

# Variable Attenuator

FVA-3100



- Excellent spectral uniformity of  $\pm 0.1$  dB

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100 dB maximum attenuation

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Monitor output

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Ultra-low insertion loss

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Standard GPIB and RS-232 interface



# First-Class Spectral Uniformity

High-quality components and meticulous calibration procedures make the FVA-3100 Variable Attenuator the instrument of choice for repeatable and accurate attenuation settings (up to 100 dB). The FVA-3100 meets system and component manufacturers' need for accurate EDFA characterization, component and system loss simulation, instrument calibration, power meter linearity measurement and spectral tuning. Its ultra-low insertion loss of 1.5 dB enables you to optimize the loss budget.

The FVA-3100 is configured for singlemode or multimode fibers. Use it as a stand-alone instrument or mounted on a 19-inch rack (optional).



## Key Features

- The FVA-3100-BW option offers high spectral uniformity, allowing you to maintain an attenuation value within  $\pm 0.1$  dB throughout the WDM spectrum when characterizing EDFAs or subsystems.
- Benefit from the monitor output port in the FVA-3100-BM, 3100-BWM or 3100-DM for accurate power-level monitoring at the receiver end of your system.
- Choose from three attenuation modes: absolute (including insertion loss), relative (in reference to the 0.00 dB level) or X+B (relative display to any selected reference value).

## Easy to Use

Access most functions at the touch of a button and manually change attenuation with the FVA-3100's user-defined steps or on-display value editing. The standard GPIB and RS-232 interface and control codes enable remote operation from a PC or test station. Program your own software solutions for complex test procedures and benefit from added computer capabilities. LabVIEW® drivers are available.

## Programmable

Cycle through a repeatable sequence of up to 100 attenuation steps, with a dwell time of up to 1000 hours per step. The program mode is ideal for automated bit-error-rate (BER) testing.

## Specifications

### General Specifications<sup>1</sup>

Models	FVA-3100-B	FVA-3100-BM	FVA-3100-BW	FVA-3100-BWM
Fiber type (μm)	9/125	9/125	9/125	9/125
Wavelength range <sup>2</sup> (nm)	1200 to 1650	1270 to 1350 1510 to 1590	1200 to 1650	1270 to 1350 1510 to 1590
Wavelength resolution (nm)	0.1	0.1	0.1	0.1
Max. attenuation (dB)	≥ 100 (1200 nm to 1350 nm) ≥ 80 (1350 nm to 1600 nm) ≥ 70 (1600 nm to 1650 nm)	≥ 100 (1270 nm to 1350 nm) ≥ 80 (1510 nm to 1590 nm)	≥ 75 (1200 nm to 1400 nm) ≥ 70 (1400 nm to 1600 nm) ≥ 65 (1600 nm to 1650 nm)	≥ 75 (1270 nm to 1350 nm) ≥ 70 (1510 nm to 1590 nm)
Insertion loss <sup>3,4</sup> (dB)				
Typical	1.5	3.0	1.5	2.0
Maximum	1.8	3.3	1.8	3.0
Resolution (dB)	0.005	0.005	0.005	0.005
Linearity <sup>5</sup> (dB)	± 0.1	± 0.1	± 0.1	± 0.1
Spectral uniformity <sup>6</sup> (dB)				
≤ 20 dB	-	-	± 0.1	± 0.1
≤ 40 dB	-	-	± 0.25	± 0.25
≤ 50 dB	-	-	± 0.35	± 0.35
Max. repeatability (dB)	± 0.03	± 0.03	± 0.03	± 0.03
Typ. return loss <sup>7</sup> (dB)	≥ 55	≥ 50	≥ 50	≥ 50
Max. input power <sup>8</sup> (dBm)	25	25	25	25
Max. PDL <sup>9</sup> (dB)				
for a 20 dB attenuation	0.2	0.2	0.2	0.2
for a 50 dB attenuation	0.2	0.2	0.3	0.3
Shutter isolation (dB)	> 100	> 100	> 100	> 100
Typ. Monitor output (dB)	-	14.5	-	14.5

  

