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# Optical test and Measurement System AQ8201 Series

*General testing of WDM system  
Automatic testing of WDM components  
(optical MUX/DEMUX, etc.)*



# High-speed, high accuracy measurement of WDM optical device specifications

## General

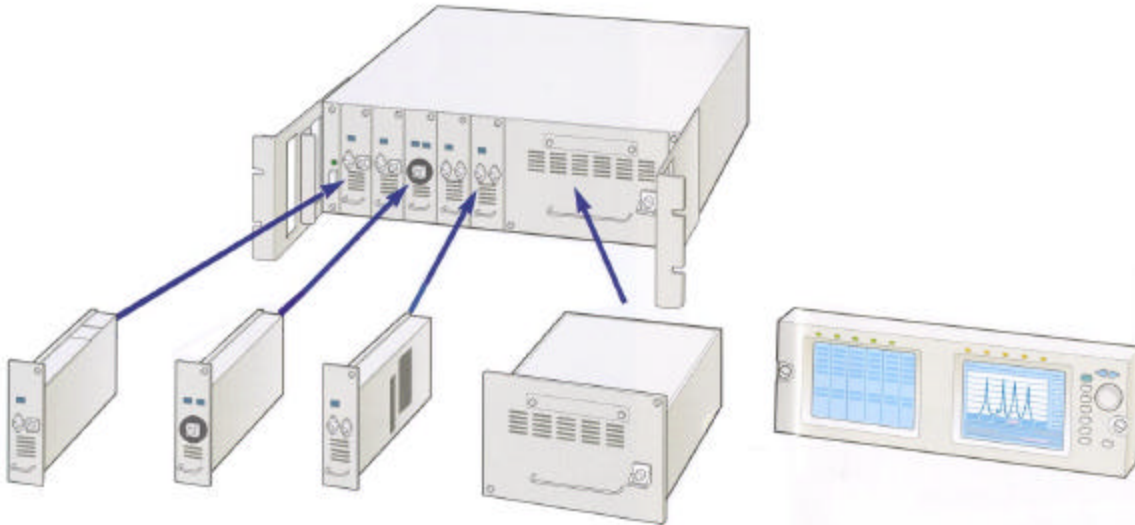
The configuration of measurement systems for evaluation is a major issue in the volume production of optical devices for WDM. The optical Test and Measurement System AQ8201 Series has a wide lineup of modules to meet diverse needs quickly. The 19-inch rack design makes space-efficient, flexible system configuration possible. And it's also effective for specification evaluation of WDM-related parts such as MUX/DEMUX, AWG and EDFA.

## Features

- General optical measurement equipment consists of the mainframe and display, and plug-in modules.
- Applies mainframe for 19-inch rack.
- Highly-visible 6.5-inch TFT color LCD
- Wide variety of module lineup
- 1 frame can mount up to 10 modules and save space.
- Support for LabVIEW driver.

## Easy to build up system for your application

Rack Mount Mainframe  
AQ8201A



WDM DFB-LD  
Module  
AQ8201-11,11A,11B

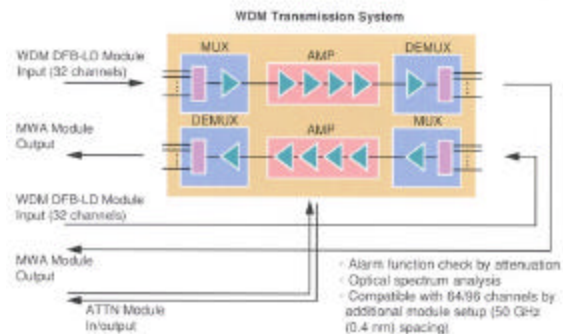
OPM  
Module  
AQ8210-21

ATTN Module  
AQ8201-31,32,33

MWA  
Module  
AQ8210-61

Display  
Controller  
AQ8210-02

## System configuration image



# Optical Test and Measurement System Components

**Display Controller module  
AQ8201-03**



**WDM DFB\_LD Module  
AQ8201-11, 11A, 11B**



**ECL Module  
AQ8201-13**



**OPM Module  
AQ8201-21**



Product name	Model	Slot width
Rack mount Mainframe	AQ8201A	—
Display controller	AQ8210-02	—
Display Controller Module	AQ8201-03	2 slots
WDM DFB-LD Module (Light source)	AQ8201-11,11A,11B	1 slot
ASE Module (Light source)	AQ8201-12,12A	2 slots
ECL Module (Light source)	AQ8201-13	1 slot
OPM module (Optical power meter)	AQ8201-21	1 slot
ATTN Module (Optical attenuator)	AQ8201-31,32,33	1 slot
MWA Module (Optical spectrum analyzer)	AQ8201-61	5 slot
RLM module (Return loss measurement)	AQ8201-71	1 slot



