Specifications

Main frame

Display	Measurements: 7-segment fluorescent display panel, 5 and 1/2 digits, 13-dot bar graph. Intensity: 4 levels (100%, 75%, 50%, 25%)
Unit display	Absolute: dBm, mW, µW, nW, pW Relative: dB Comparative: None
Calibration factor	Correction of sensor wavelength sensitivity (1nm steps) or input of relative value
Range	Automatic or fixed (up/down)
Measurement mode	Selectable, CW light/chopped light (270Hz, 1kHz, 2kHz)
Optical output waveform	Selectable, CW light/chopped light (270Hz, 1kHz, 2kHz)
Measurement interval (see note)	Selectable 10(20)/50/100ms
Averaging	Sequential average (2/5/10/20/50/100/200 times), on/off select
Display resolution	Selectable (0.1, 0.01, 0.001)
Relative measurement	Relative to reference setting or to displayed measurement value
Data storage	Max. 1,000 samples (each channel)
Attenuation setting	Peak attenuation 6.0dB(0.1dB steps)
Measurement condition setup function	10 condition sets are stored for read and use (one defined as default)
Plotter function	Memory data is graphed for output to external plotter
Data hold	Measurement maximum, minimum and difference
GP-IB	Compatible with IEEE-488
Power requirements	AC100 to 120, 200, to 240V, 48 to 63Hz, Max. 80VA
Environmental conditions	Operating temperature: 0 to 50°C, storage temperature: –25 to +70°C, humidity: 85% RH or less
Dimensions and mass	Approx. 212(W) × 88(H) × 350(D) mm, approx. 3kg
Accessories	Power cord. instruction manual, blank panel, dust cover for external extension, dust cover for GP-IB connector: one

* These specifications are applied when the AQ2141 Optical Multimeter Expansion Frame is disconnected.

Note: Value in parentheses ( ) is minimum when two sensors connected.

OPM units, sensor units, sensors

Model		AQ2731	AQ2732	AQ2733
Unit name		Sensor Unit	Sensor Unit	Sensor Unit
Wavelength range		400 to 1100nm	700 to 1700nm	
Photoreceptor		Si	InGaAs	Cooled InGaAs
Application		Small-diameter silica fiber emission [1]		
Input		AQ9335(*)connector adapter: Option [3]	AQ9389B (FC) connector adapter: Standard [4]	
Polarization dependency loss [6]		Not specified	0.02dB P-P typ.	0.02dB P-P or less
Power range [7]	CW light	–100 to 3dBm (0.1pW to 2mW)	–80 to +10dBm (10pW to 10mW)	–110 to +10dBm (0.01pW to 10mW)
	Chopped light	–100 to 0dBm (0.1pW to 1mW)	–90 to +7dBm (1pW to 5mW)	–110 to +7dBm (0.01pW to 5mW)
Inaccuracy under reference conditions [8]		±2.5% (at 850nm calibration point)	±2.5% (at 1310nm calibration point)	
Total accuracy [9]		±5% (500 to 900nm)	±5% (1000 to 1600nm)	±5% (1000 to 1650nm)
Linearity [10] (constant temperature 23±5°C)		±0.05dB (500 to 900nm, –70 to +3dBm)	±0.05dB (1000 to 1600nm, –50 to +10dBm)	±0.05dB (1000 to 1650nm, –70 to +10dBm)
Noise [11]	CW light	–93dBm or less	–73dBm or less	–93dBm or less
	Chopped light		–83dBm or less	
Analog out		0 to approx. +2V for each range, output impedance: 1.5kΩ or less		
Zero set		Automatic zero adjust		

