



## VARIABLE FIBER OPTIC ATTENUATORS – BLOCKING RECEPTACLE STYLE

### Features:

- Compact, rugged housing
- High resolution
- Wide wavelength range (from 350 to 2050nm)
- Wide variety of connectors available
- Polarization insensitive
- LOW COST!

### Applications:

- CATV, LAN and Telecommunications use
- Receiver padding
- Test and measurement
- Optical power equalization

### Product Description:

Variable attenuators consist of two baseplates with lenses. The two baseplates are aligned for optimum coupling efficiency using a patented alignment technique. A threaded radial screw is used to block the collimated beam between the two lenses. Rotating the screw changes its position within the collimated beam, thus varying the power level coupled into the receiver fiber. Because the attenuator works by directly blocking the beam, it is polarization insensitive.

Because of limitations in receptacle tolerances, receptacle style attenuators are not recommended for singlemode or polarization maintaining applications requiring low losses and good repeatability. Instead, please refer to the data sheet titled *Variable Fiber Optic Attenuators, Blocking Pigtail Style*.

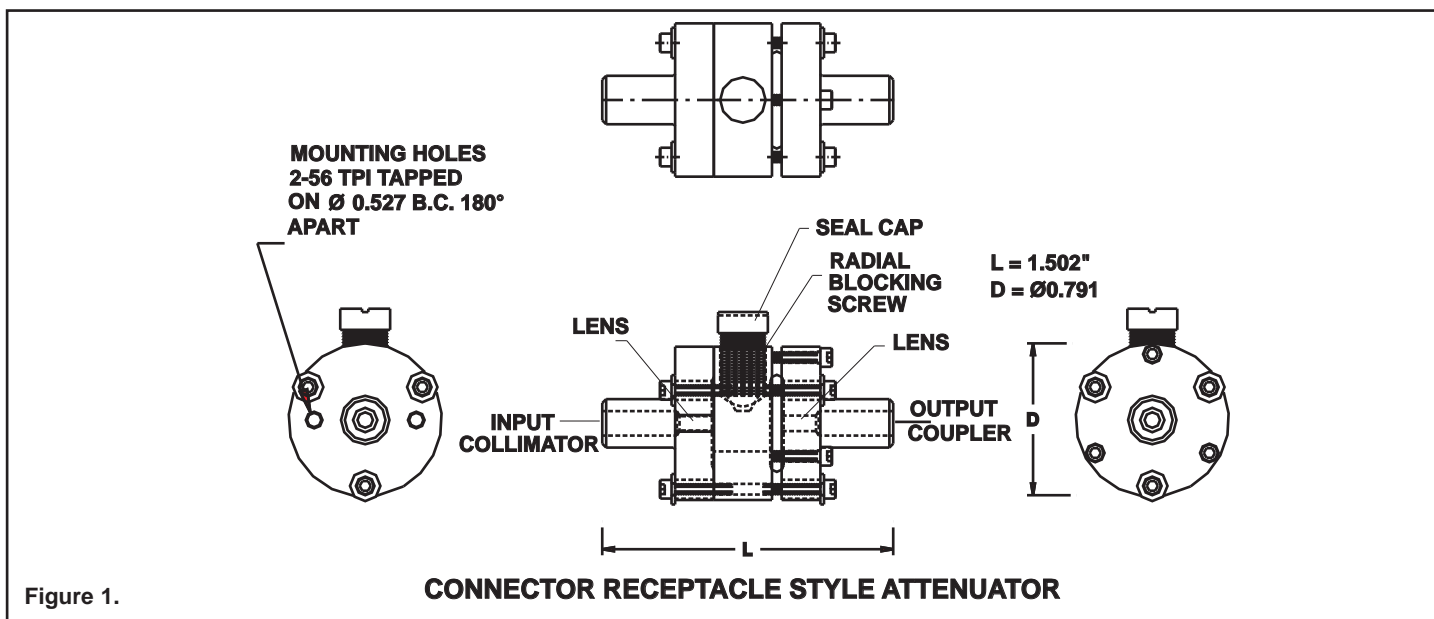


Figure 1.