**ATTN Module  
AQ8201-31, 32, 33**



**ASE Module  
AQ8201-12, 12A**

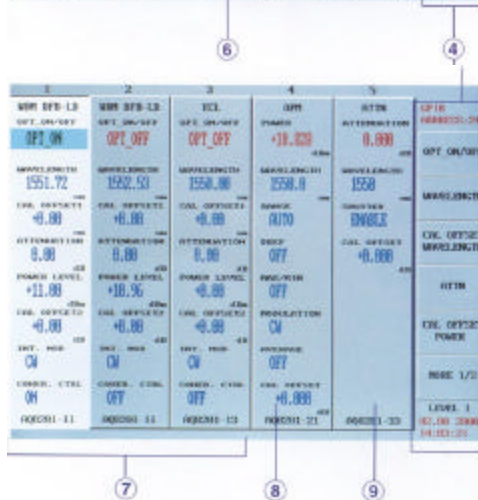
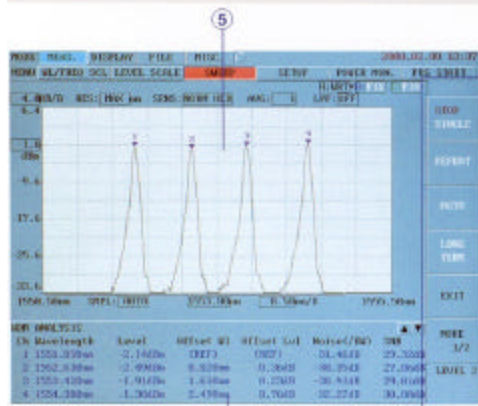
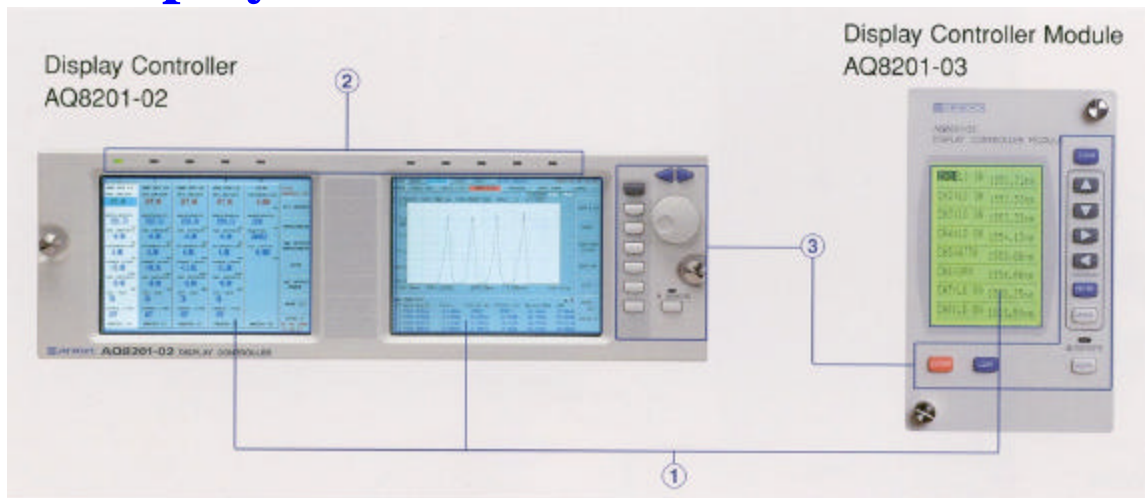


**MWA Module  
AQ8201-61**



**RLM Module  
AQ8201-71**

# Display controller



## Display Controller

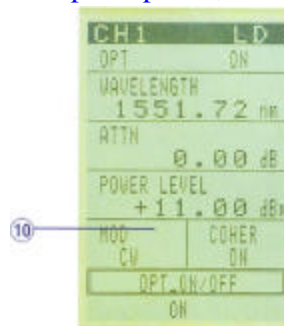
Operating panel for Rack Mount Main Frame

- ① AQ8201-02 displays information for 1 frame (10 slots) simultaneously.
- ② Operating slots and modules can be identified by LEDs.
- ③ Rotary knob (AQ8201-02) and operation switches designed for simple adjustment and operation of mounted modules.

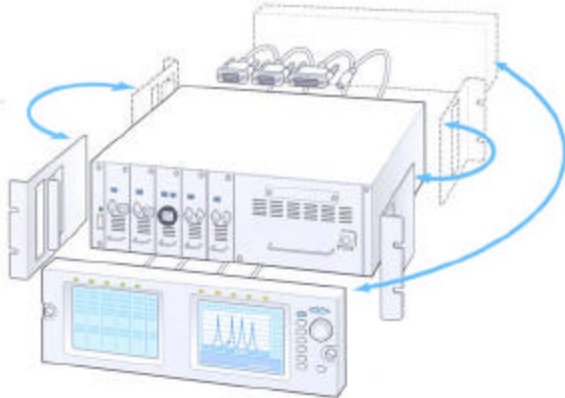
## Display screen

Displays set-up and measurement results for modules slot by slot.

- ④ The function key menu for selected module.
  - MWA module
- ⑤ Optical spectrum display
- ⑥ The overall results for analysis data (peak wavelength, wavelength spacing, peak level, SNR, etc.).
  - DFB-LD, ECL module
- ⑦ Optical output on/off, wavelength and attenuation settings.
  - OPM module
- ⑧ Optical power, wavelength, and range settings.
  - ATTN module
- ⑨ Attenuation and wave length shutter on/off settings
  - Display Controller module
- ⑩ AQ8201-03 displays detailed contents of selected 1 module only.

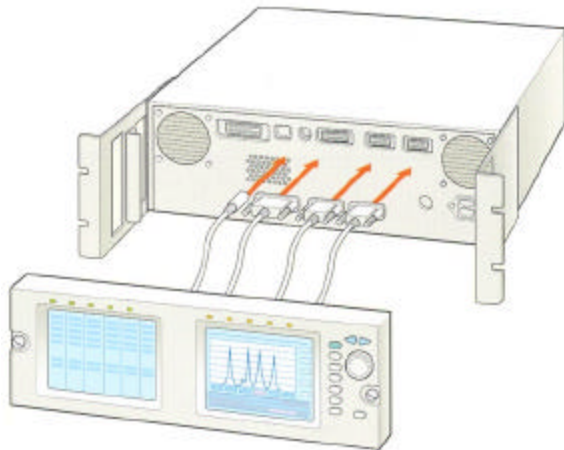


# Easy to mount



(Display controller front mounted.)

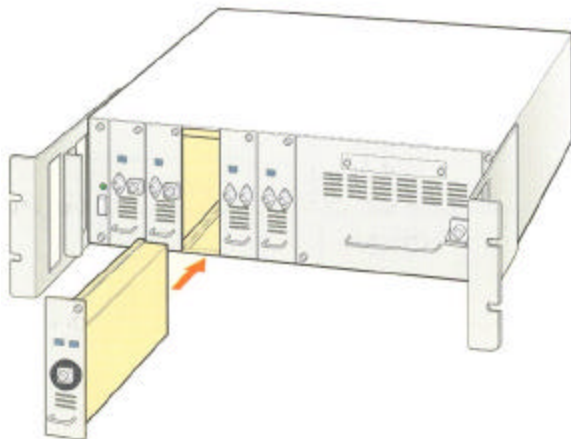
- ⦿ Display controller can be attached to either front or back. (Requires extension cord when attached to front.)



