

All Fiber Phase Shifter

Introduction

General Photonics' all fiber phase shifter/modulator provides convenient phase shift or phase modulation in a compact package. The all fiber construction offers extremely low insertion loss, PDL, residual polarization modulation, and residual amplitude modulation. It also features wide wavelength range, maximum return loss, and high optical power operation. This device is ideal for precision phase tuning or phase modulation in fiber laser systems, resonators, and interferometers.

This application note is intended to offer guidance on the electrical connection, driving voltage requirement, dimensions, and polarization properties of the device. For additional information, please contact General Photonics Corporation at (909) 590-5473.

Electrical Connection and Driving Voltage Requirement

The optical phase shift/modulation is achieved using an electrical driving signal. The all fiber phase shifter has three electrical wires for electrical connection, as shown in Figure 1. The orange wire is the positive lead and the yellow wire is the neutral or ground connection. The red wire is not in use in the current configuration. The all fiber phase shifter operation requires positive driving voltage at all times. If using an alternating current (AC) driving source, positive driving voltage can be obtained by adjusting the direct current (DC) offset or by using a bias-tee to apply a DC offset voltage. The applied DC voltage should be equal to or greater than $\frac{1}{2} V_{pp}$ (peak-to-peak voltage value). However, the peak voltage must not exceed 150 V. A driver (Model MPD-001) for the all fiber phase shifter is available from General Photonics Corporation.

Dimensions

The device can be easily mounted on a PC board or other flat surfaces with four #2-56 screws. The dimensions of the all fiber phase shifter are illustrated in Figure 2.

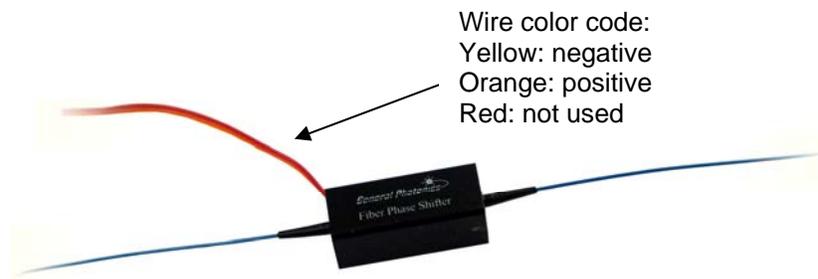


Figure 1. All Fiber Phase Shifter

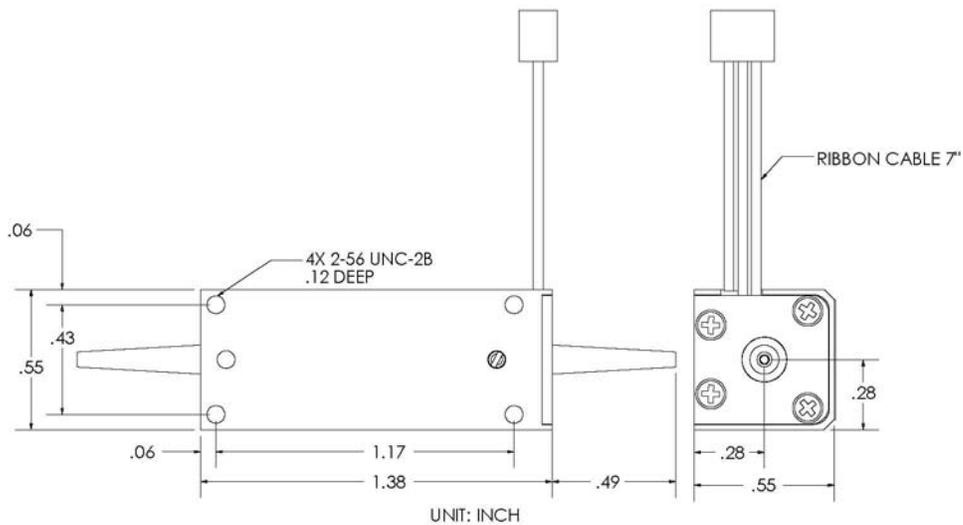


Figure 2 Mechanical dimensions of the all fiber phase shifter

Polarization Properties

The All-Fiber Phase Shifter is manufactured with standard single mode optical fiber operating from 1260 nm to 1650 nm or from 980 nm to 1310 nm depending on customer requirements. During its operation, no birefringence is induced, and therefore the polarization state remains unchanged within the Phase Shifter. However, the optical fiber pigtailed on the device will introduce significant perturbation to the input/output polarization state, particularly when the fiber is bent. For minimum polarization disturbance, a NoTail version All-Fiber Phase Shifter is recommended. The NoTail All-Fiber Phase Shifter mounts fiber connectors directly on the package and eliminates fiber pigtailed.

Using Phase Shifter as a Small Range Delay Line

The All-Fiber Phase Shifter can be used as a fine tune optical delay line for interferometers and other length critical applications. The delay adjustment range is typically 4 - 8 wavelengths at 1550 nm.