

# Variable Attenuator

IQ-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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Ideal for EDFA testing



Fiber-optic test, measurement  
and monitoring instruments

**EXFO**

# A Fully Programmable IQ Solution

Optical system manufacturers know that variable attenuators are essential in order to keep their test systems running smoothly. They look for performance, user-friendliness, complete control of test parameters and advanced programming capability. EXFO's IQ-3100 Variable Attenuator combines innovative design techniques, high-quality components and meticulous calibration procedure.

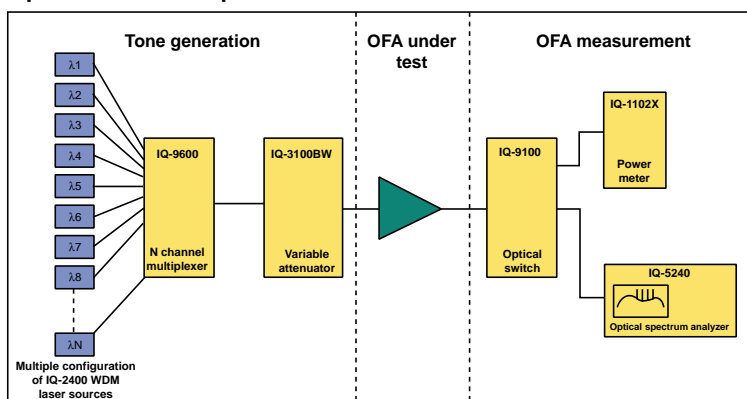
Reliability and repeatable performance. That's what the IQ-3100 offers, in a flexible and fully programmable module. Choose from three attenuation modes: absolute, relative and X+B. Cycle through a repeatable sequence of up to 100 attenuation steps, with a dwell time of up to 1000 hours per step. Add a user-friendly Windows environment, and you've got a first-class variable attenuator.



## Core Functionality

- BER testing
- EDFA characterization
- System or component loss simulation
- Accurate power-level monitoring
- Instrument calibration
- Linearity measurement
- Precision variable optical source
- Spectral tuning
- Optical margin analysis

## Optical Fiber Amplifier Characterization



Typical EDFA characterization setup

Use the IQ-3100-BW to effectively characterize OFAs. Modify the total input power sent to the DUT while maintaining spectral uniformity in a multichannel setup, as shown on the left.

# A Simple, Flexible and User-Friendly GUI

- Windows-based environment
- Easy control with software buttons, front panel keys or keyboard
- Multiple configuration storage
- True multitasking
- Online help
- Ideal for standard or custom multimodule applications

## Practical program mode

Create an automatic attenuation scan. Program up to 100 steps with a dwell time of up to 1000 hours, for excellent flexibility.

## Customized parameters

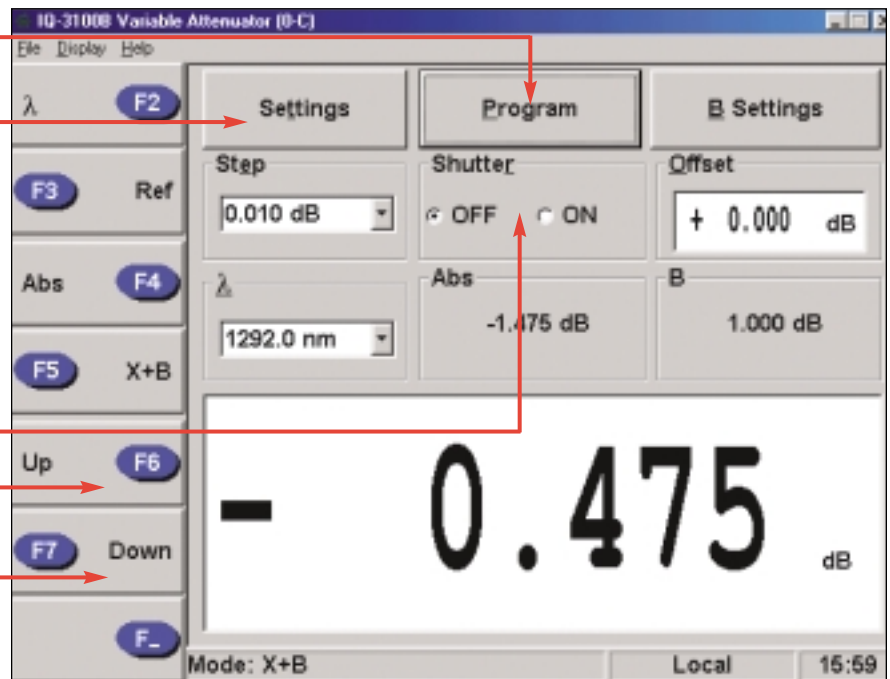
Easily customize wavelength and step size parameters according to specific requirements.

## High-isolation shutter

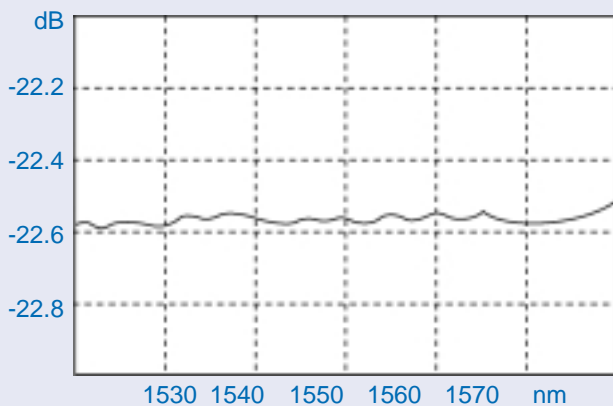
Protect personnel and sensitive components from unnecessary exposure with a > 100 dB attenuation.

## Fine-tuned attenuation settings

Scroll up or down the attenuation setting range.



## Typical Spectral Uniformity



- **100 dB maximum attenuation**  
Introduce attenuation from minimum insertion loss (typically 1.5 dB) to 100 dB according to operating wavelength.
- **± 0.03 dB repeatability**  
Ensure recurring attenuation ( $\pm 0.03$  dB) each time you select a specific setting at a specific wavelength.
- **± 0.1 dB spectral uniformity in the WDM range**  
Maintain an attenuation value within  $\pm 0.1$  dB throughout the complete WDM spectrum, simultaneously for all channels from 1520 nm to 1570 nm.
- **0.1 nm spectral resolution**  
Achieve high-precision spectral tuning, with a resolution of 0.1 nm.
- **± 0.1 dB linearity**  
Calibrate, characterize and verify component linearity with the IQ-3100.

## Specifications

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

Models	IQ-3100-B	IQ-3100-BM	IQ-3100-BW	IQ-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>3,7</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
<b>Models</b>	<b>IQ-3100-C</b>	<b>IQ-3100-D</b>	<b>IQ-3100-DM</b>	<b>IQ-3100-E</b>
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 of 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)	12 cm X 3.8 cm X 26.2 cm	(4 3/4 in X 1 1/2 in X 10 5/16 in)
Weight	0.75 kg	(1.65 lb)
Temperature	Operating Storage	0 °C to 50 °C -40 °C to 70 °C
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 approximately 50 % at 40 °C.

## Instrument Drivers

Labview® drivers and OCX controls.

## Standard Accessories

Instruction manual and Certificate of Compliance.

## Ordering Information

**IQ-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

Also available for the IQ-200 Optical Test System