(Display controller attached to back.)

- ⦿ Display controller is used for monitoring and set-up of modules in the main frame.

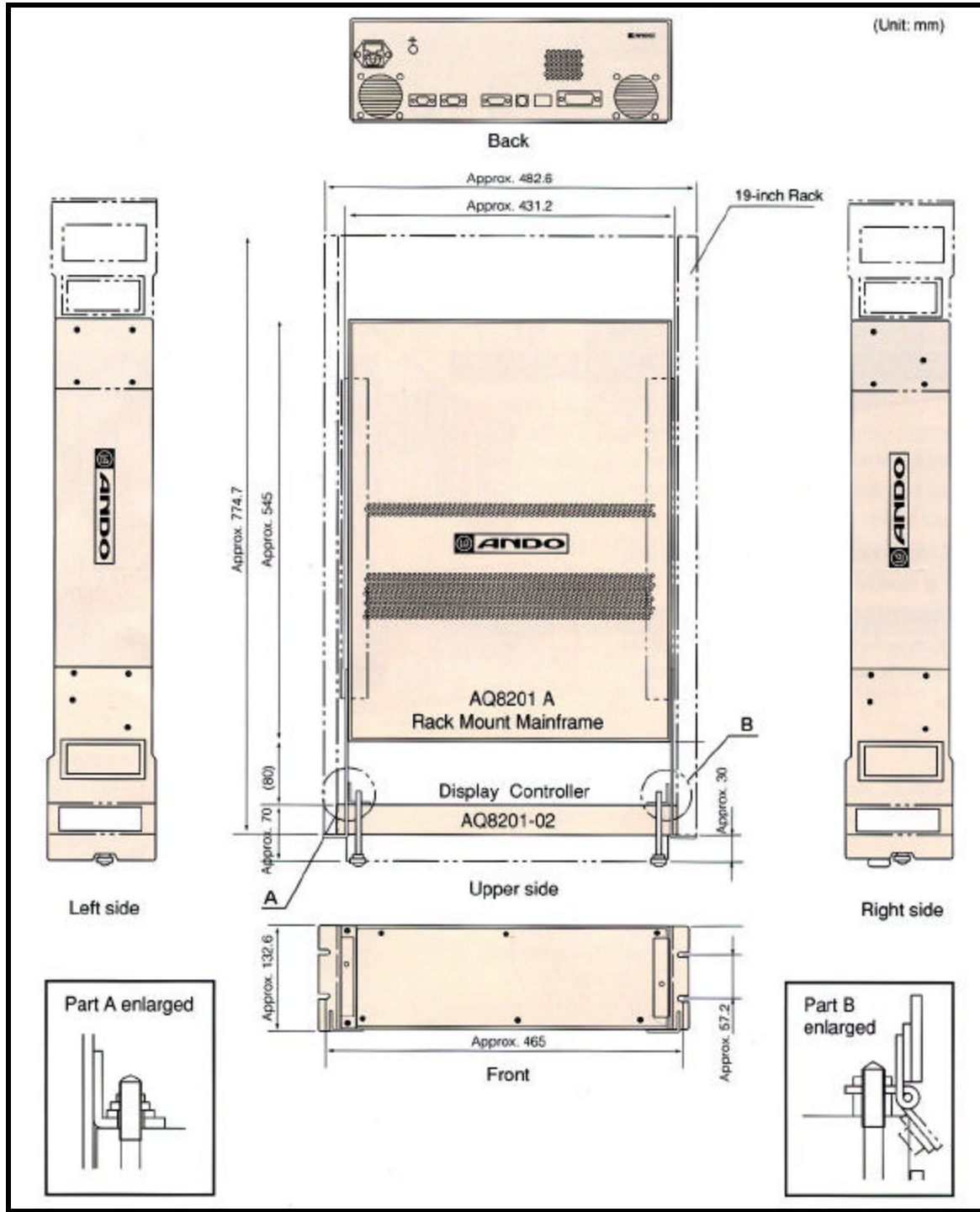
- ⦿ When an MWA module (optical spectrum analyzer) is mounted on the main frame, one display screen is used exclusively for the MWA module.



- ⦿ As illustrated at left, the structure is so simple that you can easily mount/dismount modules.

