



Test&Measurement

AQ2300 Series

Multi Application Test System



YOKOGAWA offers an optimal solution for evaluating and testing semiconductor devices, optical fibers, optical passive components, and transmission equipment with the AQ2300 series multi-application test system.

While maintaining the performance of its predecessor, the AQ2200 series, the AQ2300 has evolved into a faster, higher-density test system with enhanced data transfer speed and storage capacity. It also introduces a source measure unit to the module lineup and features a synchronization function between modules within a frame. Through the AQ2300 series, we are committed to ensuring high measurement quality and enhancing the operational efficiency of our customers.

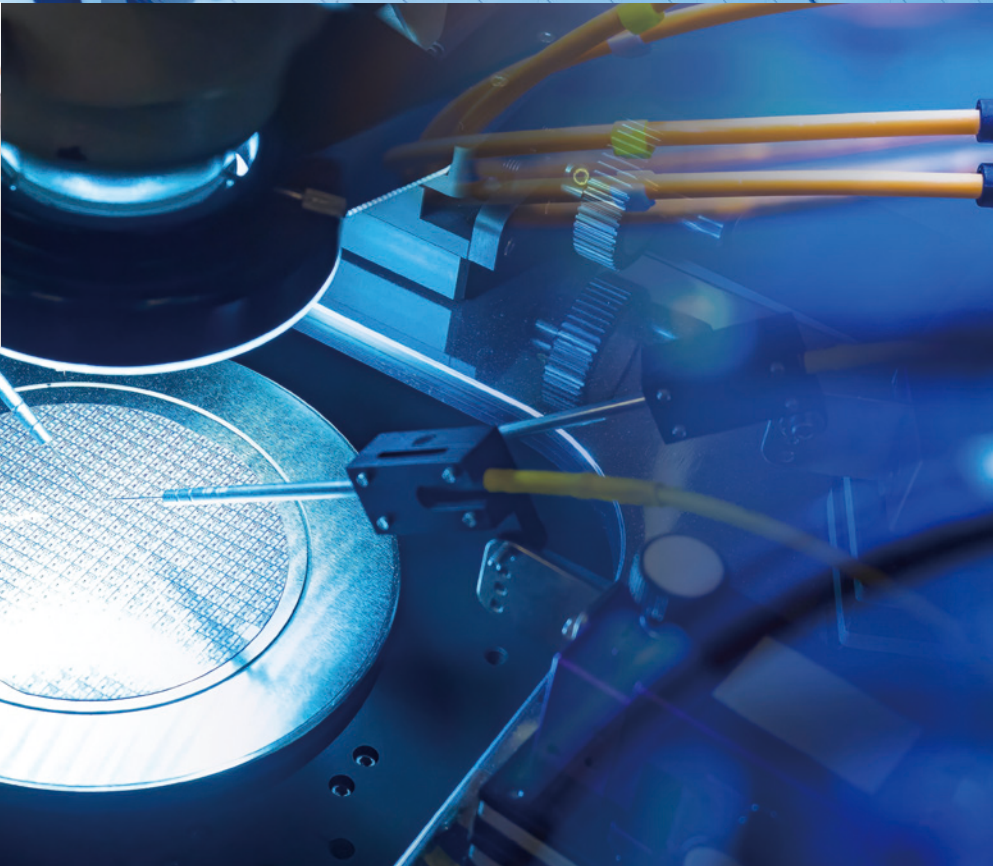
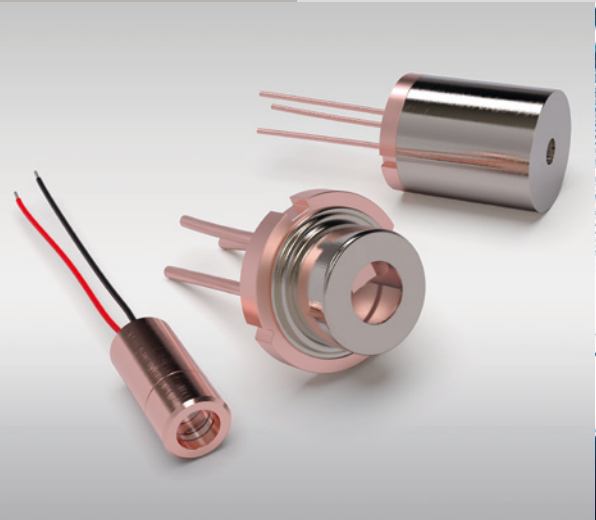
Efficiency – By freely combining modules within a single frame, users can efficiently adjust the number of measurement items and channels to match the measurement target. In sweep measurements, up to 100000 points per channel can be saved, and the file transfer speed has also been improved.

Link – The system supports multiple synchronization methods through the use of either internal or external triggering. Additionally, signals can be sent and received to initiate and terminate measurements by connecting to external equipment via the Digital I/O interface.

Credibility – YOKOGAWA prioritizes quality, ensuring stability and reliability while providing customers with trusted measurements.



*Light Source
Optical Power Measurement
Optical Attenuation
Optical Path Switching
Power Supply & Precision Measurement*



Modular Test System

Photonics-Electronics convergence



History of Multi Application Test Systems

2004

Multi Application Test System



AQ2201

AQ2202

2009

Multi Application Test System

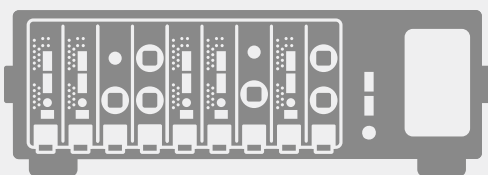


AQ2211

AQ2212

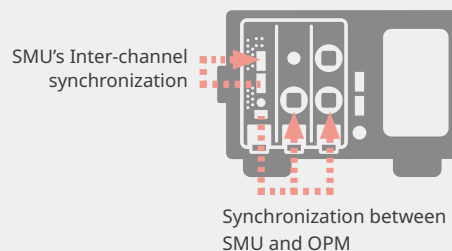
Multi-channel and high-density

Each module can be stored in a frame at high density with multiple channels. By mounting a 2-channel source measure unit or optical power meter, the number of channels can be expanded to a maximum of 6 channels in a 3-slot frame and a maximum of 18 channels in a 9-slot frame, which is useful for saving space in the measurement system.



Inter-channel synchronization

The source measure unit and optical power meter in the frame can be synchronized between channels for sweep measurements. It uses a bus connection system, so it is possible to select multiple channels that you want to synchronize, and there is no need for wiring.





- ✓ **Multi-channel, High-density, Space-saving**
Maximum 18 channels
- ✓ **High-speed data transfer with large capacity**
Measurement result file transfers in less than 1 second
Data capacity of 100001 points per channel
- ✓ **Electrical and optical measurements in a single frame**
Photoelectric convergence measurement
- ✓ **Highly accurate and stable modules**
 - **Light source**
 - **Voltage/Current source and measurement**
 - **Optical power measurement, attenuation, and switching**

For information on products and firmware updates, please visit:
<https://tmi.yokogawa.com/p/aa2300/>



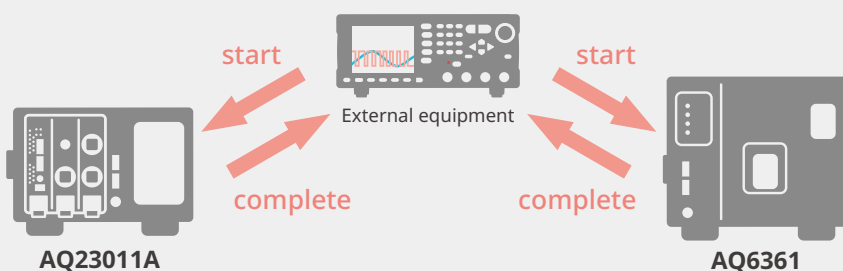
2025



Multi Application Test System AQ2300 Series

Digital I/O Control

The frame's external control interface can be equipped with a Digital I/O interface, which receives operation start signals from external devices and sends operation end signals. Among the various modules, the source measure unit supports this function.



