

ACTIVE TIMING/ DELAY MODULES

**Motorized Variable Optical Delay Line - VariDelay™ II
(MDL-002)**



General Photonics' motorized variable optical delay line provides precision optical path length adjustment of up to 560 ps, single-pass. Driven by a DC motor with an integrated encoder, the MDL-002 has a resolution of less than 0.3µm (1 fs). In addition, its advanced motion design guarantees longevity for long-term continuous operation. Low insertion loss and high reliability make this device ideal for integration in optical coherence tomography (OCT) systems, network equipment and test instruments for precision optical path length control or timing alignment. The MDL-002 is available in three configurations: 1) an integrated unit for use as a bench-top instrument for laboratory applications, 2) with the optical head and control unit separated for easy incorporation into other equipment, and 3) an OEM version with a miniature controller board. All three versions can be remote controlled by a PC or a micro-processor through an RS-232 interface. The delay line is available with either single mode or PM fiber pigtails.

Specifications:

| | | |
|---|--|--|
| Operating Wavelength ² | SM: 1260 to 1650 nm PM or double-pass: 1310 ± 50 or 1550 ± 50 nm | 840±50nm or 1060 ± 50nm |
| Optical Delay Range ^{3,4} | 0 – 330 ps (single-pass model) 0 – 560 ps (single-pass model) 0 – 1120 ps (double-pass model) | 0 – 330 ps (single-pass model) 0 – 560 ps (single-pass model) |
| Position Accuracy ⁵ | ±3 µm (single-pass) ±6 µm (double-pass) | ±3 µm (single-pass) |
| Position Repeatability ⁵ | ±3 µm (single-pass) ±6 µm (double-pass) | ±3 µm (single-pass) |
| Insertion Loss ¹ | 1.0 dB nominal (single-pass) 1.5 dB nominal (double-pass) | 1.5 dB nominal (single-pass) |
| Insertion Loss Variation ¹ | ±0.3 dB over entire range for 330 ps model ±0.5 dB over entire range for 560 ps model ±0.7 dB over entire range for 1120 ps model | ±0.3 dB over entire range for 330 ps model ±0.5 dB over entire range for 560 ps model |
| Optical Delay Resolution | 0.3 µm or 1 fs per encoder count (single-pass) 0.6 µm or 2 fs per encoder count (double-pass) | |
| PDL ¹ | 0.1 dB (SM fiber) | 0.2 dB (SM fiber) |
| Return Loss ¹ | 50 dB | |
| Extinction Ratio | > 18 dB for PM model | |
| Optical Damage Power Threshold | 300 mW | |
| Power Supply | 12 VDC / 1A max. | |
| Control Mode ⁶ | Panel keypad and RS-232 interface | |
| Display ⁶ | 2 x 16 character LCD | |
| Operating Temperature | 0 °C to 40 °C | |
| Storage Temperature | -20 °C to 60 °C | |
| Fiber Type | SMF-28 or PM Panda fiber | HI780 or PM Panda (840 nm) HI1060 or PM Panda (1060 nm) |
| Dimensions (Control Unit/Integrated Version) | 330 ps model: 7" (L) × 4" (W) × 1.6" (H) 560 ps or 1120 ps models: 9" (L) × 4.4" (W) × 1.6" (H) | 330 ps model: 7" (L) × 4" (W) × 1.6" (H) 560 ps model: 9" (L) × 4.4" (W) × 1.6" (H) |
| Dimensions (Optical Head) | 330 ps model: 5.20" (L) × 1.46" (W) × 0.7" (H) 560 ps or 1120 ps models: 6.18" (L) × 1.46" (W) × 0.7" (H) | 330 ps model: 5.20" (L) × 1.46" (W) × 0.7" (H) 560 ps model: 6.18" (L) × 1.46" (W) × 0.7" (H) |
| Dimensions (Mini Controller Board) | 2.56" (L) × 2.56" (W) × 0.85" (H) | |
| Notes: | <ol style="list-style-type: none"> Values in table are valid over an 840, 1060, 1310, or 1550 ± 50nm range for a device without connectors at 23±5°C. Other wavelengths available upon request. Contact General Photonics for details. The 1120 ps model is a double-pass device. Input and output signals travel on the same pigtail. A circulator or PBS can be used to separate input and output signals. Double-pass versions not available for 840 or 1060nm. Accuracy and repeatability specifications given for mechanical position of reflector at static position setting. For model with standard control unit. OEM board has no display and is controlled by RS-232 only. | |

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Motorized Variable Optical Delay Line - VariDelay™ II (MDL-002)