# Fit to the 19-inch rack

## Appearance of AQ8201A Rack Mount Mainframe

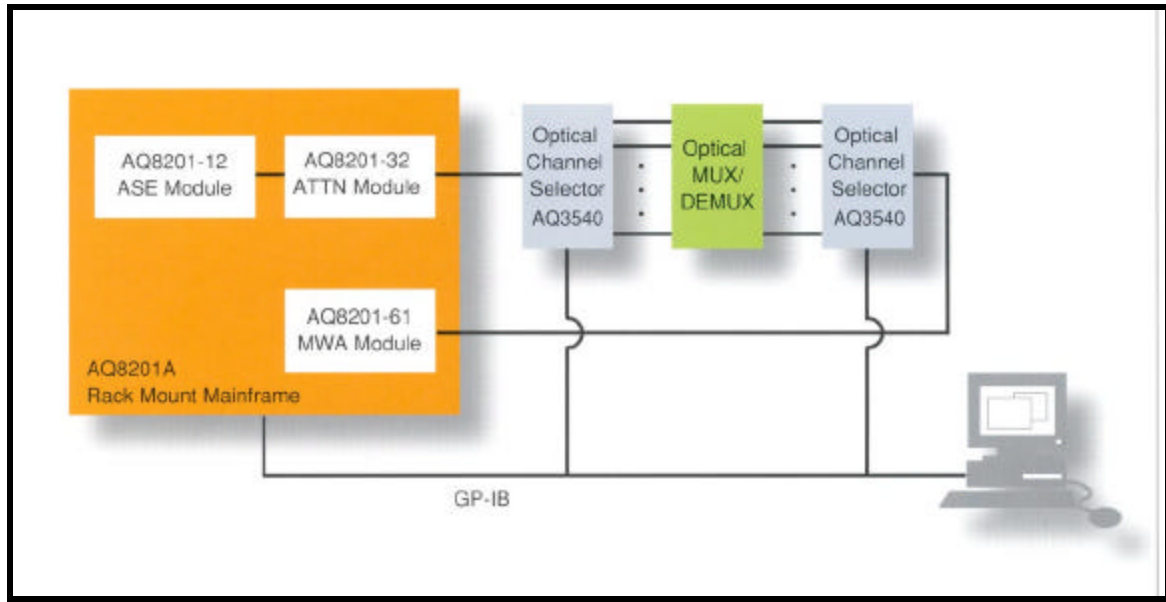


# Applications

## MUX/DEMUX test configuration

MUX/DEMUX: AWG, FBG, Filter, etc.

Evaluation items: insertion loss, center wavelength,  
Flatness, NdB band width, etc.





## Specifications

<p><b>System configurations</b></p> <p>AQ8201 series, Optical Test and Measurement System, consist of mainframe, display and various modules.</p> <ul style="list-style-type: none"> <li>• AQ8201A Rack Mount Mainframe</li> <li>• AQ8201-02 Display Controller</li> </ul> <p><i>Note Extension cable (2 for VGA, 1 for keyboard, and 1 for power supply/signal) for attaching display controller in the front is option.</i></p> <p><b>• Modules</b></p> <ul style="list-style-type: none"> <li>• AQ8201-03 Display Controller Module</li> <li>• AQ8201-11 WDM DFB-LD Module (Light source)</li> <li>• AQ8201-11A WDM DFB-LD Module (Light source for PM fiber)</li> <li>• AQ8201-11B WDM DFB-LD Module (Light source for L-band)</li> <li>• AQ8201-12 ASE Module (Light source)</li> <li>• AQ8201-12A ASE Module (High power type light source)</li> <li>• AQ8201-13 ECL module (Light source)</li> <li>• AQ8201-21 OPM Module (Optical power meter)</li> <li>• AQ8201-31 ATTN Module (Optical attenuator)</li> <li>• AQ8201-32 ATTN Module (High resolution type optical attenuator)</li> <li>• AQ8201-33 ATTN Module (High resolution type optical attenuator)</li> <li>• AQ8201-61 MWA Module (optical spectrum analyzer)</li> <li>• AQ8201-71 RLM Module (Return loss measurement)</li> </ul> <p><b>• Others</b></p> <ul style="list-style-type: none"> <li>• AQ8201-91 Vent cover (with slit)</li> <li>• AQ8201-92 Blank cover (without slit)</li> <li>• AQ8201-96 Rack Mount Kit (fro mounting 19-inch rack)</li> </ul>	<p><b>AQ8201-03 Display Controller Module</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Display</td> <td colspan="2">LCD 160×240 dots (RF-STN Black/White type)</td> </tr> <tr> <td>Environmental Conditions</td> <td colspan="2">Operating temperature: 5 to 40°C Storage Temperature: 0 to 50°C Humidity: 85% RH or less (no condensation)</td> </tr> <tr> <td>Dimensions and mass</td> <td colspan="2">Approx. 79.5 (W) × 130 (H) × 324 (D) mm Approx. 1.5kg</td> </tr> </table> <p style="text-align: center;"><b>AQ8201-11, 11A WDM DFB-LD Module (Light Source)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Available wavelength range</td> <td colspan="2">1524.11 to 1570.01nm ①</td> </tr> <tr> <td>Center wavelength</td> <td colspan="2">±0.15nm ② ③</td> </tr> <tr> <td>Wavelength accuracy</td> <td colspan="2">Within ±0.05nm</td> </tr> <tr> <td rowspan="2">Spectral width</td> <td>Coherence control ON</td> <td>50MHz (typ.)</td> </tr> <tr> <td>Coherence control OFF</td> <td>5 MHz or less</td> </tr> <tr> <td>Optical output level</td> <td colspan="2">+10dBm or more ② (AQ8201-11) +13dBm or more ④ (AQ8201-11A)</td> </tr> <tr> <td>Polarization extinction ratio</td> <td colspan="2">20 dB (typ.) ④ (AQ8201-11A)</td> </tr> <tr> <td>SMSR</td> <td colspan="2">30 dB or more ⑤</td> </tr> <tr> <td rowspan="2">Output level stability</td> <td>15 minutes</td> <td>Within ±0.005dB ⑥</td> </tr> <tr> <td>24 hours</td> <td>Within ±0.03dB ⑥</td> </tr> <tr> <td rowspan="2">Wavelength stability</td> <td>15 minutes</td> <td>Within ± 0.005nm ②</td> </tr> <tr> <td>24 hours</td> <td>Within ±0.01nm ②</td> </tr> <tr> <td>Wavelength range</td> <td colspan="2">1.6nm (min.) ②</td> </tr> <tr> <td>Optical attenuation range</td> <td colspan="2">10dB (0.01dB step)</td> </tr> <tr> <td>Optical isolation</td> <td colspan="2">55dB or more</td> </tr> <tr> <td>RIN</td> <td colspan="2">-145 dB/Hz</td> </tr> <tr> <td>Internal modulation</td> <td colspan="2">100 Hz to 300 kHz (CHOP)</td> </tr> <tr> <td>External modulation</td> <td colspan="2">100 Hz to 300 kHz (Sine Wave)</td> </tr> <tr> <td rowspan="2">Applicable fiber</td> <td colspan="2">SM (10/125μm) (AQ8201-11)</td> </tr> <tr> <td colspan="2">PM (10/125μm) (AQ8201-11A)</td> </tr> <tr> <td>Optical connector</td> <td colspan="2">FC/Angled PC ⑦</td> </tr> <tr> <td>Laser product class</td> <td colspan="2">IEC825: class3A</td> </tr> </table>	Display	LCD 160×240 dots (RF-STN Black/White type)		Environmental Conditions	Operating temperature: 5 to 40°C Storage Temperature: 0 to 50°C Humidity: 85% RH or less (no condensation)		Dimensions and mass	Approx. 79.5 (W) × 130 (H) × 324 (D) mm Approx. 1.5kg		Available wavelength range	1524.11 to 1570.01nm ①		Center wavelength	±0.15nm ② ③		Wavelength accuracy	Within ±0.05nm		Spectral width	Coherence control ON	50MHz (typ.)	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<p><i>Note: When 10 modules of AQ8201-11, 11A, 11B are in operation temperature is 10 to 30 °C</i></p>																																																																								
<p><b>Accessory for AQ8201A</b></p> <p>Rack mount angle: 2 (8×screws)</p> <p><b>Options for AQ8201A</b></p> <p>AQ8201-91 Vent cover (with slit)</p> <p>AQ8201-92 Blank cover (without slit)</p> <p><b>AQ8201-02 Display Controller</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Display</td> <td>6.5-inch TFT color LCD</td> </tr> <tr> <td>Environmental conditions</td> <td>Operation temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)</td> </tr> <tr> <td>Dimensions and mass</td> <td>Approx. 425 (W) × 132.5 (H) × 70 (D) mm Approx. 4kg</td> </tr> </table>	Display	6.5-inch TFT color LCD	Environmental conditions	Operation temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)	Dimensions and mass	Approx. 425 (W) × 132.5 (H) × 70 (D) mm Approx. 4kg	<p>*Specifications assured after warm-up for one hour.</p> <p>Notes:</p> <p>① Select from Aqaq8201-11, 11A available wavelength on next page.</p> <p>② CW light, attenuation 0.0dB, coherence control "OFF", at fiber end (FC/Angled PC FC/SPC, 2m, SMF)</p> <p>③ ± is specified wavelength.</p> <p>④ CW light, Attenuation 0.0dB, Coherence control OFF, with end of the optical connector mounted on panel.</p> <p>⑤ Attenuation 0.0dB at the center wavelength</p> <p>⑥ Ambient temperature: constant in 20 to 30°C, CW light, attenuation 0.0dB, coherence control "ON", at fiber end (FC/Angled PC-FC/SPC, 2m, SMF)</p> <p>⑦ Angled PC in manufactured by SEIKOH GIKEN. : Return loss over 60dB or more</p>																																																																	
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### Options for AQ8201-02