Module Lineup

- Light Source (LS)
- Optical Power Meter (OPM)
- Optical Attenuator (VOA)
- Optical Switch (OSW)
- Source Measure Unit (SMU)

Lineup

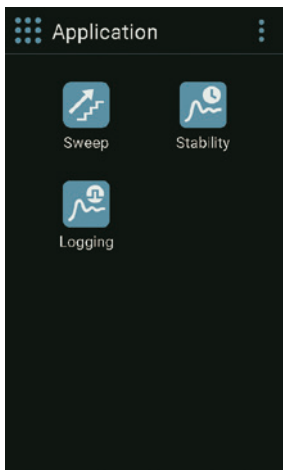
Frame

Various trigger synchronization functions

For source measure units and optical power meters, it is possible to connect a trigger signal from an internal trigger (Timer) within the frame or from external equipment to each channel. Additionally, triggers can be output to other channels when voltage or current settings are completed or during measurement timing.

Useful Applications

- Sweep: Sweep measurement (I-V, I-L)
- Logging: Short-term optical power measurements
- Stability: Long-term optical power measurement (up to 99 days)
- Display of optical connector end-face image (No pass/fail function)
- Web server function (Viewer, etc.)



Application menu



Logging/Stability Graph

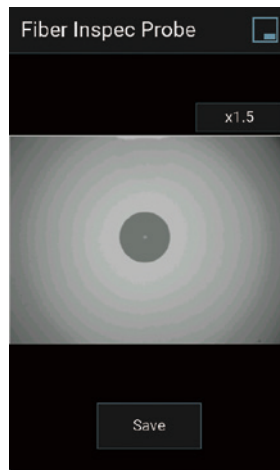
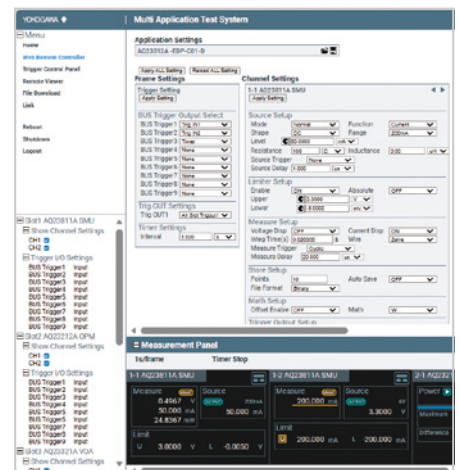


Image of optical connector end face



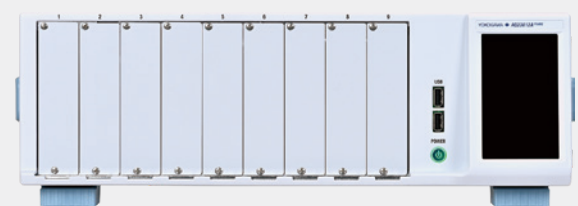
Web server function

AQ23011A/AQ23012A

- Number of slots: 3 or 9 slots
- Remote Interface: Ethernet, USB (Type-C), GP-IB (Optional)
- External interface: Trigger I/O, Trigger I/O 2 or Digital I/O (Available options)
- External storage interface: USB (Type-A)



AQ23011A



AQ23012A

Modules

LS (Light Source)

AQ23111A/AQ23112A

- Number of channels: 1 or 2 channel (1 slot)
- Device type: DFB-LD
- Optical output level: +10 dBm or more
- Center Wavelength: Select from 1310/1550/1625/1650 nm
- Spectral linewidth: 10 MHz (typ.)
- SMSR: 35 dB or more
- Applicable fiber: SMF
- Connector: FC/Angled PC



AQ23191A

- Number of channels: 1 channel (1 slot)
- Device type: ASE
- Optical output level: +16 dBm or more
- Center Wavelength: Select from C-band or C/L-band
- Applicable fiber: SMF
- Connector: FC/PC, SC/PC



OPM (Optical Power Meter)

AQ23211A/AQ23212A

- Number of channels: 1 or 2 channel (1 slot)
- Power range (CW): -90 to +15 dBm
- Wavelength range: 800 to 1700 nm
- Analog output: Approx. 0 to 2 V/Approx. 0 to 5 V
- Uncertainty: $\pm 2.5\%$
- Applicable fiber: SMF, MMF
- Connector: FC, SC, LC, MU
- *Angled PC supported
- *Product AQ23211A only



AQ23221A

- Number of channels: 1 channel (1 slot)
- Power range (CW): -70 to +30 dBm
- Wavelength range: 970 to 1660 nm
- Analog output: Approx. 0 to 2 V/Approx. 0 to 5 V
- Uncertainty: $\pm 3\%$
- Applicable fiber: SMF, MMF
- Connector: FC, SC, LC, MU
- *Angled PC supported



AQ23291A (Optical sensor head)

- Number of channels: 1 channel (1 slot)
- Device type: InGaAs 5 mm diameter
- Power range (CW): -90 to +15 dBm
- Wavelength range: 800 to 1700 nm
- Uncertainty: $\pm 1.8\%$
- Applicable fiber: SMF, MMF
- Connector: FC, SC, LC, MU
- *Angled PC supported
- *To use this product, the AQ23202A (interface module) is required.



AQ23295A (Optical sensor head)

- Number of channels: 1 channel (1 slot)
- Device type : Si, □5.8 mm
- Power range (CW): -90 to +10 dBm
- Wavelength range: 400 to 1100 nm
- Uncertainty: $\pm 2.5\%$
- Applicable fiber: SMF, MMF
- Connector: FC, SC, LC, MU
- *Angled PC supported
- *To use this product, the AQ23202A (interface module) is required.



AQ23202A (Interface module)

- Number of channels: 2 channel (1 slot)
- Analog output: Approx. 0 to 2 V/Approx. 0 to 5 V
- Connector type: BNC, approx. 100 Ω
- Wavelength range: 400 to 1100 nm

*For optical sensor head



VOA (Variable optical attenuator)

AQ23311A (Without optical output monitoring function)

- Number of channels: 1 channel (1 slot)
- Maximum attenuation: 60 dB
- Maximum input power: +23 dBm
- Wavelength range: 1200 to 1700 nm
- Insertion loss: ± 1.0 dB (typ.)
- Applicable fiber: SMF
- Connector: FC/PC, SC/PC
- Monitoring output port (Optional)



AQ23321A (With optical output monitoring function)

- Number of channels: 1 channel (1 slot)
- Maximum attenuation: 60 dB
- Maximum input power: +23 dBm
- Wavelength range: 1200 to 1700 nm
- Insertion loss: ± 1.9 dB (typ.)
- Applicable fiber: SMF
- Connector: FC/PC, SC/PC
- Output monitor accuracy: $\pm 5\%$ or less



AQ23332A (With optical output monitoring function, 2 CH)


- Number of channels: 2 channel (1 slot)
- Maximum attenuation: 40 dB
- Maximum input power: +23 dBm
- Wavelength range: 1260 to 1640 nm
- Insertion loss: ± 1.8 dB (typ.)
- Applicable fiber: SMF
- Connector: FC/PC, FC/Angled PC
- Output monitor accuracy: $\pm 5\%$ or less



OSW (Optical Switch)


AQ23411A/AQ23412A/AQ23413A

- Number of switches: 1
- Port configuration: 1×4, 1×8, 1×16
- Maximum input power: +27 dBm
- Wavelength range: 1260 to 1650 nm
- Insertion loss: ±1.0 dB (typ.)
- Repeatability: ±0.01 dB
- Applicable fiber: SMF
- Connector: FC/PC, SC/PC



AQ23421A/AQ23422A


- Number of switches: 2
- Port configuration: 1×2, 2×2
- Maximum input power: +27 dBm
- Wavelength range: 1260 to 1650 nm
- Insertion loss: ±1.0 dB (typ.)
- Repeatability: ±0.01 dB
- Applicable fiber: SMF
- Connector: FC/PC, SC/PC



SMU (Source Measure Unit)

AQ23811A

- ±6 V/±600 mA, 2 channels (1 slot)
- Voltage accuracy: ±0.02%
- Current accuracy: ±0.03% (Range 20 μA to 200 mA)
- Output waveform: DC, Pulse (50 μs to 1 second)
- Resolution: 100 μV/1 pA
- Sweep: Linear, Logarithmic, Program