Models	FVA-3100-C	FVA-3100-D	FVA-3100-DM	FVA-3100-E
Fiber type (μm)	50/125	62.5/125	62.5/125	100/140
Wavelength range <sup>2</sup> (nm)	700 to 1350	700 to 1350	700 to 1350	700 to 1350
Wavelength resolution (nm)	0.1	0.1	0.1	0.1
Max. attenuation (dB)	≥ 100 (700 nm to 1000 nm) ≥ 65 (1000 nm to 1350 nm)	≥ 100 (700 nm to 1000 nm) ≥ 65 (1000 nm to 1350 nm)	≥ 100 (700 nm to 1000 nm) ≥ 65 (1000 nm to 1350 nm)	≥ 100 (700 nm to 1000 nm) ≥ 65 (1000 nm to 1350 nm)
Insertion loss <sup>3,4</sup> (dB)				
Typical	1.5	1.5	3.0	1.5
Maximum	2.0	2.0	4.5	2.0
Resolution (dB)	0.01	0.01	0.01	0.01
Linearity <sup>5</sup> (dB)	± 0.1	± 0.1	± 0.12	± 0.1
Max. repeatability (dB)	± 0.03	± 0.03	± 0.03	± 0.03
Typ. return loss <sup>7</sup> (dB)	≥ 25	≥ 25	≥ 25	≥ 25
Max. input power <sup>8</sup> (dBm)	25	25	25	25
Shutter isolation (dB)	> 100	> 100	> 100	> 100
Typ. monitor output (dB)	-	-	13	-

### Notes

- At 23 °C ± 2 °C.
- Calibrated at 1310 nm and 1550 nm for singlemode fiber; calibrated at 1300 nm for multimode fiber.
- Measured at 1310 nm and 1550 nm for singlemode fiber; measured at 1300 nm for multimode fiber. The insertion loss is dependent on the input numerical aperture.
- Measured with FC/UPC connectors for singlemode fiber and FC/PC for multimode fiber.
- Using a light source with 0.002 dB stability for a 15-minute period (source accuracy of ± 0.5 nm), non-polarized light, at a calibrated wavelength and an attenuation of up to 60 dB.
- Measured between 1520 nm and 1570 nm.
- The return loss is limited by the return loss of the connectors. The connectors used are FC/APC for the IQ-3100-B and IQ-3100-BM, FC/UPC for the IQ-3100-BW and the IQ-3100-BWM, and FC/PC for multimode fiber.
- Input power above this limit may damage the unit. The linearity may be higher than specified.
- Peak-to-peak value. Measured at 1550 nm.

## General Specifications

Size (H X W X D)	11.7 cm X 22.2 cm X 33.3 cm	(4 5/8 in X 8 3/4 in X 13 1/8 in)
Weight	2.6 kg	(5.8 lb)
Temperature		
Operating	0 °C to 40 °C	(32 °F to 104 °F)
Storage	-40 °C to 70 °C	(-40 °F to 158 °F)
Relative humidity <sup>1</sup>	0 to 80% non-condensing	

### Notes

1. Measured in the 0 °C to 31 °C (32 °F to 87.8 °F) range decreasing linearly to 50 % at 40 °C.

## Instrument Drivers

LabVIEW® drivers and OCX controls.

## Standard Accessories

Instruction manual and Certificate of Compliance.

## Ordering Information

FVA-3100-**XXX**

Option

Connector code

B = 9/125 µm  
 BM = 9/125 µm with monitor output  
 BW = 9/125 µm optimized for spectral flatness  
 BWM = 9/125 µm optimized for spectral flatness with a monitor output  
 C = 50/125 µm  
 D = 62.5/125 µm  
 DM = 62.5/125 µm with monitor output  
 E = 100/140 µm

EI = EXFO PC/UPC interface  
 EA = EXFO APC interface

The fixed baseplate (EI or EA) must be ordered with a removable universal connector adapter EUI-XX. Please specify an EUI from the following list:

EUI-28 = DIN 47256  
 EUI-76 = HMS-10/AG (EI only)  
 EUI-89 = FC narrow key  
 EUI-90 = ST (EI only)  
 EUI-91 = SC  
 EUI-95 = E-2000

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