

# Miniature Manual Variable Optical Delay Line - VariDelay™ I (VDL-002)



The VDL-002 is a miniaturized variable optical delay line designed specifically for OEM applications. With a delay range of up to 250 ps, this device is a superior replacement for the variable RF phase shifters inadequately adapted from the RF/wireless field for fiber optic communications. It is especially useful in coherent detection systems for adjusting phase or delay differences between signals. The VDL-002 eliminates the VSWR problems of RF phase shifters for high frequency and broadband signals, especially at 40 and 100Gbps. A single device can be used for any data rate, simplifying inventory management. With a footprint of only 0.72" x 1.46" x 2.2" for a delay range of 100 ps, the device can be conveniently integrated into network modules, test instruments, and OCT equipment for precision optical path length control or timing alignment. An internal mirror can be installed to cause light to double pass the device, doubling the delay range. The unique design makes hermetically sealed packaging possible and enables Telcordia qualification when required. Finally, a locking mechanism is provided for locking the delay at a permanent position. The VDL-002 generally comes with single mode or PM fiber pigtailed per customer requirement.

## Specifications:

Operating Wavelength <sup>2</sup>	SM: 840 ± 50nm, 1060 ± 50 nm, 1260-1650 nm PM: 840, 1060, 1310 or 1550 nm ± 50 nm
Optical Delay Range <sup>3</sup>	0 – 100 ps (3 cm) continuous for 100 ps model 0 – 250 ps (7.5 cm) continuous for 250 ps model Internal mirror option for doubling the range
Delay Stability	0.15 ps
Zero Point Delay Offset <sup>4</sup>	180 ps
Insertion Loss <sup>1</sup>	1.0 dB nominal
Insertion Loss Variation <sup>1</sup>	±0.3 dB over entire range
PDL <sup>1</sup>	0.1 dB (1260-1650nm single mode fiber) 0.2 dB (840 or 1060nm single mode fiber)
Return Loss <sup>1</sup>	55 dB
Extinction Ratio	> 18 dB for PM model
Optical Damage Power Threshold	300 mW
Operating Temperature	-15 to 50 °C
Storage Temperature	-40 to 60 °C
Fiber Type	840nm: HI780 or PM Panda 1060nm: HI1060 or PM Panda 1310 and/or 1550nm: SMF-28 or PM Panda
Position Locking	Included
Dimensions	2.20" (L) × 1.46" (W) × 0.72" (H) for 100 ps model 3.15" (L) × 1.46" (W) × 0.72" (H) for 250 ps model

Notes:  
 1. Specifications in table apply for a single-pass device without connectors, measured over 1310 ± 50 nm or 1550 ± 50 nm at 23±5°. The output pigtail can also be replaced with a Faraday mirror to create a double pass device with a total range of 200 or 500 ps, respectively. Some specifications will change for other wavelengths or for double pass devices.  
 2. Other wavelengths available upon request. Contact General Photonics for details.  
 3. Double pass device has 200 ps or 500 ps delay range. Since input and output signals travel on the same pigtail, a circulator or PBS may be necessary to separate input and output signals for some applications.  
 4. Absolute delay at 0 ps setting measured to the edge of the enclosure (excluding caps, boots, and pigtails).

## Features:

- Compact size
- High resolution
- Low insertion loss
- High stability
- Longevity

## Applications:

- Coherent detection systems
- Optical time division multiplexing (OTDM)
- Optical coherence tomography (OCT)
- Optical interferometry
- Optical Fourier spectrum analysis
- Fiber sensors

## Related Products:

- Motorized Delay Lines (MDL-002, MDL-003)
- Manual Delay Line (VDL-001, VDL-004)
- Components

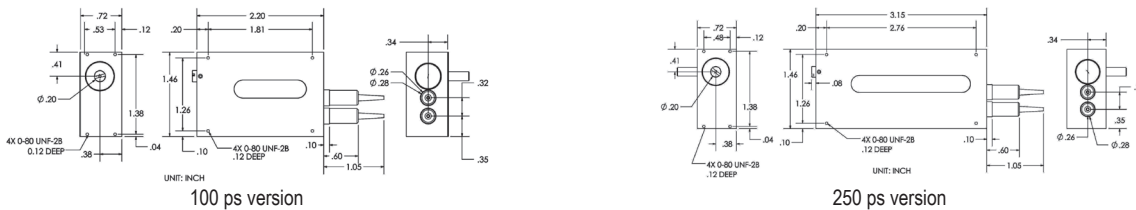
## Tech Info:

- [Optical Coherence Tomography Technologies](#)

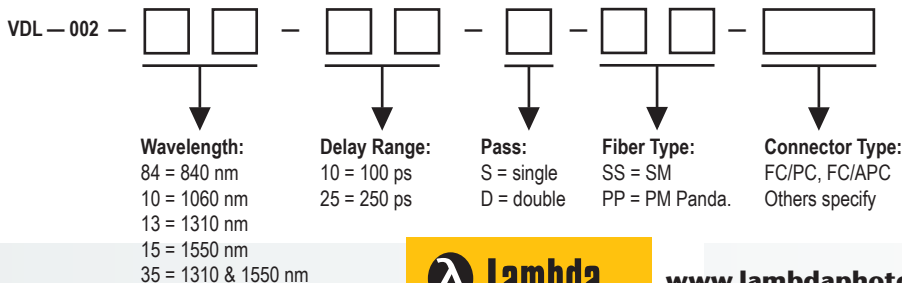
## FAQ:

- [Delay Lines](#)

## Dimensions (in inches):



## Ordering Information:



Configuration Notes:  
 1. Wavelength: 35 option (dual window 1310/1550nm) is available only for SM single-pass devices. PM or double-pass devices are single-window (1310 or 1550nm) only.  
 2. Double pass only available with SM fiber.  
 3. Double-pass not available for 840 or 1060nm.