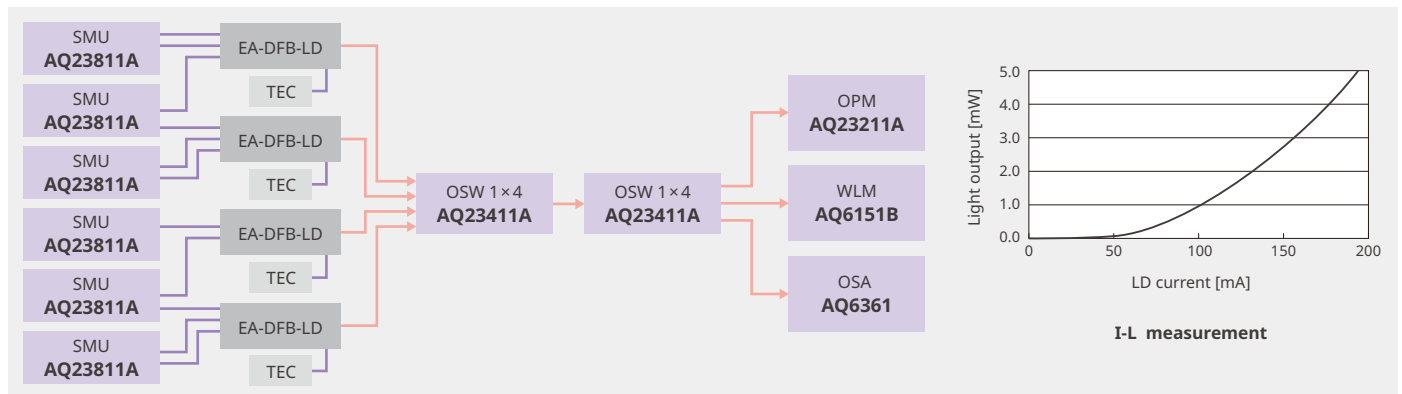


Applications

Static characteristics measurement of laser diode modules and photodiode modules

By synchronizing the source measure unit and optical power meter and utilizing the sweep function, the I-L characteristics of LD modules can be measured.

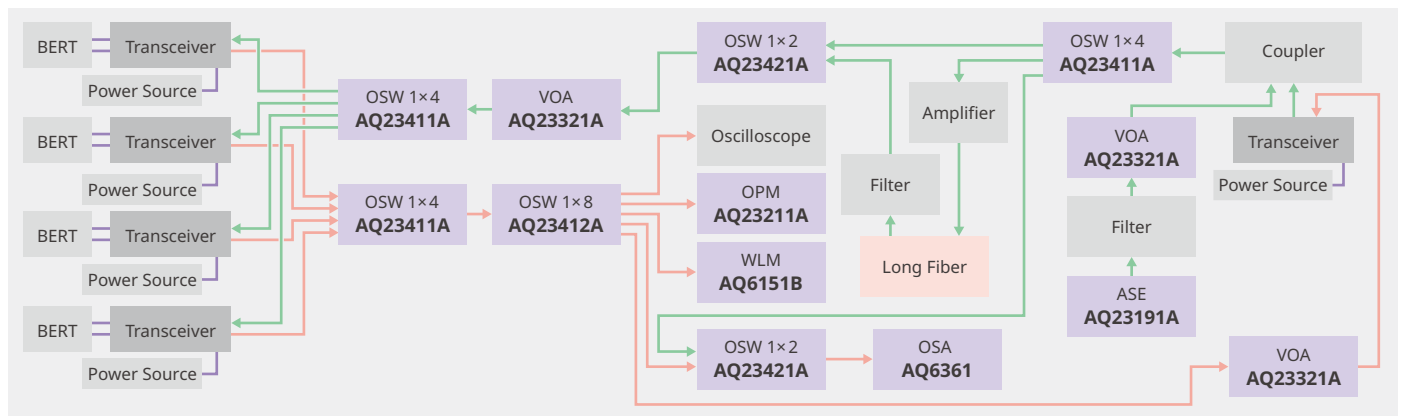
[Measurement items] I-L measurement, DC extinction ratio, PD current, Modulator current, Wavelength, Spectrum



Optical transceiver measurements

Various measurements of optical transceivers can be performed.

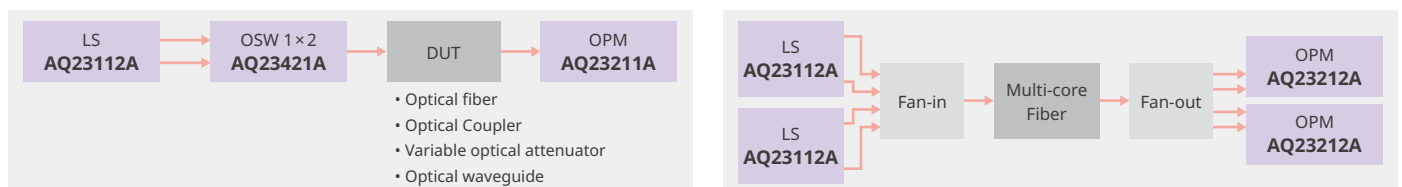
[Measurement items] Optical power, Wavelength, Spectrum, Optical power adjustment, ASE noise loading



Loss measurement of optical passive components

Optical insertion loss of optical fibers, etc. can be measured.

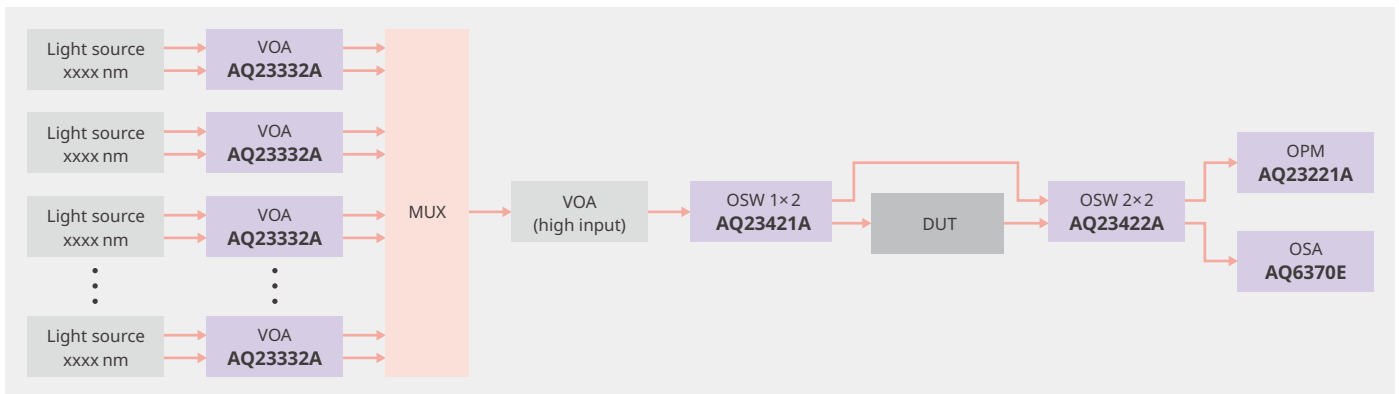
[Measurement items] Optical insertion loss, Crosstalk



Optical Fiber Amplifier Measurements

By using a wavelength-selectable light source, the gain and noise figure in a wavelength-multiplexed state can be obtained.

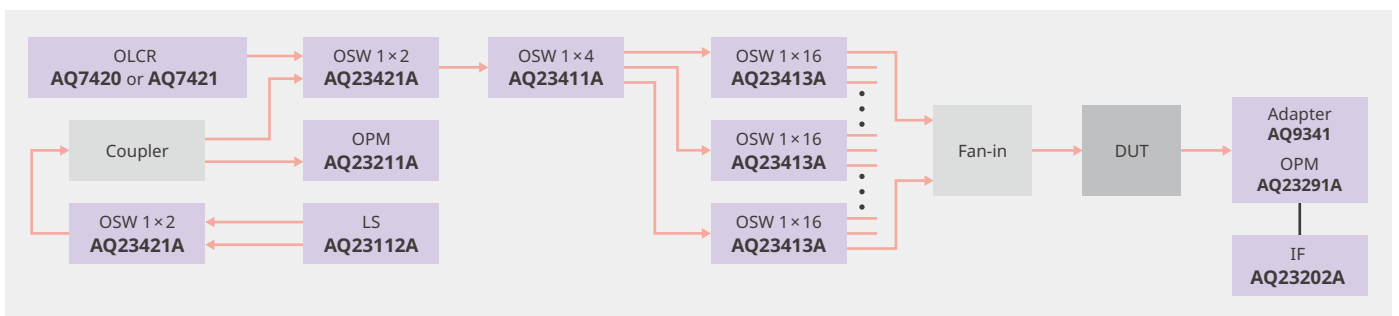
[Measurement items] Gain, Gain flatness, Noise figure, ASE noise



MPO component inspection system

Various measurements of MPO products can be performed in combination with a reflection measurement instrument.

