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Motor Driven Variable Attenuator Questionnaire

Please print clearly

Name: _____

Company: _____

Mailing Address: _____

_____

Telephone #: _____ **Fax #:** _____

E-Mail: _____

Thank you for choosing OZ Optics. In order to help you choose the best components for your system, we would appreciate it if you could answer the following questions. Please check the appropriate boxes, fill in the blanks, and mail or fax back the first two pages only. If you do not know what to enter, write "DON'T KNOW" beside the question. We will then recommend an option.

Part A: Attenuator information.

1. Wavelength of operation, in nm: 780, 830, 1310, 1550, Other_____
2. Is your application sensitive to backreflection? (See note 1 for help) Yes No
   If Yes, what is your requested maximum return loss (in dB) 25 40 50 60
3. What is the minimum acceptable loss? <1dB <2dB
   Other ___dB
4. What is the maximum allowable response time for a 3 dB attenuation change?
   _____ milliSeconds Not important
5. What resolution do you require? <0.01dB <0.05dB <0.10dB
6. What accuracy do you require? _____dB over the range of 0 to _____ dB
7. What supply voltage is available for driving the attenuator? (OEM version only). Check all that apply.
   5 volts 6 volts 12 volts Other_____
8. What is the maximum attenuation required for your application? _____dB
9. What kind of electrical interface would you like?
   User supplies all motor drive electronics and microcontroller.
   Motor drive electronics included, but does not include microcontroller . Controller will be supplied by user.
   Intelligent microcontroller; a) Calibrated Uncalibrated
   b) Communicate via: RS232 SPI
   I^2C Other _____

Answer questions 10 through 12 only if you require an intelligent, calibrated version.

10. If the interface is SPI: What is the idle state of the clock? High Low
11. If the interface is SPI, on what edge of the clock does the data change?
    Rising Falling.
12. If the interface is I^2C, what 7-bit address should the unit respond to?
    Address: _____, decimal hex binary

Part B: Fiber optic cable information.

1) What is the fiber type required: (See note 2 for help)
   Multimode (MM) step index Multimode (MM) graded index
   Singlemode (SM) Polarization maintaining (PM)
2) What is the fiber Core / Cladding diameter in microns: _____ / _____
3) What is the fiber Numerical Aperture (Sine of acceptance angle)? _____
4) What is the fiber length required, in meters? _____
5) What is the cable type?
   0.25mm O.D. acrylate jacketing only
   0.40mm O.D. acrylate jacketing only
   0.9mm O.D. tight nylon jacketing
   0.9mm O.D. Hytrel loose tubing
   3.0mm O.D. Kevlar reinforced cable
   3.0mm O.D. armored cable
   5.0mm O.D. armored cable
   Other _____
6) What type of connectors do you want at the ends of the cable?
   NTT-FC (Flat Endface) Super NTT-FC / PC Ultra NTT-FC / PC SC
   Angled NTT-FC / PC (APC) SMA 905 AT&T-ST
   Angled SC
   Cylindrical 1.8mm O.D. ferrule Other_____
7) For polarization maintaining connectors only, do you want the slow axis of the PM fiber:
   Aligned and locked in line with the connector key
   Unlocked and rotatable

Note: If the connectors are not locked, the customer must rotate the fiber until the polarization axis is aligned with a second PM fiber.

Part C: Other requirements:

Please provide a block diagram of your system needs. Do you have any special requirements other than the ones listed above? (For example, a fused splitter, monitor photodiode, etc.) If so, please describe them in the space provided. Use additional sheets if necessary.

NOTE 1:

Backreflection often causes the signal intensity to fluctuate in some systems as well as change the laser frequency. To minimize the backreflection, both ends of the fiber should be angle polished and / or AR (antireflection) coated.

NOTE 2:

Sometimes the customer does not know what type of fiber he has or wants. In that case we need to know the customer's application to help him pick the proper fiber. The following information might help you select the fiber type.

The term multimode means there is more than one path for light to travel inside a **single** fiber. These paths are known as modes. It does not mean the unit consists of multiple fibers in a bundle. When coherent laser light is coupled into multimode fiber, the output shows speckles as shown in the following figure. Bending the fiber causes the speckle pattern to change. If the losses in a system depend on which modes are excited, then changing the modes excited in the fiber changes the output power. This is known as modal noise. If the source being used is an LED, then one does not see speckles, and modal noise is not an issue. However, for laser sources, modal noise is an issue.

When blocking style attenuators are used with multimode fiber, some modes are blocked, while others are transmitted. This can produce 1dB or greater modal noise fluctuations with coherent sources. A variable attenuator using a neutral density filter is not as strongly affected by modal noise. However, neutral density filter attenuators only offer 30dB range and can only handle about 50mW of power.

The output from a singlemode (SM) fiber shows a nice smooth gaussian profile as shown. This pattern does not change with bending, so the blocking technique gives accurate results. Modal noise is not an issue. Singlemode fiber does not maintain polarization under stress such as bending. For that you need polarization maintaining (PM) fiber. PM fiber is also singlemode.