Model		AQ2734	AQ2735	AQ2730		
				AQ2741	AQ2742	AQ2743
Unit name		Sensor Unit	Sensor Unit	OPM Unit		
				Sensor	Sensor	Sensor
Wavelength range		900 to 1870nm	700 to 1700nm	400 to 1100nm	750 to1800nm	
Photoreceptor		Cooled InGaAs		Si l10mm	Ge ø 5mm	Cooled Ge ø 5mm
Application		Small-diameter silica fiber emission [1]		Large-diameter fiber emission, free-space beam [2]		
Input		AQ 9389B (FC) connector adapter: Standard [4]		Photodiode direct [5]		
Polarization dependency [6]		0.02dB P-P or less	0.02dB P-P typ.	Not specified	0.03dB P-P typ.	
Power range [7]	CW light	–90 to +3dBm (1pW to 2mW)	–80 to +27dBm (10pW to 0.5W)	–80 to +10dBm (10pW to 10mW)	–60 to +10dBm (1nW to 10mW)	–80 to +10dBm (10pW to 10mW)
	Chopped light	–90 to 0dBm (1pW to 1mW)	–80 to +24dBm (10pW to 0.25W)	–90 to +7dBm (1pW to 5mW)	–70 to +7dBm (0.1nW to 5mW)	–90 to +7dBm (1pW to 5mW)
Inaccuracy under reference conditions [8]		±2.5% (at 1310nm calibration point)		±2.5% (at 850nm calibration point)	±2.5% (at 1310nm calibration point)	
Total accuracy [9]		±5% (1200 to 1700nm)	±5% (1000 to 1650nm)	±5% (500 to 900nm)	±5% (950 to 1600nm)	
Linearity [10] (constant temperature 23±5°C)		±0.05dB (1200 to 1700nm, –60 to +3dBm)	±0.05dB (1000 to 1650nm, –40 to +27dBm)	±0.05dB (500 to 900nm, –50 to +10dBm)	±0.05dB (950 to 1600nm, –30 to +10dBm)	±0.05dB (950 to 1600nm, –50 to +10dBm)
Noise [11]	CW light	–83dBm or less	–73dBm or less	–73dBm or less	–53dBm or less	–73dBm or less
	Chopped light			–83dBm or less	–63dBm or less	–83dBm or less
Analog out		0 to approx. +2V for each range, output impedance: 1.5kΩ or less				
Zero set		Automatic zero adjust				

Notes
1) Applicable fiber ≦ 62.5/125µm (GI) NA ≦ 0.275
2) Applicable fiber ≦ 730/750µm (SI) NA ≦ 0.5 AQ2741 sensor ≦ 100/140µm (SI) NA ≦ 0.28 AQ2742/2743 sensors
3) (*) indicates connector type. Specify FC, SC, ST, DIN or HMS-10/A connector. For other connectors please consult your vendor or the manufacturer.
4) Can be used with other connectors in addition to FC. For other connectors please consult your vendor or the manufacturer.
5) Used in combination with the AQ9335(*) connector adapter. (*) indicates connector type. Specify FC, SC, ST, DIN or HMS-10/A connector. For other connectors please consult your vendor or the manufacturer.
6) Wavelength 1550nm, SM fiber
7) AQ2731 sensor unit and AQ2741 sensor at wavelength 850nm, AQ2732/2733/2734/2735 sensor units and AQ2742/2743 sensor at wavelength 1310nm.
8) Reference conditions
(1) Power level –20dBm (10µW), CW light
(2) AQ2731 sensor unit and AQ2741/2742/2743 sensors with SM fiber, NA = 0.1, AQ2732/2733/2734/2735 sensor units with 10µm optical fiber, master cord FC connector.
(3)Ambient temperature: AQ2731/2732 sensor unit and AQ2741/2742 sensor at 23±1°C, AQ2733/2734/2735 sensor units and AQ2743 sensor at 23±5°C.
(4)2731 sensor unit and AQ2741/2742/2743 sensors with FC connector adapter. AQ2732/2733/2734/2735 sensor units with AQ9389B FC connector adapter.
9) Operating conditions
(1) Power level –20dBm (10µW), CW light
(2) ≦ 50µm optical fiber, NA ≦ 0.2
(3) Ambient temperature: AQ2731/2732 sensor units and AQ2741/2742 sensors at 23±1°C, AQ2733/2734/2735 sensor units and AQ2743 sensor at 23±5°C.
(4) 2731 sensor unit and AQ2741/2742/2743 sensors with AQ9335 (*) FC connector adapter. AQ2732/2733/2734/2735 sensor units with AQ9389B (FC/SC) connector adapter.
10) (1)Linearity for one wavelength within wavelength specified in total measurement accuracy.
(2) CW light, ambient temperature: AQ2731/2732 sensor units and AQ2741/2742 sensors at 23±1°C, AQ2733/2734/2735 sensor units and AQ2743 sensor at 23±5°C.
11) (1)Averaging 1s (measurement interval 100ms, averaging executed 10 times).
(2) AQ2731 sensor units and AQ2741 sensor at 700 to 900nm, AQ2732/2733/2734/2735 sensor units and AQ2742/2743 sensor at 1200 to 1600nm.
(3) CW, chopped (270Hz).
(4) Ambient temperature: AQ2734 sensor unit at 0 to 30°C