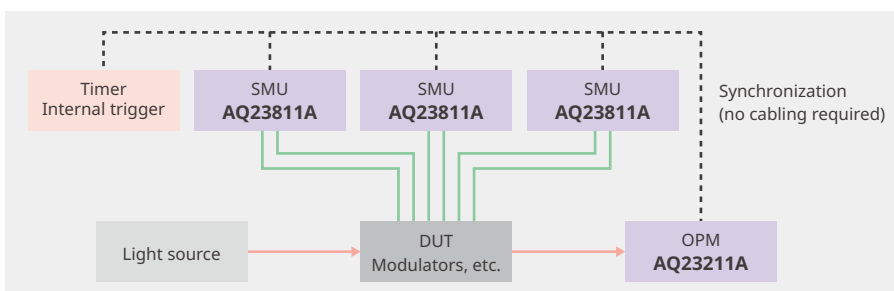
[Measurement items] Insertion loss, Total optical return loss, Partial optical return loss, Micro-crack detection



High-speed sweep testing of multi-power-supply optical devices

It enables high-speed synchronized measurements between an optical power meter and multiple power supplies.

[Measurement items] Searching for optimal voltage or current conditions, Optical power variation



Functions and connection interfaces (Frame)

AQ23011A



AQ23012A



1 Display screen

2 USB ports for peripherals (Type A, 2 ports)
Compatible with data storage devices and keyboards

3 Remote interlock terminal
For safety functions

4 Trigger input terminal, Trigger output terminal

5 Digital I/O terminal

6 Ethernet port (10/100/1000BASE-T)
Used to remotely control the instrument

7 USB port for PCs (Type C)
Used to access the instrument's internal memory or remotely control the instrument from a PC

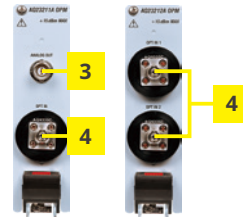
8 GP-IB port (Optional)
Used to remotely control the instrument

Functions and connection interfaces (Modules)

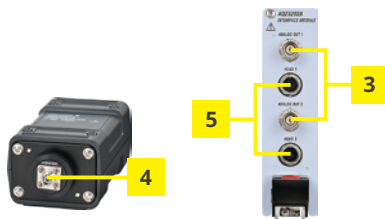
AQ23111A/AQ23112A/AQ23191A



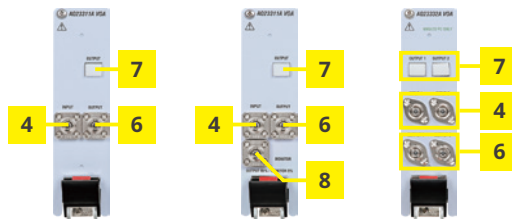
AQ23211A/AQ23212A/AQ23221A



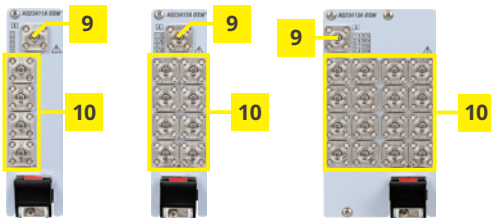
AQ23291A/AQ23295A/AQ23202A



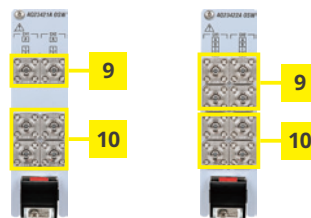
AQ23311A/AQ23321A/AQ23332A



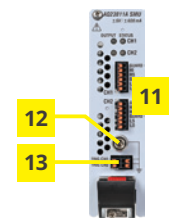
AQ23411A/AQ23412A/AQ23413A



AQ23421A/AQ23422A



AQ23811A



- 1** OUTPUT key
- 2** Laser output
- 3** Analog signal output terminal
- 4** Optical input port
- 5** Optical sensor head connector
- 6** Optical output port
- 7** ENABLE/DISABLE key
*Turns the optical output ON/OFF.
- 8** Optical signal monitor output port (Optional)
- 9** Common port
*The selected port is connected.
- 10** Select port
- 11** Output terminals (CH1, CH2)
*Isolation is provided from the chassis and other channels.
- 12** Functional ground terminal
*Electrically connected to the chassis
- 13** Trigger signal I/O terminal
*The GND terminal is connected to the chassis.

Specification

Frame AQ23011A/AQ23012A

Items		Specifications	
Model		AQ23011A	AQ23012A
Number of slots		3	9
Display		Color LCD (Touchscreen)	
Remote interface	Ethernet	IEEE-802.3 compatible, connector: RJ-45 × 1, Ethernet (1000BASE-T), protocol: TCP/IP, DHCP	
	USB	USB 2.0 (type-C) × 1, protocol: Mass Storage, USB-TMC (Separate driver installation required.)	
	GP-IB ^{*1}	IEEE-488 compatible, protocol: IEEE-488.2 compatible, Factory-installed option	
Interlock function (safety function)		Contact input, connector: BNC	
External storage interface		USB Rev2.0 compatible, connector: USB Type-A × 2, Power supply: 5 V/500 mA	
External control interface ^{*2}	Trigger I/O 1, 2	TTL level (Low active), connector: BNC, Trigger I/O 2: Factory-installed option	
	Digital I/O	CMOS level (5 V/3.3 V) × 8 ports, connector: push-in connection plug × 2, Factory-installed option	
Power requirement		100 to 240 VAC, 50/60 Hz	
Power consumption		170 VA (including modules)	470 VA (including modules)
Withstand voltage (between power supply cases)		1.5 kVAC for 1 minute (Insulation resistance: 500 VDC, >10 MΩ)	
Operating conditions		Ambient temperature: +5 to +40°C, Ambient humidity: 20 to 80%RH (no condensation), Altitude: 2000 m or less	
Storage conditions		Ambient temperature: -20 to +60°C, Ambient humidity: 20 to 80%RH (no condensation), Altitude: 3000 m or less	
Safety standard		EN61010-1, EN IEC 61010-2-030, Overvoltage category (installation category) II, Pollution degree 2	
Emissions		EN61326-1 Class A, EN55011 Class A Group1, EN61000-3-2, EN IEC 61000-3-2, EN61000-3-3	
Immunity		EN61326-1 Table2 (for industrial locations)	
Dimensions (excluding protrusions)		213 (W) × 132 (H) × 420 (D) mm	426 (W) × 132 (H) × 470 (D) mm
Weight		Approx. 6 kg	Approx. 10 kg
Sweep function ^{*3}	Minimum sampling interval	100 μs	
	Maximum number of points	100000 points	
Logging function ^{*4}	Measurement power range	Fixed	
	Minimum sampling interval	100 μs	
	Maximum number of points	1000000 points	
Stability function ^{*4, *5}	Minimum sampling interval	100 ms	
	Maximum number of points	1000000 points	
	Maximum measurement time	99 days	
Other function	Image display	Displays connector end-face images from an optical fiber scope via USB. ^{*6} (No inspection function.)	
	Built-in web server	For PC operation (Ethernet connection, web browser required)	

*1: Factory-installed option (Cannot be retrofitted)

*2: Choice External Trigger I/O 2 or Digital I/O (Cannot be retrofitted)

