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Agilent 8156A
Optical Attenuator
Technical Specifications



The Agilent 8156A is produced to the ISO 9001 international quality system standard as part of Agilent's commitment to continually increasing customer satisfaction through improved quality control.

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Specifications describe the instrument's warranted performance.
They are measured at 1310 nm and 1550 nm using a Fabry Perot laser source, single-mode fiber and Agilent 81000AI or Agilent 81000SI connector interfaces.

Optical Attenuator Specifications - Standard Options

	Agilent 8156A #100	Agilent 8156A #101	Agilent 8156A #201
Wavelength range	1200 - 1650 nm		
Attenuation range	60 dB (excluding insertion loss)		
Fiber type	9/125 μm single-mode		
Connector type	straight contact		angled contact
Return loss[1]	> 35 dB	> 45 dB	> 60 dB
Insertion loss (typ.)[2]	4.5 dB	2.5 dB	
Attenuation accuracy (linearity)[3] **typical**	< ±0.2 dB[4] < ±0.1 dB[4]	< ±0.1 dB < ±0.05 dB	
Repeatability **typical**	< ±0.01 dB < ±0.005 dB		
Polarization dependent loss (PDL) **typical**	< 0.15 dB_{pp} < 0.075 dB_{pp}	< 0.08 dB_{pp} < 0.02 dB_{pp}	
Polarization mode dispersion (PMD)	4 fs		
Useful back reflection range	9.0 - 35 dB	5.0 - 45 dB	5.0 - 60 dB

[1] Typical, depends on performance of external connector.
[2] Includes insertion loss of two HMS-10 connectors. Typical variation over temperature range < 0.3 dB_{pp}.
[3] Measured at constant temperature.
[4] With narrow linewidth lasers, such as DFB lasers, power fluctuations up to 0.2 dB_{pp} may occur.

Ordering Information

Two connector interfaces are required for each Agilent 8156A.

Agilent 8156A optical attenuator mainframe (non-modular).

Options
100 standard performance version.
101 high performance version.
201 high performance, high return loss version.
202 back reflector kit for option 201 and option 221 (consists of 1 ea Agilent 81000SI, Agilent 81000FI, Agilent 81113PC, Agilent 81000UM, Agilent 81000BR).
OB2 additional operating manual.

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Specifications describe the instrument's warranted performance. They are measured at 1310 nm and 1550 nm using a Fabry Perot laser source, single-mode fiber and Agilent 81000AI or Agilent 81000SI connector interfaces.

Optical Attenuator Specifications - Monitor Output Options

	Agilent 8156A #121	Agilent 8156A #221
Wavelength range	1200 - 1650 nm	
Attenuation range	60 dB (excluding insertion loss)	
Fiber type	9/125 μm single-mode	
Connector type	straight contact	angled contact
Insertion loss (typ.)[1]	3.3 dB	3.3 dB
Return loss[2]	> 45 dB	> 60 dB
Attenuation accuracy (linearity)[3] **typical**	< ±0.1 dB < ±0.05 dB	< ±0.1 dB < ±0.05 dB
Repeatability **typical**	< ±0.01 dB < ±0.005 dB	< ±0.01 dB < ±0.005 dB
Polarization dependent loss (PDL) **typical**	< 0.1 dB_{pp} < 0.03 dB_{pp}	< 0.1 dB_{pp} < 0.03 dB_{pp}
Polarization mode dispersion (PMD)	6 fs	6 fs
Monitor output (typ.)	13 dB tap (1:20)	
Useful back reflection range	6.6 - 45 dB	6.6 - 60 dB

[1] Includes insertion loss of two HMS-10 connectors. Typical variation over temperature range < 0.3 dB_{pp}.

[2] Typical, depends on performance of external connector.

[3] Measured at constant temperature.

Ordering Information

Three connector interfaces are required for each Agilent 8156A.

Agilent 8156A optical attenuator mainframe (non-modular).

Options

121 high performance version, monitor output.

221 high performance, high return loss version, monitor output.

203 back reflector kit for option 201 and option 221 (consists of 1 ea Agilent 81000SI, Agilent 81000FI, Agilent 81113PC, Agilent 81000UM, Agilent 81000BR).

OB2 additional operating manual

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Specifications describe the instrument's warranted performance. They are measured at 1300 nm using an LED source, multi-mode fiber and Agilent 81000AI connector interface.

Optical Attenuator Specifications - Multimode Option

	Agilent 8156A #350
Wavelength range	1200 - 1650 nm
Attenuation range	60 dB (excluding insertion loss)
Fiber type	50/125 μm multimode
Connector type	straight contact
Insertion loss (typ.)[1]	3 dB
Return loss[2]	22 dB
Attenuation accuracy (linearity)[3] **Typical**	$<$ ±0.1 dB $<$ ±0.08 dB
Repeatability **Typical**	$<$ ±0.01 dB ±0.005 dB

[1] Includes insertion loss of two HMS-10 connectors.

[2] Typical, depends on performance of external connector.

[3] Measured at constant temperature.

Ordering Information

Two connector interfaces are required for each Agilent 8156A.

Agilent 8156A optical attenuator mainframe (non-modular).

Options

350 50/125 m multimode option.

OB2 additional operating manual.

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Supplementary Performance Characteristics

Minimum Attenuation Step: 0.001 dB.

Settling Time: 20 ms to 400 ms (depending on actual setting).

Maximum Input Level: 23 dBm (200 mW).

Operating Modes
Attn: Attenuation is displayed and can be varied.

λ**:** Entering of wavelength for automatic correction of attenuation using typical correction values.

Cal: Offset factor to adjust display within 99.99 dB range.

Disp→ Cal: Sets displayed attenuation value to 0.00 dB.

Sweep: Manual or automatic up and down sweep of attenuation. Start, stop, stepsize, and dwell time (not in manual mode) can be entered.

Back Reflect: For entering desired return loss (back reflection level). Return loss is displayed and can be varied within insertion loss and return loss of connector used. Requires Agilent 81000BR backreflector.

Enable/Disable: Optical signal path interrupted with shutter (>80 dB blocking).

Store/Recall: 9 user-selectable parameter settings may be stored and recalled. Recall of default setting.

General

Recalibration period: 1 year.

Warm-up time: not required if previously stored within operating temperature range.

GPIB Capability: all modes and parameters can be programmed, SCPI command set, Agilent 8157A compatability mode.

GPIB Interface Function Code: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0.

Environmental

Storage temperature: –40°C to +70°C.

Operating temperature: 0°C to +55°C.

Humidity: <95% R.H. from 0°C to +40°C.

Power: 100/120/220/240 Vrms, 10%, 90 VA max., 48 – 400 Hz.

Battery Back-up (for non-volatile memory): with instrument switched off all current modes and data will be maintained for at least 10 years after delivery.

Dimensions:
89 mm H, 212.3 mm W, 345 mm D (3.5" x 8.36" x 13.6").

Weight: net 5.3 kg (11.7 lbs), shipping 9.6 kg (21.2 lbs).

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Related Literature
8156A Optical Attenuator
Configuration Guide
p/n 5963-3367E

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