High return loss connector adapter

Model	AQ9438 (FC)
Unit name	High Return Loss Connector Adapter
Applicable fiber	SM (10/125μm)
Return loss [1]	40dB or more
Insertion loss [2]	0.2dB or less

Notes
1) Wavelength 1310/1550nm, SM fiber. When connected PC polished plug with 40dB or more.
2) Wavelength 1310/1550nm, SM fiber. Standard AQ9389B (FC) Connector Adapter as reference.

Return loss unit

Model	AQ7310 [1, 2]	AQ7315 [3, 4, 5]
Unit name	Optical Return Loss Measuring Unit	
Wavelength range	1280 to 1600nm	1270 to 1330nm
Dynamic range [6]	65dB or more	40dB or more
Relative measurement accuracy [7]	Within ±0.4dB (0 to 50dB) Within ±0.7dB (50 to 60dB)	Within ±0.5dB (0 to 30dB) Within ±1.0dB (30 to 40dB)
Measurement stability	Within ±0.02dB [8]	Within 1dB$_{P\text{-}P}$ [9]
Applicable fiber	SM (10/125μm)	GI (50/125μm)
Light source input connector	FC/PC	
Measurement output connector [10]	SC/APC	

(*) Recommended exciters

Maker	Unit name	Notes
Sumitomo Electric Industries, LTD.	Exciter for loss measurement of GI type optical fiber LF-2C	—
Fujikura Ltd.	Dummy fiber for optical loss measurement FMC-03	With front protecting cover
	Dummy fiber for optical loss measurement FMC-04	Without front protecting cover
The Furukawa Electric co.,LTD.	GSGG type exciter	

Notes
1) With AQ4211/AQ4213 LD Unit, with 1280 to 1600nm wavelength range. At 23±1˚C, with Fresnel reflection reference.
2) Requires master cord for AQ7310.
3) When using the AQ4212 (130) LD Unit. At 23°C with total reflection reference.
4) Requires master cord for AQ7315
5) AQ7315's LD light source output is needed to be connected to exciter. (*)
6) Varies with master cord.
7) Varies with light source stability, photoreceptor linearity, and isolation of optical coupler.
8) Display stability with Fresnel reflection measurement, 5 minutes.
9) Display stability with total reflection reference measurement, 5 minutes.
10) Manufactured by SEIKOH GIKEN. APC: Angled PC
* Please consult your vendor or our sales offices on AQ7316 (applicable fiber: GI (62.5/125μm)).

Light source unit (LED)

Model		AQ4215 (085)	AQ4215 (131)	AQ4215 (155)	AQ4218 (131)	AQ4218 (155)
Unit name		LED Unit				
Emission device		LED				
Center wavelength [1]		850 ± 15nm	1310 ± 30nm	1550 ± 35nm	1310 ± 10nm	1550 ± 10nm
Applicable fiber		GI (50/125μm, 62.5/125μm)	GI (50/125μm, 62.5/125μm)/ SM (10/125μm)	SM (10/125μm)		
Spectral halfwidth [2]		60nm or less	140nm or less	195nm or less	20nm or less	25nm or less
Optical output level [3]	GI (50/125μm)	–15dBm or more	–21dBm or more	————		
	SM (10/125μm)	————	–40dBm or more	–43dBm or more	–50dBm or more	
Output level	Temperature stability	————			0.2dB or less [4]	
	Time stability	Within ±0.005dB [5] Within ±0.03dB [7]	Within ±0.005dB [6] Within ±0.03dB [8]		Within ±0.003dB [6] Within ±0.03dB [8]	
Optical connector [9]		AQ9433 (*) Connector Adapter: option			AQ9434 (*) Universal Adapter: option	