*3: Functions for the source measurement units and optical power meters

*4: Function for the optical power meters

*5: Functions for the output power monitor of optical attenuator

*6: Operation verified with Lightel DI-1000 and DI-2000

Light Source AQ23111A/AQ23112A

Items	Specifications
Number of channels (Slot widths)	1 or 2 channels (1 slot)
Device type	DFB-LD
Center Wavelength	1310 nm ±5 nm, 1550 nm ±5 nm, 1625 nm ±5 nm, 1650 nm ±5 nm ^{*1, *2, *4}
Optical output level	+10 dBm or more ^{*1, *2, *5}
Output level stability (5 minutes)	±0.005 dB ^{*1, *3, *5}
Spectral linewidth	Narrow: 10 MHz (typ.) ^{*1, *6} , Wide: 100 MHz (typ.)
SMSR	35 dB or more ^{*1, *2, *4}
RIN	-135 dB/Hz (typ.) ^{*1, *2, *4, *6}
Output setting range	6 dB [resolution 0.01 dB (typ.)] ^{*3, *5}
Fiber type	SMF (ITU-T G.652.D)
Optical connector	FC/Angled PC (Narrow-key type)
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm
Weight	AQ23111A: Approx. 0.7 kg, AQ23112A: Approx. 0.8 kg
Laser safety standard class	EN 60825-1: 2014+A11: 2021, IEC 60825-1: 2014, GB/T 7247.1-2024, Class 1

*After 30 minutes warm up.

*The environmental conditions are subject to the specification of frame controller, unless otherwise specified.

*1: At maximum output power

*4: Spectral linewidth: Narrow

*2: Ambient temperature: 23±2°C

*5: Spectral linewidth: Wide

*3: At constant temperature (within ±0.5°C)

*6: Not guaranteed

Laser Safety Information

This laser light source is a Class 1 Laser product as defined by IEC 60825-1: 2014 Safety of Laser Products—Part 1: Equipment Classification and Requirements. In addition, this instrument complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.



Laser class 1 label

Do not look directly into the laser beam. Do not view the laser beam with optical aids or instruments.

Light Source AQ23191A

Items	Specifications	
Model	AQ23191A-CB	AQ2391A-CL
Number of channels (Slot widths)	1 channel (1 slot)	
Device type	ASE	
Wavelength range	C-band: 1530 to 1565 nm	C/L-band: 1530 to 1600 nm
Optical output level	+16 dBm or more*1,*2	
Output level stability	±0.005 dB or less (5 minutes)*1,*2 ±0.03 dB or less (8 hours)*1,*2	
Spectral power density	-9 dBm/nm or more	-14 dBm/nm or more
Fiber type	SMF (ITU-T G.652.D)	
Optical connector	FC/PC or SC/PC	
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm	
Weight	Approx. 0.8 kg	
Laser safety standard class	EN 60825-1: 2014+A11: 2021, IEC 60825-1: 2014, GB/T 7247.1-2024, Class 3R	

*After 30 minutes warm up.

*The environmental conditions are subject to the specification of frame controller, unless otherwise specified.

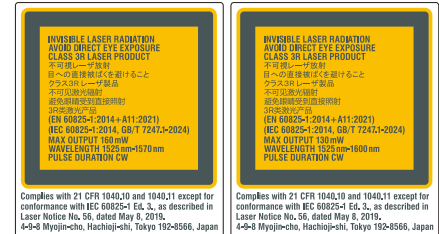
*1: Ambient temperature: 23±2°C *2: At constant temperature (within ±0.5°C)

Laser Safety Information

This laser light source is a Class 3R Laser product as defined by IEC 60825-1: 2014 Safety of Laser Products—Part1: Equipment Classification and Requirements. In addition, this instrument complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Laser class 3R label

Do not look directly into the laser beam.
Do not view the laser beam with optical aids or instruments.



AQ23191A-CB

AQ23191A-CL

Optical Power Meter AQ23211A/AQ23212A/AQ23221A

Items	Specifications		
Model	AQ23211A	AQ23212A	AQ23221A
Number of channels (Slot widths)	1 channel (1 slot)	2 channel (1 slot)	1 channel (1 slot)
Detector type	InGaAs		
Wavelength range	800 to 1700 nm		970 to 1660 nm
Power range (CW)	-90 to +15 dBm*1		-70 to +30 dBm*1
Minimum display resolution	1/10000		
Applicable fiber*3	≤62.5/125 μm (GI), NA ≤0.275, SMF (ITU-T G.652.D)		
Uncertainty under reference conditions	±2.5%*2,*3		±3%*2,*8
Total uncertainty	±5% ±5 pW*2,*4		±5% ±2 nW*2,*9,*10
Polarization dependence	0.02 dBp-p (typ.)*2,*5		0.03 dBp-p (typ.)*2,*11
Linearity	±0.02 dB ±5 pW*2,*6		±0.05 dB ±2 nW*2,*10,*12
Noise level	5 pW or less*7		2 nW or less*13
Averaging time (minimum)	20 μs		
Analog output	Mode	AUTO, LINEAR, LOG	
	Output voltage	Approx. 0 to 2 V/Approx. 0 to 5 V	
	Connector type	BNC connector	
	Output impedance	Approx. 100 ohm	
Optical connector	AQ9335C connector adapter*14		
Calibration cycle	1 year		
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm		
Weight	Approx. 0.6 kg	Approx. 0.7 kg	

*All values in the specifications assume a warm-up period of one hour.

*The environmental conditions are subject to the specification of frame controller.

*1: At 1310 nm

*2: When using the AQ9335C connector adapter and single-mode fiber

*3: Power level: 100 μW (-10 dBm), CW light, wavelength: 1310/1550 ±20 nm, light source spectrum width: 10 nm or less, ambient temperature: 23±1°C, optical fiber: SMF (ITU-T G.652.D), optical connector: FC/PC, wavelength setting error: 0.5 nm or less, changes to the measuring instrument due to the passage of time are not included in these conditions. More than 1 year but less than 2 years since the last calibration: add 0.5%, over 2 years: add 1.0%, averaging: 1 second, polarization dependence is not included.

*4: Power level: 10 mW to 100 nW (-40 dBm to +10 dBm), CW light, wavelength range: 1200 to 1600 nm, optical fiber: SMF (ITU-T G.652.D) [add ±1% if GI 50/125 (ITU-T G.651.1), add ±9% if GI 62.5/125 (IEC 60793-2)], auto range, Other condition are the same as*3s conditions.

*5: Wavelength: 1550 ±30 nm, ambient temperature: 23±1°C, optical fiber: SMF (ITU-T G.652.D), optical connector: FC/PC

*6: Power level: 10 mW to 100 nW (-40 dBm to +10 dBm), CW light, wavelength range: 1200 to 1600 nm, ambient temperature: 23±1°C (constant temperature), optical fiber: SMF (ITU-T G.652.D), auto range, averaging: 1 second

*7: Wavelength: 1200 to 1600 nm, ambient temperature: 23±1°C (constant temperature), averaging: 1 second, within 5 minutes after zero set execution.

*8: Power level: 100 μW (-10 dBm), CW light, wavelength: 1310/1550±20 nm, light source spectrum width: 10 nm or less, ambient temperature: 23±2°C, optical fiber: SM (ITU-T G.652.D), optical connector: FC/PC, wavelength setting error: 0.5 nm or less, changes to the measuring instrument due to the passage of time are not included in these conditions. Add 0.5% for each year since the last calibration

*9: Power level: 1 μW to 1 W (-30 dBm to +30 dBm), CW light, wavelength range: 1260 to 1620 nm, optical fiber: 50 GI, NA 0.2 (add±2% if 62.5 GI, NA 0.275), auto range, averaging: 1 second. Other conditions are the same as*3s conditions

*10: Add 0.001 dB/mW if the input power is greater than 10 mW.