Extension cables for attaching display controller to the front.

### AQ8201-11, 11A Available wavelength Table

(Please consult your vendor or sales offices when you require other wavelengths than listed)

Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
190.95	1570.01	192.90	1554.13	194.85	1538.58
191.00	1569.59	192.95	1553.73	194.90	1538.19
191.05	1569.18	193.00	1553.33	194.95	1537.79
191.10	1568.77	193.05	1552.93	195.00	1537.40
191.15	1568.36	193.10	1552.52	195.05	1537.00
191.20	1567.95	193.15	1552.12	195.10	1536.61
191.25	1567.54	193.20	1551.72	195.15	1536.22
191.30	1567.13	193.25	1551.32	195.20	1535.82
191.35	1566.72	193.30	1550.92	195.25	1535.43
191.40	1566.31	193.35	1550.52	195.30	1535.04
191.45	1565.90	193.40	1550.12	195.35	1534.64
191.50	1565.50	193.45	1549.72	195.40	1534.25
191.55	1565.09	193.50	1549.32	195.45	1533.86
191.60	1564.68	193.55	1548.91	195.50	1533.47
191.65	1564.27	193.60	1548.51	195.55	1533.07
191.70	1563.86	193.65	1548.11	195.60	1532.68
191.75	1563.45	193.70	1547.72	195.65	1532.29
191.80	1563.05	193.75	1547.32	195.70	1531.90
191.85	1562.64	193.80	1546.92	195.75	1531.51
191.90	1562.23	193.85	1546.52	195.80	1531.12
191.95	1561.83	193.90	1546.12	195.85	1530.72
192.00	1561.42	193.95	1545.72	195.90	1530.33
192.05	1561.01	194.00	1545.32	195.95	1529.94
192.10	1560.61	194.05	1544.92	196.00	1529.55
192.15	1560.20	194.10	1544.53	196.05	1529.16
192.20	1559.79	194.15	1544.13	196.10	1528.77
192.25	1559.39	194.20	1543.73	196.15	1528.38
192.30	1558.98	194.25	1543.33	196.20	1527.99
192.35	1558.58	194.30	1542.94	196.25	1527.60
192.40	1558.17	194.35	1542.54	196.30	1527.22
192.45	1557.77	194.40	1542.14	196.35	1526.83
192.50	1557.36	194.45	1541.75	196.40	1526.44
192.55	1556.96	194.50	1541.35	196.45	1526.05
192.60	1556.55	194.55	1540.95	196.50	1525.66
192.65	1556.15	194.60	1540.56	196.55	1525.27
192.70	1555.75	194.65	1540.16	196.60	1524.88
192.75	1555.34	194.70	1539.77	196.65	1524.49
192.80	1554.94	194.75	1539.37	196.70	1524.10
192.85	1554.54	194.80	1538.98		