Model		AQ4221 (131)	AQ4221 (155)	AQ4222 (131)	AQ4222 (155)
Unit name		EE-LED Unit			
Emission device		EE-LED			
Center wavelength [1]		1310 ± 10nm	1550 ± 10nm	1310 ± 40nm	1550 ± 30nm
Applicable fiber		SM (10/125μm)			
Spectral halfwidth [2]		20nm or less	25nm or less	100nm or less	140nm or less
Optical output level [3]	GI (50/125μm)	————			
	SM (10/125μm)	–28dBm or more	–32dBm or more	–15dBm typ.	–17dBm typ.
Output level	Temperature stability	————			
	Time stability	Within ±0.005dB [6] Within ±0.03dB [8]		±0.005dB typ. [6] ±0.05dB typ. [9]	±0.003dB typ. [6] ±0.03dB typ. [9]
Optical connector [10]		AQ9434 (*) Universal Adapter: option			

Notes
1) At 25˚C
2) At 25˚C. Spectral halfwidth shown as FWHM.
3) CW light, 0 to 50˚C, 2m fiber injection end
4) 0 to 50˚C (8 hours), connector injection end
5) Constant temperature, 5 minutes (single temperature between 20 and 30˚C), GI (50/125μm), 2m injection end
6) Constant temperature, 5 minutes (single temperature between 20 and 30˚C), SM (10/125μm), 2m injection end
7) ±1˚C (1 hour) between 0 and 50˚C, GI (50/125μm), 2m injection end
8) ±1˚C (1 hour) between 0 and 50˚C, SM (10/125μm), 2m injection end
9) ±1°C (1 hour) between 0 and 40°C, SM (10/125μm), 2m injection end
10) (*) indicates connector type. Specify FC, SC, ST, DIN or HMS-10/A connector. For other connectors please consult your vendor or our sales offices.

Light source unit (LD)

Model		AQ4211 (131)	AQ4211 (155)	AQ4211 (165)	AQ4212 (130)	AQ4213 (131/155)	AQ4214 (131)	A4214 (155)
Unit name		LD Unit					DFB-LD Unit	
Emission device		LD					DFB-LD	
Center wavelength [1]		1310 ± 20nm	1550 ± 20nm	1650+5nm/–10nm	1300 ±20nm	1310/1550 ± 20nm	1310 ± 10nm	1550 ± 10nm
Applicable fiber		SM (10/125μm)			GI (50/125μm)	SM (10/125μm)		
Spectral width [2]		5nm or less	10nm or less		5nm or less	5/10nm or less	0.1nm or less	
Optical output level [3]	GI (50/125μm)	————			0dB or more		————	
	SM (10/125μm)	0dBm or more			————	–1dBm or more	0dBm or more	
Output level	Temperature stability	0.2dB or less [4]		0.3dB or less [5]	0.3dB or less [4]	0.3dB or less [5]	0.3dB or less [5]	
	Time stability	Within ±0.003dB [6] Within ±0.03dB [7]		Within ±0.005dB [6] Within ±0.05dB [8]	Within ±0.01dB [9] Within ±0.05dB [10]	Within ±0.005dB [6] Within ±0.05dB [8]	Within ±0.01dB [6] Within ±0.05dB [8]	
Optical connector		AQ9434 (*) Universal Adapter: option [11]					SC/APC [12]	

Notes
1) At 25˚C 2) At 25˚C. Spectral width shown as RMS. (2σ, –20dB)
3) CW light, 2m fiber injection end
4) 0 to 50˚C (8 hours), connector injection end
5) 0 to 40˚C (8 hours), connector injection end
6) Constant temperature, 5 minutes (single temperature between 20 and 30˚C), SM (10/125μm), 2m injection end
7) ±1˚C (1 hour) between 0 and 50˚C, SM (10/125μm), 2m injection end
8) ±1˚C (1 hour) between 0 and 40˚C, SM (10/125μm), 2m injection end
9) Constant temperature, 5 minutes (single temperature between 20 and 30˚C), GI (50/125μm), 2m injection end
10) ±1˚C (1 hour) between 0 and 50˚C, GI (50/125μm), 2m injection end
11) (*) indicates connector type. Specify FC, SC, ST, DIN or HMS-10/A connector. For other connectors please consult your vendor or our sales offices.
12) Manufactured by SEIKOH GIKEN. APC: Angled PC