*11: Wavelength: 1550±30 nm, ambient temperature: 23±2°C, optical fiber: SM (ITU-T G.652), optical connector: FC/PC

*12: Power level: 1 μW to 1 W (-30 dBm to +30 dBm), CW light, wavelength range: 1260 to 1620 nm, ambient temperature: 23±2°C (constant temperature), optical fiber: SM (ITU-T G.652), auto range, averaging: 1 second

*13: Wavelength range: 1260 to 1620 nm, ambient temperature: 23±2°C (constant temperature), averaging: 1 second

*14: Select from FC, SC, LC, or MU

Optical Sensor Head AQ23291A/AQ23295A

Items	Specifications	
	AQ23291A	AQ23295A
Number of channels	1 channel	
Detector type	InGaAs 5 mm diameter	Si □ 5.8 mm
Wavelength range	800 to 1700 nm	400 to 1100 nm
Power range (CW)	-90 to +15 dBm ^{*1}	-90 to +10 dBm
Minimum display resolution	1/10000	
Applicable fiber	≤62.5/125 μm (GI), ≤NA0.275	
Uncertainty under reference conditions	±1.8% ^{*2, *3, *5}	±2.5% ^{*2, *4, *5}
Total uncertainty	±5% ±5 pW ^{*2, *6, *8}	±5% ±5 pW ^{*2, *7, *8}
Polarization dependence	0.025 dB (typ.) ^{*2, *9}	—
Linearity	±0.015 dB ±5 pW ^{*2, *10, *12, *13}	±0.04 dB ±5 pW ^{*2, *11, *12, *14}
Noise level	5 pW or less ^{*15}	5 pW or less ^{*16}
Averaging time (minimum)	20 μs	
Optical connector	AQ9335C connector adapter ^{*17}	
Calibration cycle	1 year	
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm	
Weight	Approx. 0.3 kg	

*All values in the specifications assume a warm-up period of one hour.

*The environmental conditions are subject to the specification of frame controller.

*1: At 1310 nm

*2: When the AQ9335C Connector Adapter is used.

*3: Wavelength: 1310/1550±20 nm, optical fiber: SM (ITU-T G.652.D) NA = 0.1, polarization dependence is not included

*4: Wavelength: 850±15 nm, optical fiber: SM (850 nm SMF)

*5: Power level: 100 μW (-10 dBm), CW light, light source spectrum width: 10 nm or less, ambient temperature: 23±2°C, optical connector: FC/PC, averaging: 1 second, wavelength setting error: 0.5 nm or less, changes to the measuring instrument due to the passage of time are not included in these conditions. More than 1 year but less than 2 years since the last calibration: add 0.4%, over 2 years: add 0.8%.

*6: Wavelength: 1000 to 1630 nm, polarization dependence is not included

*7: Wavelength: 500 to 900 nm (900 to 1000 nm: add ±2%)

*8: Power level: 1 nW to 10 mW (-60 dBm to +10 dBm), CW light, light source spectrum width: 10 nm or less, ambient temperature: 23±5°C, optical fiber: GI50 NA0.2 (add ±1% if GI62.5 and NA0.275), optical connector: FC/PC, averaging: 1 second, auto range, wavelength setting error: 0.5 nm or less, changes to the measuring instrument due to the passage of time are not included in these conditions. More than 1 year but less than 2 years since the last calibration: add 0.4%, over 2 years: add 0.8%.

*9: Wavelength: 1550 nm, ambient temperature: 23±2°C, optical fiber: SM (ITU-T G.652.D) NA = 0.1, optical connector: FC/PC

*10: Wavelength: 1000 to 1630 nm, optical fiber: SM (ITU-T G.652) NA = 0.1

*11: Wavelength: 500 to 900 nm, beam condition: SM (850 nm SMF), GI50 NA = 0.2 or GI62.5 NA = 0.275

*12: Power level: 1 nW to 10 mW (-60 dBm to +10 dBm), CW light, ambient temperature: 23±2°C (constant temperature), auto range, averaging: 1 second, optical connector: FC/PC

*13: For free-space light measurement, the power density of the light-detecting surface is 30 mW/mm² or less.

*14: For free-space light measurement, the power density of the light-detecting surface is 5 mW/mm² or less.

*15: Wavelength: 1000 to 1630 nm, ambient temperature: 23±2°C (constant temperature), averaging: 1 second, within 5 minutes after zero set execution

*16: Wavelength: 500 to 900 nm, ambient temperature: 23±2°C (constant temperature), averaging: 1 second, within 5 minutes after zero set execution

*17: Select from FC, SC, LC, or MU (It is also possible to measure free-space light by removing the connector adapter.)

Interface Module AQ23202A

Items		Specifications
Number of channels (Slot widths)		2 channels (1 slot)
Analog output	Mode	AUTO, LINEAR, LOG
	Output voltage	Approx. 0 to 2 V/Approx. 0 to 5 V
	Connector type	BNC connector
	Output impedance	Approx. 100 ohm
Dimensions (excluding protrusions)		106.5 (H) × 31 (W) × 321.5 (D) mm
Weight		Approx. 0.5 kg

Variable Optical Attenuator AQ23311A/AQ23321A/AQ23332A

Items	Specifications		
Model	AQ23311A	AQ23321A	AQ23332A
Number of channels (Slot widths)	1 channel (1 slot)		2 channels (1 slot)
Wavelength range	1200 to 1700 nm		1260 to 1640 nm
Insertion loss	1.0 dB (typ.) ^{*1, *2, *3, *4} 1.6 dB or less ^{*1, *2, *3, *5}	1.9 dB (typ.) ^{*1, *2, *3, *4} 2.3 dB or less ^{*1, *2, *3, *5}	1.8 dB (typ.) ^{*2, *3, *4, *6, *9} 3.0 dB or less ^{*2, *3, *5, *6, *9}
Maximum attenuation	60 dB		40 dB ^{*6}
Attenuation accuracy	±0.1 dB or less ^{*2, *3, *6, *7}		Attenuation 0 to 10 dB: ±0.15 dB (typ.) or less ^{*2, *3, *6, *8, *9, *10} Attenuation 10 to 20 dB: ±0.20 dB (typ.) or less ^{*2, *3, *6, *8, *9, *10} Attenuation 20 to 40 dB: ±0.45 dB (typ.) or less ^{*2, *3, *6, *8, *9, *10}
Attenuation repeatability	±0.01 dB or less ^{*1, *2, *8}		Attenuation 0 to 20 dB: ±0.10 dB (typ.) or less ^{*2, *3, *6, *8, *9, *10, *14} Attenuation 20 to 40 dB: ±0.15 dB (typ.) or less ^{*2, *3, *6, *8, *9, *10, *14}
Display resolution	0.001 dB		0.01 dB
Output monitor accuracy	—	±5% or less ^{*2, *9, *11, *13}	±5% or less (setting range: -50 to +20 dBm) ^{*2, *3, *4, *6, *9, *13}
Optical return loss	45 dB or less ^{*3, *6, *12}		40 dB or less ^{*2, *3, *6, *9}
Polarization dependence	0.08 dBp-p or less ^{*3, *6}	0.1 dBp-p or less ^{*3, *6}	Attenuation 0 to 10 dB: ±0.3 dBp-p or less ^{*2, *3, *6} Attenuation 10 to 20 dB: ±0.4 dBp-p or less ^{*2, *3, *6} Attenuation 20 to 30 dB: ±0.6 dBp-p (typ.) ^{*2, *3, *6}
Maximum input power	+23 dBm		+23 dBm
Shutter isolation	90 dB or more [Operating life: 10 million cycles (typ.)]		70 dB or more [Operating life: 10 million cycles (typ.)]
Attenuation setting speed	—		80 dB/s to 4 dB/s
Applicable optical fiber	SMF (ITU-T G.652.D)		SMF (ITU-T G.652.D)
Monitor port option	Output ratio	-13 dB (typ.) ^{*1, *2, *3}	—
	Insertion loss	2.3 dB or less ^{*1, *2, *3}	
	Polarization dependence	0.1 dBp-p or less ^{*3, *6}	
Optical connector	FC/PC, SC/PC		FC/PC, FC/Angled PC
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm		
Weight	Approx. 0.8 kg	Approx. 0.9 kg	Approx. 0.8 kg

*All values in the specifications assume a warm-up period of one hour. The environmental conditions are subject to the specification of frame controller.

*Unless otherwise noted, all specifications include the connector.

*1: Wavelength: 1310±15 nm, 1550±15 nm

*2: Ambient temperature: 23±2°C (constant temperature)

*3: When using the Yokogawa reference master cord (SMF)

*4: Connectors not included

*5: Connectors are included

*6: Wavelength: 1550±15 nm

*7: 0.15 dB or less if the wavelength is 1310±15 nm

*8: 2 σ

*9: Polarization dependence is not included.