### AQ8201-11B WDM DFB-LD Module (Light Source)

Available wavelength range	1570.42 to 1620.50nm <sup>①</sup>	
Center wavelength	±0.15 nm <sup>② ③</sup>	
Wavelength accuracy	Within ±0.05nm	
Spectral width	Coherence control OFF	50 MHz (typ.)
	Coherence control ON	5 MHz or less
Optical output level	+ 10dBm or more <sup>②</sup>	
SMSR		30dB or more <sup>④</sup>
Output level stability	15 minutes	Within ± 0.005dB <sup>⑤</sup>
	24 hours	Within ± 0.03dB <sup>⑤</sup>
Wavelength stability	15 minutes	Within ± 0.005dB <sup>②</sup>
	24 hours	Within ± 0.01dB <sup>②</sup>
Wavelength range	1.6nm (min.) <sup>②</sup>	
Optical attenuation range	10dB (0.01dB step)	
Optical isolation	55dB or more	
RIN	-145dB/Hz	
Internal modulation	100Hz to 300kHz (CHOP)	
External modulation	100Hz to 300kHz (Sine Wave)	
Applicable fiber	SM (10/125μm)	
Optical connector	FC/Angled PC <sup>⑥</sup>	
Laser product class	IEC825: class3A	
Environmental Conditions	Operation temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)	
Dimensions and mass	Approx. 39.5(W)×130(H)×339(D) mm Approx. 0.7kg	

\*Specifications assure after warm-up for one hour

Notes:

- ① Select from AQ8201-11B available wavelength on next page.
- ② CW light, attenuation 0.0dB, coherence control “OFF”, at fiber end (FC/Angled PD-FC/SPC, 2m, SMF)
- ③ ± is specified wavelength.
- ④ Attenuation 0.0dB at the center wavelength.
- ⑤ Ambient temperature: constant in 20 to 20°C, CW light, attenuation 0.0dB, coherence control “ON”, at fiber end (FC/Angled PC-FC/SPC, 2m, SMF)
- ⑥ Angled PC is manufactured by SEIKOH GIKEN.: return loss over 60dB or more

AQ8201-11B Available Wavelength Table (Please consult your vendor or sales offices when you require other wavelength than as below)						AQ8201-12, 12A ASE Module (Light Source)		
Frequency (Tz)	Wavelength (nm)	Frequency (Thz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)	Spectrum density (-13 dbm/nm)	1525 to 1570nm <sup>①</sup> (typ.) 1530 to 1565nm <sup>①</sup>	
185.00	1620.50	187.00	1603.17	189.00	1586.20	Optical output power	+ 10dBm or more <sup>①</sup> (AQ8201-12) +15dBm or more <sup>①</sup> (AQ8201-12A)	
185.05	1620.06	187.05	1602.74	189.05	1585.78	Output level stability	within ±0.005 dB <sup>① ②</sup> within ±0.05dB <sup>① ③</sup>	
185.10	1619.62	187.10	1602.31	189.10	1585.36			
185.15	1619.19	187.15	1601.88	189.15	1584.95	Optical modulation mod	CW	
185.20	1618.75	187.20	1601.46	189.20	1584.53	Polarization extinction mod	0.1dB (typ.)	
185.25	1618.31	187.25	1601.03	189.25	1584.11	Optical attenuation rang	6dB (0.1dB step)	
185.30	1617.88	187.30	1600.60	189.30	1583.69	Applicable fiber	SM (10/125µm)	
185.35	1617.44	187.35	1600.17	189.35	1583.27	Optical connector	AQ9441 (*) Universal adapter (option) <sup>④</sup>	
185.40	1617.00	187.40	1599.75	189.40	1582.85	Laser product class	IEC825: class 3A	
185.45	1616.57	187.45	1599.32	189.45	1582.44	Environmental conditions	Operating temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)	
185.50	1616.13	187.50	1598.89	189.50	1582.02			
185.55	1615.70	187.55	1598.47	189.55	1581.60			
185.60	1615.26	187.60	1598.04	189.60	1581.18			
185.65	1614.83	187.65	1597.62	189.65	1580.77	Dimensions and mass	Approx. 79.5 (W)×130(H)×339(D)mm Approx. 2kg	
185.70	1614.39	187.70	1597.19	189.70	1580.35			
185.75	1613.96	187.75	1596.76	189.75	1579.93	* Specifications assured after warm-up for one hour.		
185.80	1613.52	187.80	1596.34	189.80	1579.52	NOTES: <sup>①</sup> CW light, attenuation 0.0dB, at fiber end (SMF,FC/PC, 2m)		
185.85	1613.09	187.85	1595.91	189.85	1579.10	<sup>②</sup> 5 minutes (at constant temperature in 20 to 30°C)		
185.90	1612.65	187.90	1595.49	189.90	1578.69	<sup>③</sup> In one hour (± 1°C in 0 to 40°C)		
185.95	1612.22	187.95	1595.06	189.95	1578.27	<sup>④</sup> FC, ST and SC connector are available		
186.00	1611.79	188.00	1594.64	190.00	1577.86	AQ8201-13 ECL Module (Light Source)		
186.05	1611.35	188.05	1594.22	190.05	1577.44	Available wavelength range	1460 to 1580nm	
186.10	1610.92	188.10	1593.79	190.10	1577.03	Wavelength setting range	10 pm	
186.15	1610.49	188.15	1593.37	190.15	1576.61	Wavelength accuracy	Within ±0.2mm <sup>① ② ③ ④</sup>	
186.20	1610.06	188.20	1592.95	190.20	1576.20	Wavelength repeatability	± 50 pm (typ.) <sup>① ② ④</sup>	
186.25	1609.62	188.25	1592.52	190.25	1575.78	Wavelength setting time	3 seconds (typ.) <sup>⑤</sup>	
186.30	1609.19	188.30	1592.10	190.30	1575.37	Spectral width	Coherence control ON	100 MHz (typ.) <sup>① ②</sup>
186.35	1608.76	188.35	1591.68	190.35	1574.95		Coherence control OFF	5 MHz (typ.) <sup>① ②</sup>
186.40	1608.33	188.40	1591.26	190.40	1574.54	Optical output level	460 to 1580nm	+6 dBm or more <sup>① ② ⑦</sup>
186.45	1607.90	188.45	1590.83	190.45	1574.13		490 to 1580nm	+8 dBm or more <sup>① ② ⑦</sup>
186.50	1607.47	188.50	1590.41	190.50	1573.71		520 to 1580nm	+ 10 dBm or more <sup>① ② ⑦</sup>
186.55	1607.04	188.55	1598.99	190.55	1573.30	SMSR	45dB or more <sup>① ② ⑥</sup>	
186.60	1606.60	188.60	1598.57	190.60	1572.89	Output level stability	15 minutes	Within ±0.005dB <sup>① ② ④ ⑦</sup>
186.65	1606.17	188.65	1589.15	190.65	1572.48		1 hour	Within ±0.01dB <sup>① ② ④ ⑦</sup>
186.70	1605.74	188.70	1588.73	190.70	1572.06	Wavelength stability	15 minutes	Within ±0.005nm <sup>① ② ④</sup>
186.75	1605.31	188.75	1588.30	190.75	1571.65		24 hours	Within ±0.01nm (typ.) <sup>① ② ④</sup>
186.80	1604.88	188.80	1587.88	190.80	1571.24	Optical attenuation range	10dB (0.01dB step) <sup>① ⑥</sup>	
186.85	1604.46	188.85	1587.46	190.85	1570.83	RIN	-145 dB/Hz (typ.) <sup>① ②</sup>	
186.90	1604.03	188.90	1587.04	190.90	1570.42	Internal modulation	100Hz to 300kHz (CHOP) <sup>⑧</sup>	
186.95	1603.60	188.95	1586.62			External modulation	100Hz to 300kHz (Sine Wave)	
NOTES ① Temperature fixed at 23°C, CW light, 2m fiber output, single vertical mode ② Optical attenuation: 0.0dB ③ After wavelength calibration ④ C-band: 1520 to 1750 nm ⑤ Full span (120 nm) ⑥ Wavelength: 1550 nm ⑦ Spectrum width: coherence control ON ⑧ Setting resolution: 0.1 kHz, accuracy: ±2 % ⑨ Angled PC is manufactured by SEIKOH GIKEN, return loss over 60dB or more ⑩ Ambient temperature of the mainframe						Applicable fiber	SM (10/125µm)	
						Optical connector	FC/Angled PC <sup>⑩</sup>	
						Laser product class	IEC825: class3A	
						Environmental conditions	Operating temperature: 23 ± 5°C <sup>⑩</sup>	
							Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)	
Dimensions and mass	Approx. 39.5(W)×130(H)×339(D)mm Approx. 1.2kg							