Light source unit

Model		AQ4224 (155)
Unit name		WDM LD Unit
Selectable wavelength range [1]		1530 to 1570nm
Center wavelength [2, 7]		λP ± 0.1nm
Applicable fiber [3]		SM (10/125μm)
Spectral width [2, 4]		0.1nm or less
Wavelength adjustment	Adjustment range	1nm [8]
	Resolution	0.01nm [8]
Optical output level [8]		+10dBm or more
Center wavelength stability		Within 0.01nm [2, 5] Within 0.03nm [2, 6, 8]
Output level	Temperature stability	±0.3dB [8, 9]
	Time stability	Within ±0.01dB [2, 5] Within ±0.05dB [2, 6, 8]
Optical connector [10]		SC/APC

Notes
1) Please consult your vendor or our sales offices for information on other wavelength range than above.
2) CW light, 0.0dB attenuation, at connecting fiber output point (SC/APC-FC/SPC, 2m, SMF).
3) Please consult your vendor or our sales offices for information on other fibers.
4) rms (2α, -20dB) Note 5: 5 minutes (constant and single temperature between 20 and 30°C)
6) 1 hour (±1°C between 10 and 30°C)
7) λp: 1552.5nm ± (n x 0.8nm) = 193.1 THz ± (n x 100GHz) Note 8: Representative rate
9) Environmental temperature between 10 and 30°C
10) Manufactured by SEIKOH GIKEN. APC: Angled PC

Model		AQ4310 (155)
Unit name		ASE Unit
Spectrum density (-13dBm/nm)		1525 to 1570nm (typ.) 1530 to 1565nm
Applicable fiber		SM (10/125μm)
Total output power [1, 2]		+10dBm or more
Output level	Temperature stability	±0.3dB [5]
	Time stability	Within ±0.005dB [1, 6] Within ±0.05dB [1]
Polar wave light extinction comparison		0.1dB typ.
Optical connector [7]		AQ9434 (*) Universal Adapter (option)

Notes
1) CW light, 0.0dB attenuation, at SM fiber (10/125μm) 2m output point.
2) At 25°C.
3) 8 hours (at 0 to 40°C)
4) 5 minutes (single temperature between 20 and 30°C)
5) *: connector type. Select FC, SC, ST, DIN or HMS-10/A. Please consult your vendor or our sales offices for information on other connectors.
* This unit can be mounted by AQ2141 Optical Multimeter Expansion Frame.
By connecting AQ2141 mounted AQ4310 (155) and AQ2140, the operation from AQ2140 becomes possible.

Expansion frame

Model	AQ2141
Unit name	Optical Multimeter Expansion Frame
Number of connecting unit	Max. 4 channels
Number of channel connection	Max. 16, connectable 4 units max. to AQ2140 [1]
Connectable unit [2]	One of sensors [3] (Sensor unit, OPM unit) or light sources [4] (Light source unit)
Interface	Original serial interface
Environmental conditions	Operating temperature: 0 to 50˚C, Storage temperature: –25 to +70˚C, Humidity: 85% RH or less
Power requirements	AC100 to 240V, 48 to 63Hz, approx. 60VA
Dimensions and mass	Approx. 212 (W) x 133 (H) x 350 (D) mm, approx. 3.5kg
Accessories	Power cord: 1, connecting cord: 1, user's manual: 1

* Needs AQ2140 to make sensor units work.

Notes
1) When connected to AQ2140 you already have, some AQ2140 models may require factory updates to software depending on their version.
2) Optical return loss measurement unit is not supported.
3) Sensors and OPM units should all be of the same type. Some sensors and OPM units may require factory updates to software depending on their version. Please consult your vendor or our sales offices for information on software.
4) Light source units may be freely mixed.