*10: 1 minute after setting the attenuation

*11: Any one wavelength within 1310±15 nm or 1550±15 nm

*12: When using PC connectors (return loss 48 dB or more)

*13: Output power: -10 dBm

*14: Under step operation (0, 10, 20, 30, 40 dB)

Optical Switch AQ23411A/AQ23412A/AQ23413A/AQ23421A/AQ23422A

Items	Specifications				
Model	AQ23411A	AQ23412A	AQ23413A	AQ23412A	AQ23422A
Port configuration	1 × 4	1 × 8	1 × 16	1 × 2	2 × 2
Number of switches (Slot widths)	1 switch (1 slot)		1 switch (2 slot)	2 switches (1 slot)	
Wavelength range	1260 to 1650 nm				
Applicable optical fiber	SMF (ITU-T G.652.D)				
Insertion loss	1.0 dB (typ.) ^{*1, *2, *3, *4} 1.4 dB or less ^{*1, *2, *3, *5}				
Repeatability	±0.01 dB or less ^{*1, *2, *6}				
Crosstalk	-60 dB or less ^{*1, *2, *3}			-50 dB or less ^{*1, *2, *3}	
Optical return loss	45 dB or more ^{*1, *2, *3, *7}				
Maximum input power	+27 dBm				
Polarization dependence	0.08 dBp-p or less ^{*1, *2, *3}			0.08 dBp-p or less ^{*2, *3, *8}	
Optical connector	FC/PC, SC/PC				
Dimensions (excluding protrusions)	106.5 (H) × 31 (W) × 321.5 (D) mm				
Weight	Approx. 0.7 kg	Approx. 0.8 kg	Approx. 1.3 kg	Approx. 0.7 kg	

*All values in the specifications assume a warm-up period of one hour. The environmental conditions are subject to the specification of frame controller.

*Unless otherwise noted, all specifications include the connector.

*1: Wavelength: 1550±15 nm, 1310±15 nm

*2: Ambient temperature: 23±2°C (constant temperature)

*3: When using the Yokogawa reference master cord (SMF)

*4: Connectors not included

*5: Connectors are included

*6: 2 σ

*7: When using PC connectors (return loss 48 dB or more)

*8: Wavelength: 1550±15 nm

Source Measure Unit AQ23811A ($\pm 6\text{ V}/\pm 600\text{ mA}$)

Items	Specifications
Number of channels (Slot widths)	2 channels (1 slot)
Function	Voltage, Current
Output waveform	DC, Pulse (Pulse width: 50 μs to 1 second)
Sweep mode	Linear, Logarithmic, Program (up to 100001 steps)
Voltage sense	2-wire, 4-wire
DC Voltage Source	Range: $\pm 6.0000\text{ V}$, Resolution: 100 μV , Maximum load current: $\pm 600\text{ mA}/\pm 200\text{ mA}^*$
DC Current Source	Range: $\pm 200.000\text{ nA}$ to $\pm 600.00\text{ mA}$, Minimum resolution: 1 pA, Maximum load voltage: $\pm 6\text{ V}/\pm 2\text{ V}^2$
Output Noise (Typical)	20 mVp-p (For 10 Hz to 20 MHz, 6 V Voltage source range, Output liberation)
DC Voltage Measurement ^{*3}	Range: $\pm 6.3000\text{ V}$, Resolution: 100 μV , Accuracy: $\pm 0.02\% + 500\ \mu\text{V}$
DC Current Measurement ^{*3}	Range: $\pm 210.000\text{ nA}$ to $\pm 630.00\text{ mA}$, Minimum resolution: 1 pA, Accuracy: 0.03% + 30 nA (200 μA range)
Response time (Typical)	10 μs (Voltage source mode, 6 V range, Current limiter setting $\pm 600\text{ mA}$, Output open) 15 μs (Current source mode, 600 mA range, Voltage limiter setting $\pm 6\text{ V}$, Output short-circuited)
Calibration cycle	1 year
Dimensions (excluding protrusions), Weight	106.5 (H) \times 31 (W) \times 321.5 (D), 800 g

*1: Sink maximum load currents exceeding $\pm 2\text{ V}$ are allowed up to $\pm 200\text{ mA}$.

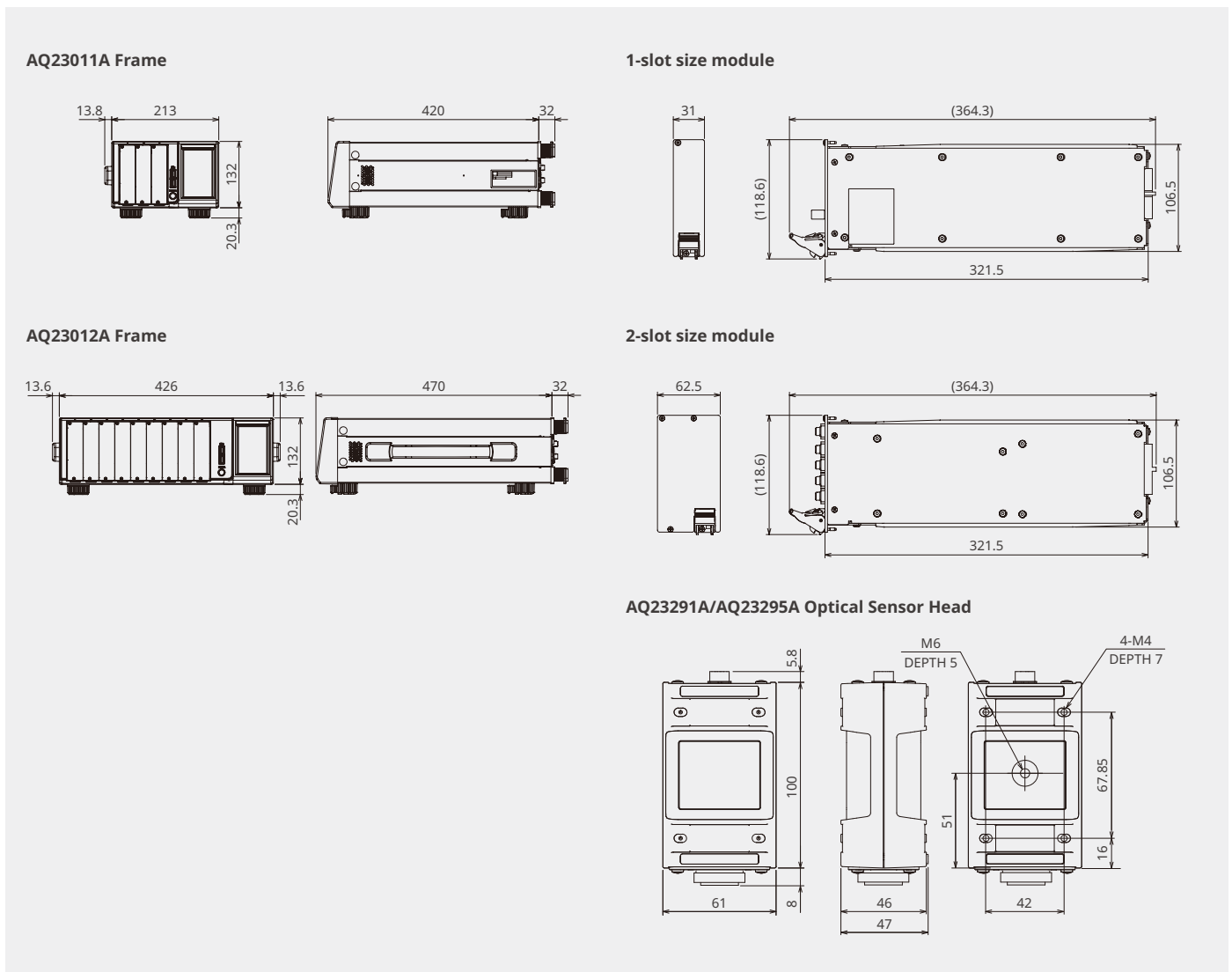
*2: The sink maximum load voltage in the 600 mA range is allowed up to $\pm 2\text{ V}$.