\*Specifications assured after warm-up for one hour.

<b>AQ8201-21 OPM module (Optical power meter)</b>		
Wavelength range	700 to 1700nm	
Photodetector	Cooled InGaAs	
Application	Small-diameter silica fiber emission①	
Optical connector	AQ9389B (FC) Connector Adapter (standard)②	
Polarization dependant loss	0.02dB P-P (typ.)③	
Power range	CW light	-80 to +27 dBm ④
	Chopped light	-80 to +24 dBm ④
Accuracy under reference condition	± 2.5 % (at 1310nm calibration point) ⑤	
Total accuracy	± 5% (1000 to 1650nm) ⑥	
Linearity	±0.05dB (1000 to 1650nm, -40 to +27dBm)②	
Noise	CW light	- 73 dBm or less ⑧
	Chopped light	
Environmental conditions	Operating temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity:85%RH or less (no condensation)	
Dimensions and mass	Approx. 39.5 (W) × 130 (H) × 339 (D)mm Approx. 1.2 kg	

\*Specifications assured at fixed temperature within 23±5°C

\* Specifications assured after warm-up for one hour.

Notes:

① Applicable fiber 62.5/125μm (GI) NA 0.275

② ST and SC connector are also available

③ At 1550nm wavelength, SM fiber

④ AT 1310nm wavelength

⑤ Reference conditions

1. Power level: -20dBm (10μW), CW light

2. SM fiber, master FC connector

3. Ambient temperature: 23 ± 5°C

4. Calibrated with AQ9389B (FC) connector adapter (If you disconnect adapter, the accuracy of specifications may be lost. When you change connector adapter, we recommend recalibration.

⑥ Operating conditions:

1. Power level: -20dBm (10μW), CW light

2. 50 μm optical fiber, Na 0.2

3. Ambient temperature: 23±5°C

4. With AQ9389B (FC) connector adapter

⑦ 1. Linearity at wave length within wavelength specified in total accuracy

2. CW light, environmental temperature: 23±5°C

⑧ 1. Averaging 1s (averaging executed 10 times)

2. In wave length 1200 to 1600nm

3. CW, chopped light (270 Hz)

#### Accessory for AQ8201-21

Plug for analog output: 1

<b>AQ8201-31, 32 ATTN Module (Optical attenuator)</b>	
Wavelength range	1200 to 1600nm
Insertion loss	2.5dB or less (1310/1550nm)① ②
Maximum attenuation level	60dB
Attenuation deviation	Within ± 0.1 (1310/1550nm)dB① ②
Repeatability	Within ±0.02dB①
Minimum attenuation step	0.05 dB (AQ8201-31)
	0.01 dB (AQ8201-32)
Optical return loss	60dB or more (1310/1550nm)①②③
Polarization dependant loss	0.05 dBmP-P (typ.) (1550nm)①
Maximum input power	+ 23 dBm
Shutter isolation	100dB or more
Applicable fiber	SM (10/125 μm)
Optical connector	FC/Angled PC④
Environmental conditions	Operating temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity:85%RH or less(no condensation)
Dimensions and mass	Approx. 39.5(W)×130(H)×339(D)mm Approx. 1 kg

\*Specifications assured after warm-up for one hour.

\*Specifications assured at fixed temperature within 25 ± 3°C.

Notes

① At constant temperature

② Using master cord

③ With FC/Angled PC connector (return loss: 63dB or more)

④ Angled PC is manufactured by SEIKOH GIKEN.