## Ordering Information for Standard Parts:

Bar Code	Part Number	Description
187	BB-200-33-633-M	Receptacle style variable attenuator at 633nm for multimode applications with female FC receptacles on both sides.
8908	BB-200-33-700-M	Receptacle style variable attenuator at 700nm for multimode applications with female FC receptacles on both sides.
9369	BB-200-33-1300/1550-M	Receptacle style variable attenuator at 1300/1550nm for multimode applications with female FC receptacles on both sides.
188	BB-200-55-633-M	Receptacle style variable attenuator at 633nm for multimode applications with female SMA 905 receptacle on both ends.
11094	BB-200-55-820-M	Receptacle style variable attenuator at 820nm for multimode applications with female SMA 905 receptacles on both sides.
11095	BB-200-55-1300-M	Receptacle style variable attenuator at 1300nm for multimode applications with female SMA 905 receptacle on both ends.
8033	BB-200-58-690-M	Receptacle style variable attenuator at 690nm for multimode applications with female SMA 905 receptacle on input end and ST receptacle on output end.
9277	BB-200-88-800-M	Receptacle style variable attenuator at 800nm for multimode applications with female ST receptacles on both sides.
5821	BB-200-88-904-M	Receptacle style variable attenuator at 904nm for multimode applications with female ST receptacles on both sides.
2169	BB-200-88-1300-M	Receptacle style variable attenuator at 1300nm for multimode applications with female ST receptacles on both sides.

## Standard Product Specifications:

Insertion Loss:	Typically 2dB for multimode attenuators
Backreflection:	15dB for receptacle style attenuators (BB-200 style),
Attenuation Range:	2 to 80 dB with 0.01dB resolution up to 10dB, 0.1dB resolution up to 30 dB
Available Wavelengths:	350-2050nm
Vibration:	Less than ±0.05dB change between 10Hz-55Hz, 1.52 mm amplitude, for 2 hours.

## Ordering Examples For Standard Parts:

A customer needs a variable attenuator with female ST receptacles for 1300nm wavelength for a multimode application. In this case the OZ Part number, barcode and description will be:

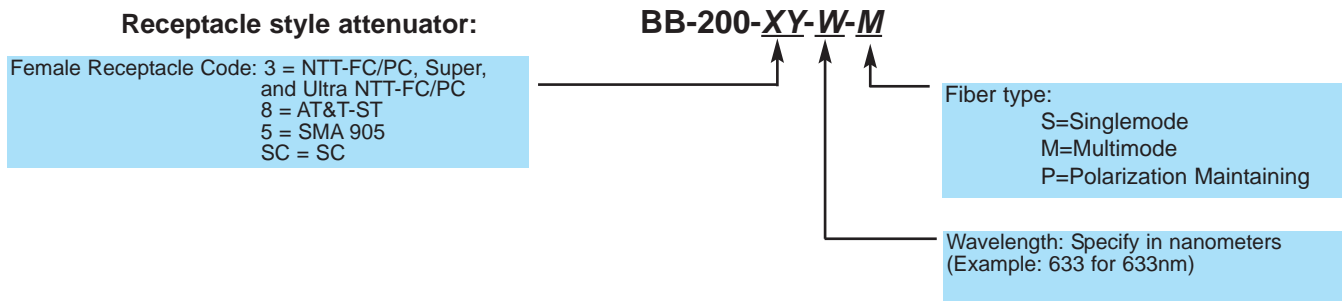
Bar Code	Part Number	Description
2169	BB-200-88-1300-M	Receptacle style variable attenuator at 1300nm for multimode applications with female ST receptacles on both sides

## Ordering Information For Custom Parts:

OZ Optics welcomes the opportunity to provide custom designed products to meet your application needs. As with most manufacturers, customized products do take additional effort so please expect some differences in the pricing compared to our standard parts list. In particular, we will need additional time to prepare a comprehensive quotation, and lead times will be longer than normal. In most cases non-recurring engineering (NRE) charges, lot charges, and a 10 piece minimum order will be necessary. These points will be carefully explained in your quotation, so your decision will be as well informed as possible. We strongly recommend buying our standard products.

## Questionnaire For Custom Parts:

1. What is the application?
2. What wavelengths do you plan on using?
3. What power level do you need to handle?
4. What size multimode fiber do you plan on using?



## Ordering Examples For Custom Parts:

A customer needs a receptacle style variable attenuator with SMA 905 receptacle on input side and FC receptacle on output side for a multi-mode application at 1300/1550 nm. In this case OZ part number will be: **BB-200-53-1300/1550-M**

## Frequently Asked Questions (FAQs):

**Q:** What advantages or disadvantages does the beam blocking version have over the neutral density versions?

**A:** The beam blocking technique is naturally suited for high power applications, and can achieve greater attenuation levels. The neutral density version shows less mode dependence or modal noise in multimode applications.