Features:

- Compact
- High resolution
- Low backlash
- Low insertion loss
- High stability
- Highest delay to length ratio
- Long delay: more than 560 ps

Applications:

- Optical Coherence Tomography (OCT)
- Optical Fourier spectrum analysis
- Optical interferometry
- Delay generation and measurement
- Optical time division multiplexing (OTDM)
- Fiber sensors

Related Products:

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

Tech Info:

- Optical Coherence Tomography Technologies

FAQ:

- Delay Lines

Typical Performance Data:

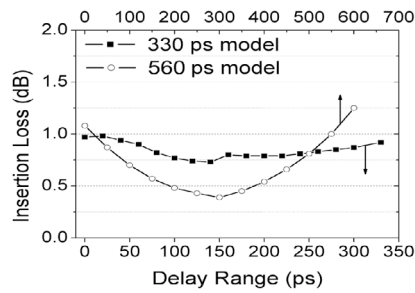
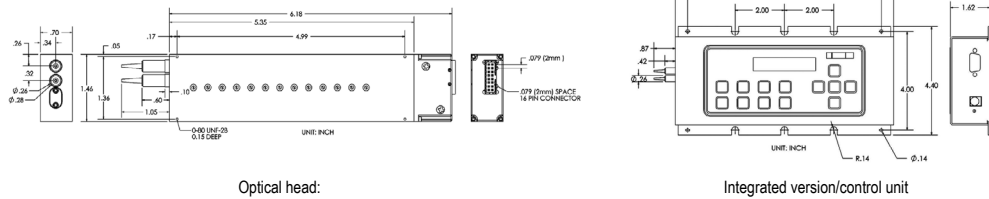


Figure 1. Insertion loss vs. optical delay.

Dimensions: (Representative drawings: 560 ps version, in inches)



Ordering Information:

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|---------------------------------------|---|-----|---|--------------------------|---|--------------------------|--------------------------|---|--------------------------|--------------------------|---|--------------------------|--------------------------|---|--------------------------|--------------------------|---|--------------------------|--------------------------|--|
| MDL | — | 002 | — | <input type="checkbox"/> | — | <input type="checkbox"/> | <input type="checkbox"/> | — | <input type="checkbox"/> | <input type="checkbox"/> | — | <input type="checkbox"/> | <input type="checkbox"/> | — | <input type="checkbox"/> | <input type="checkbox"/> | — | <input type="checkbox"/> | <input type="checkbox"/> | |
| Configuration: | | | | | | | | | | | | | | | | | | | | |
| I = integrated | | | | | | | | | | | | | | | | | | | | |
| D = Remote head/standard controller | | | | | | | | | | | | | | | | | | | | |
| O = Remote head/mini controller board | | | | | | | | | | | | | | | | | | | | |
| Wavelength: | | | | | | | | | | | | | | | | | | | | |
| 84 = 840nm | | | | | | | | | | | | | | | | | | | | |
| 10 = 1060 nm | | | | | | | | | | | | | | | | | | | | |
| 13 = 1310 nm | | | | | | | | | | | | | | | | | | | | |
| 15 = 1550 nm | | | | | | | | | | | | | | | | | | | | |
| 35 = 1310 & 1550 nm | | | | | | | | | | | | | | | | | | | | |
| Delay Range: | | | | | | | | | | | | | | | | | | | | |
| 33 = 330 ps | | | | | | | | | | | | | | | | | | | | |
| 56 = 560 ps | | | | | | | | | | | | | | | | | | | | |
| 11 = 1120 ps | | | | | | | | | | | | | | | | | | | | |
| Fiber Type: | | | | | | | | | | | | | | | | | | | | |
| SS = SM | | | | | | | | | | | | | | | | | | | | |
| PP = PM Panda | | | | | | | | | | | | | | | | | | | | |
| Connector Type: | | | | | | | | | | | | | | | | | | | | |
| FC/PC, FC/APC | | | | | | | | | | | | | | | | | | | | |
| SC/PC, SC/APC or NC = no connectors | | | | | | | | | | | | | | | | | | | | |
| Others specify | | | | | | | | | | | | | | | | | | | | |

Configuration Notes:

1. For SM pigtails, the default configuration is 3mm jacketed. For PM pigtails, the default configuration is 900µm loose tube jacketed.
2. Wavelength: 35 option (dual window 1310/1550nm) is available only for SM single-pass devices (330 and 560 ps). PM or double-pass devices are single-window (1310 or 1550nm) only.
3. Double-pass only available with SM fiber.
4. Double-pass not available for 840 or 1060nm.

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