<b>AQ8201-33 ATTN module (Optical attenuator)</b>	
Wavelength range	1480 to 1650nm
Insertion loss	2.5 dB or less (1550nm)① ②
Maximum attenuation range	60db
Attenuation deviation	Within ±0.1dB (1520 to 1620nm) ①②
Repeatability	±0.005 dB (typ.)① (AQ8201-33)
Minimum attenuation range	0.001dB (AQ8201-33)
Optical return loss	60dB or more (1550nm)① ② ③
Polarization dependant loss	0.05dB P-P (typ.) (1550nm)①
Maximum input power	+23 dBm
Shutter isolation	100dB or more
Applicable fiber	SM (10/125 μm)
Optical connector	FC/Angled PC④
Environmental conditions	Operating temperature: 5 to 40°C
	Storage temperature: 0 to 50°C
	Humidity:85%RH or less(no condensation)
Dimensions and mass	Approx.39.5(W)×130(H)×339(D)mm Approx. 1kg

\*Specifications assured after warm-up for one hour.

\*Specifications assured at fixed temperature within 25± 3°C

Notes

① At constant temperature

② Using master cord

③ With FC/Angled PC connector (Return loss: 63dB or more)

④ Angled PC is manufactured by SEIKOH GIKEN

Measurement wavelength range	1200 to 1700nm (vacuum wavelength)	Data analysis	WDN analysis (Table of wavelength, Level and SNR list.) EDFA analysis (gain/NF), peak search spectrum width search, notch width search, Delta marker (max. 100), line marker (analysis range setting), graphical display for long term measurement		
Wavelength accuracy	within $\pm 0.05\text{nm}$ (1550 to 1570nm) ① within $\pm 0.3\text{nm}$ (1200 to 1700nm) ①		Others	Wavelength self-calibration function. (built-in reference light source), wavelength Level offset function, label function	
Wavelength linearity	within $\pm 0.02\text{nm}$ (1500 to 1570nm) ①			Internal memory	2 Mbyte
Wavelength repeatability	within $\pm 0.005\text{nm}$ (1 minute)		Applicable fiber		SM (10/125 $\mu\text{m}$ )
Wavelength resolution	Max. resolution: 0.08nm (typ.)(1550 to 1600nm) Resolution setting: Max., 0.2, 0.5, 1.0nm Resolution accuracy: $\pm 5\%$ (resolution: 0.2nm or more) ②		Optical connector		AQ9441(*) Universal Adapter (Option) ③
Measurement level range	-90 to +20dBm (1200 to 1600nm) ② -80 to +20dBm (1600 to 1700nm) ②	Environmental conditions	Operating temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)		
Level accuracy	$\pm 0.3\text{dB}$ (typ.) (1310/1550nm, input: -30dBm, sensitivity mode: HIGH 1 to 3) ②		Dimensions and mass	Approx. 200(W) $\times$ 130(H) $\times$ 339(D)mm Approx. 5kg	
Polarization dependant loss	within $\pm 0.05\text{dB}$ (1310/1550nm) ②	*Specifications assured after warm-up for one hour.			
Level linearity	within $\pm 0.05\text{dB}$ (input: -40 to 0 dBm, Sensitivity mode: HIGH 1 to 3)	Notes: ① 10/125 SM fiber (FC/PC connector), at constant temperature within 25 $\pm$ 3°C ② 10/125 SM fiber (FC/PC connector), at constant temperature within 10 to 35°C ③ Specify FC, SC or ST connector			
Level flatness	within $\pm 0.1\text{dB}$ (1550 to 1570nm) ①	<b>AQ8201-71 RLM Module (Return loss measurement)</b>			
Level reproducibility	within $\pm 0.02\text{dB}$ (1310/1550nm, input: -23dBm)	Wavelength range	1280 to 1600nm		
Dynamic range (Stray light level)	40dB or more (1523nm, peak: $\pm 1.0\text{nm}$ , Resolution: 0.08nm) 30dB or more (1523nm, peak: $\pm 0.4\text{nm}$ , Resolution: 0.08nm)	Dynamic range	65dB or more ①		
Optical input return loss	30dB (typ.) (1310/1550nm)	Relative measurement accuracy	within $\pm 0.4\text{dB}$ (0 to 50dB) ② within $\pm 0.7\text{dB}$ (50 to 60dB) ②		
Sweep time	Approx. 1 second (Span: 50nm or less, sensitivity mode : NORMAL HOLD, averaging time: 1, sample point: AUTO)	Measurement stability	Within $\pm 0.002\text{dB}$ ③		
Automatic measurement	Program function (5 programs, 200 steps) Long term function	Applicable fiber	SM (10/125 $\mu\text{m}$ )		
Measurement condition settings	Span: 0 to 500nm Sensitivity mod: NORMAL HOLD, AUTO, HIGH 1/2/3 Averaging: 1 to 1000 Sample point: 11 to 20001, AUTO Automatic setting function Sweep between markers 0 nm sweep Averaging measurement of pulse light	Input connection (from light source)	FC/PC		
		Output connector (to DUT)	SC/Angled PC ④, ⑤		
		Environmental conditions	Operating temperature: 5 to 40°C Storage temperature: 0 to 50°C Humidity: 85%RH or less (no condensation)		
		Dimensions and mass	Approx. 39.5(W) $\times$ 130(H) $\times$ 339(D)mm Approx. 1.2kg		
Trace display	Level scale setting Simultaneous display of 3 individual traces Max./min. display Roll averaging display Differential trace display Power density display, % display, Frequency axis	*Specifications assured after warm-up for one hour.			
		<b>General conditions otherwise specified:</b> <ul style="list-style-type: none"> <li>Optical input level: -5 to 0dBm, CHOP (270 Hz)</li> <li>Wavelength: 1550 nm</li> <li>Reference: fresnel refraction (master cord)</li> <li>Ambient temperature: 23<math>\pm</math>1°C</li> </ul> Notes ① Varies depending on master cord ② Depends on stability of light source to be used, linearity of photo receiver and isolation of optical directional coupler ③ Fresnel reflection measurement for 5 minutes ④ Angled PC is manufactured by SEIKOH GIKEN. ⑤ Do not connect other master cord than one specified by ANDO to output connector			

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