**Q:** What do you mean by mode dependence and modal noise?

**A:** 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. 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 offer lower attenuation range (around 40dB) and can only handle about 50mW of power.

**Q:** Do 1300/1550nm attenuators work at other wavelengths?

**A:** Yes, they do. They can also be used for the S (1470-1520nm), C (1520-1570nm) and L (1570-1620nm) bands, with little variation in attenuation.

## Application Notes:

The variable attenuator can be used to measure or test the dynamic range of power detectors. Figure 2 illustrates a possible set up for such an application. OZ Optics variable attenuators are very useful to measure high dynamic ranges for detectors because of their high attenuator levels (up to 80dB). By changing the attenuation level the maximum dynamic range of the power detector can be found.

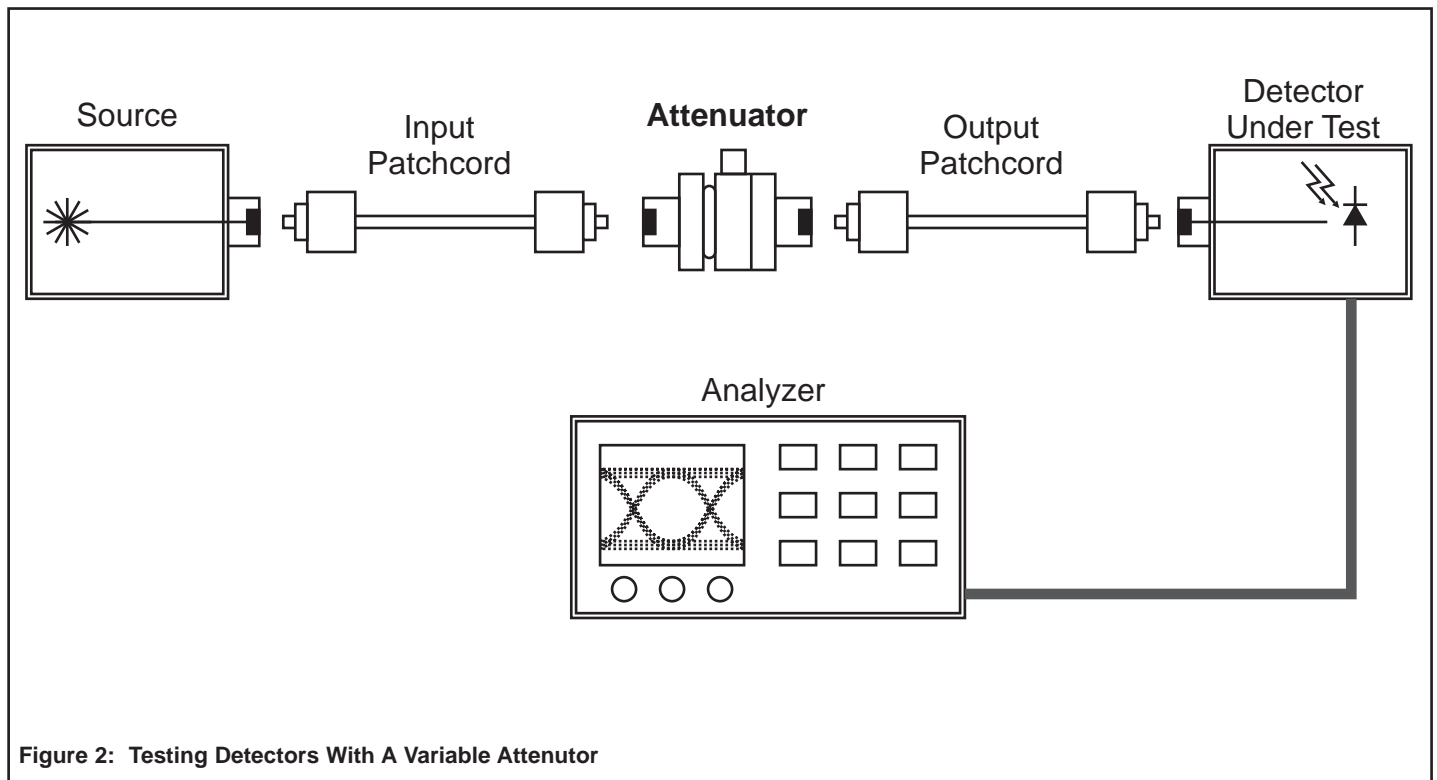


Figure 2: Testing Detectors With A Variable Attenuator