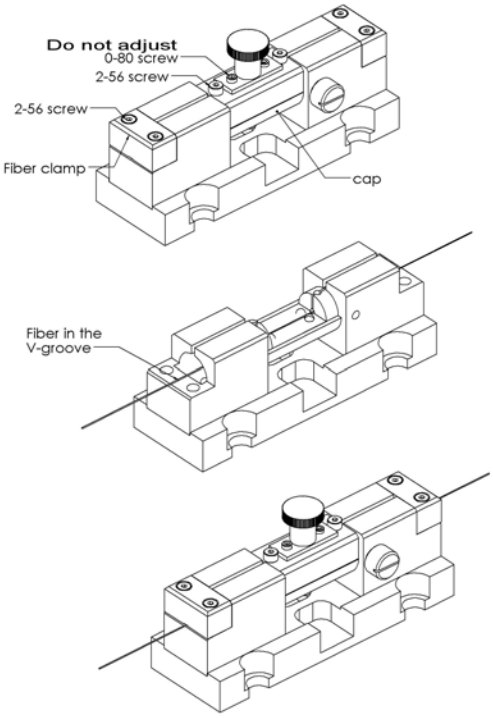
Note: Please Follow Steps 1 - 4 for the F-POL-IL polarization controller only.

Step 1 Remove the two fiber clamps on the left and right ends of the device by unscrewing the two 2-56 hex screws on each fiber clamp.

Step 2 Remove the center cap by unscrewing the two 2-56 hex cap screws near both ends of the center cap (be careful to prevent small parts in the cap from dropping out and getting lost). **Do not adjust (tighten, loosen, or remove) the two small 0-80 screws close to the center knob.** Rotate the center section so that its metal plate is horizontal (see middle picture).

Step 3 Place a section of the fiber in which the polarization is to be controlled into the slot. The fiber should lie straight across the V-grooves on the side blocks and the metal plate in the center section. Put the two fiber clamps back on top of the fiber. Make sure that the section of fiber in the device is straight and securely held by the fiber clamps in the V-grooves below. The pressure on the fiber clamps should be just enough to hold the fiber in place. Do not over-tighten the screws.

Step 4 Put the center cap back on top of the stainless steel plate and tighten the two 2-56 hex cap screws. The polarization controller is now ready for use. See Step 6 for an operation example.



Please note that for the 900µm version of the in-line polarization controller, only fibers with a 900µm tight buffer should be used. The polarization controller will not function properly with a 900µm loose tube.

Note: Please follow Step 5 for the F-POL-PT and F-POL-PC (F-POL-APC) only.

Step 5 Connect the polarization controller at the desired point in your setup using the input/output fiber pigtails (F-POL-PT) or fiber bulkhead connectors (F-POL-PC and F-POL-APC). The polarization controller is now ready for use. See Step 6 for an operation example.

Operation:

The polarization of the light in the fiber can be changed by changing the pressure applied to the fiber and/or the axis along which the pressure is applied, as described in the first paragraph of this instruction note. Steps 6-9 below explain how to use the polarization controller to maximize the light output from a polarization sensitive device such as a polarizer.

Step 6 Launch light into the fiber going through the polarization controller, which in turn should be connected to the polarization sensitive device. Monitor the output power with the help of an optical power meter. Follow Steps 7 - 8 to optimize the polarization state for the device, indicated by a maximum power reading.

Step 7 Apply pressure to the center portion of the fiber by tightening the knob on the rotatable fiber squeezer while monitoring the optical power. If applying pressure causes an increase in monitored optical power, keep increasing the pressure until the monitored optical power starts to decrease.

NOTE

Please do not apply excessive pressure to the fiber by overtightening the screw. In most cases, sufficient pressure can be generated by tightening the screw half way.

Step 8 Rotate the fiber squeezer while maintaining the applied pressure on the fiber, to fine-tune the output polarization. Adjust the pressure and orientation of the fiber squeezer iteratively until the maximum monitored optical power is obtained. This indicates that the optimal polarization state has been reached. In most cases, the desired polarization can be achieved in 2 or 3 iterations.

Step 9 If applying additional pressure causes little change in the monitored optical power, or causes the optical power to decrease, release the pressure and rotate the center section of the polarization controller to a new position. Repeat Steps 7 and 8 if turning the knob causes an increase in monitored optical power. Following this procedure will result in a minimum number of iterations.

Once the desired polarization state is achieved, the plastic set screw on the side of the device (or, for the PLC-006, two small metal screws on either side of the center section) can be used to fix the position.

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