*3: If the integration time is less than 1 PLC, an additional value must be added. Please refer to the manual for details.

Note: For details, please refer to another catalog "AQ2300 Series Source Measure Unit".

External Dimension

Unit: mm



Models and suffix codes

AQ23011A

Model	Suffix Code	Description
AQ23011A		AQ23011A Frame (3 slots)
External interface	-ETP	No Digital I/O, ExtTrigger I/O 2 per port (Not for retrofiting)
	-EDP	Digital I/O 8 ports, ExtTrigger I/O 1 port
GP-IB interface	-N01	No GP-IB interface included (Not for retrofiting)
	-C01	Equipped with GP-IB interface
Power cord	-D	UL/CSA Standard and PSE compliant, 125 V
	-F	VDE/Korean standard, 250 V
	-H	Chinese standard, 250 V
	-N	Brazilian standard, 250 V
	-Q	British standard, 250 V
	-R	Australian standard, 250 V
	-T	Taiwanese standard, 250 V
	-B	Indian standard, 250 V
	-U	IEC plug Type B, 250 V

Accessories: Blank panel × 3

AQ23012A

Model	Suffix Code	Description
AQ23012A		AQ23012A Frame (9 slots)
External interface	-ETP	No Digital I/O, ExtTrigger I/O 2 per port (Not for retrofiting)
	-EDP	Digital I/O 8 ports, ExtTrigger I/O 1 port
GP-IB interface	-N01	No GP-IB interface included (Not for retrofiting)
	-C01	Equipped with GP-IB interface
Power cord	-D	UL/CSA Standard and PSE compliant, 125 V
	-F	VDE/Korean standard, 250 V
	-H	Chinese standard, 250 V
	-N	Brazilian standard, 250 V
	-Q	British standard, 250 V
	-R	Australian standard, 250 V
	-T	Taiwanese standard, 125 V
	-B	Indian standard, 250 V
	-U	IEC plug Type B, 250 V

Accessories: Blank panel × 9

AQ23111A

Model	Suffix Code	Description
AQ23111A		AQ23111A Light Source (1 CH)
Center wavelength, Type	-W31	1310 nm, DFB-LD
	-W55	1550 nm, DFB-LD
	-W62	1625 nm, DFB-LD
	-W65	1650 nm, DFB-LD
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCA	FC/Angled PC connector

AQ23112A

Model	Suffix Code	Description
AQ23112A		AQ23112A Light Source (2 CH)
Center wavelength, Type	-W3131	CH1: 1310 nm, CH2: 1310 nm, DFB-LD
	-W3155	CH1: 1310 nm, CH2: 1550 nm, DFB-LD
	-W3162	CH1: 1310 nm, CH2: 1625 nm, DFB-LD
	-W3165	CH1: 1310 nm, CH2: 1650 nm, DFB-LD
	-W5555	CH1: 1550 nm, CH2: 1550 nm, DFB-LD
	-W5562	CH1: 1550 nm, CH2: 1625 nm, DFB-LD
	-W5565	CH1: 1550 nm, CH2: 1650 nm, DFB-LD
	-W6262	CH1: 1625 nm, CH2: 1625 nm, DFB-LD
	-W6265	CH1: 1625 nm, CH2: 1650 nm, DFB-LD
	-W6565	CH1: 1650 nm, CH2: 1650 nm, DFB-LD
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCA	FC/Angled PC connector

AQ23191A

Model	Suffix Code	Description
AQ23191A		AQ23191A Light Source (1 CH)
Wavelength band, Type	-CB	C band, ASE
	-CL	CL band, ASE
Connector type	-FCC	FC/PC connector
	-SCC	SC/PC connector

AQ23211A/AQ23212A/AQ23221A

Model	Suffix Code	Description
AQ23211A		AQ23211A Optical Power Meter (1 CH)
AQ23212A		AQ23212A Optical Power Meter (2 CH)
AQ23221A		AQ23221A Optical Power Meter (2 CH, High power)
Connector adapter	-FCC	AQ9335C (FC) Connector Adapter (with a light shielding cap)
	-SCC	AQ9335C (SC) Connector Adapter (with a light shielding cap)
	-LCC	AQ9335C (LC) Connector Adapter
	-MUC	AQ9335C (MU) Connector Adapter
	-NCA	No connector adapter

AQ23291A/AQ23295A

Model	Suffix Code	Description
AQ23291A		AQ23291A Optical sensor head (InGaAs, 5 mm dia.)
AQ23295A		AQ23295A Optical sensor head (Si, □5.8 mm)
Connection cable	-L1	Connection cable (1 m)
	-L4	Connection cable (4 m)
Connector adapter	-FCC	AQ9335C (FC) Connector Adapter (with a light shielding cap)
	-SCC	AQ9335C (SC) Connector Adapter (with a light shielding cap)
	-LCC	AQ9335C (LC) Connector Adapter
	-MUC	AQ9335C (MU) Connector Adapter
	-NCA	No connector adapter

AQ23202A

Model	Suffix Code	Description
AQ23202A		AQ23202A Interface module for optical sensor head (2 CH)

AQ23311A

Model	Suffix Code	Description
AQ23311A		AQ23311A Variable optical attenuator (No output monitor)
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCC	FC connector
	-SCC	SC connector
Monitor port	/MP	Monitor output port

AQ23321A

Model	Suffix Code	Description
AQ23321A		AQ23321A Variable optical attenuator (With output monitor)
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCC	FC connector
	-SCC	SC connector

AQ23332A

Model	Suffix Code	Description
AQ23332A		AQ23332A Variable optical attenuator (2 CH, With output monitor)
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCC	FC/PC connector
	-FCA	FC/Angled PC connector

AQ23411A/AQ23412A/AQ23413A

Model	Suffix Code	Description
AQ23411A		AQ23411A Optical switch (1 × 4, Single)
AQ23412A		AQ23412A Optical switch (1 × 8, Single)
AQ23413A		AQ23413A Optical switch (1 × 16, Single)
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCC	FC connector
	-SCC	SC connector

AQ23421A/AQ23422A

Model	Suffix Code	Description
AQ23421A		AQ23421A Optical switch (1 × 2, Dual)
AQ23422A		AQ23422A Optical switch (1 × 2, Dual)
Fiber type	-SMF	Single mode fiber (9/125 μm)
Connector type	-FCC	FC connector
	-SCC	SC connector

AQ23811A

Model	Suffix Code	Description
AQ23811A		AQ23811A Source Measure Unit (±6 V/±600 mA)
Model	-10	Standard model

[Packaging]

Modules are shipped with frames inserted.
(Blank panels are installed in empty slots, and spare panels are included.)
If shipping only the module, up to 3 units can be included.

Accessories

Model	Suffix Code	Description
735186		Blank panel for AQ2300 series frames
735183	-03	Rackmount kit for AQ23011A
	-09	Rackmount kit for AQ23012A
AQ9335C	-FCC	AQ9335C (FC) Connector Adapter (No light shielding cap)*
	-SCC	AQ9335C (SC) Connector Adapter (No light shielding cap)*
	-LCC	AQ9335C (LC) Connector Adapter (With a dust protection cap)
	-MUC	AQ9335C (MU) Connector Adapter (With a dust protection cap)
AQ9340	-12	AQ9340 MPO Connector Adapter (12 or 24-fiber) (IEC-61754-7)
	-16	AQ9340 MPO Connector Adapter (16 or 32-fiber)
AQ9436C		AQ9436C Ribbon fiber Adapter (2, 4, 8, 12-fiber)
AQ9440C		AQ9440C MT Connector Adapter (2, 4, 8, 12, 24-fiber)
M3407GD		NUT (Connector adapter mounting nut)
M3407HA		Light shielding cap (FC)
M3407HB		Light shielding cap (SC)
B8072FF		Light shielding cap (LC, MU)
M3407HD		Dust protection cap (LC)
M3407HE		Dust protection cap (MU)
A3604JQ		Push-in connector (for SMU AQ23811A)
A3606JQ		Push-in connector (for SMU AQ23811A)

*When executes the ZERO-SET of optical sensors, use a light shielding cap (option).

Multi-fiber measurement adapter

MPO Connector Adapter (AQ9340-12)

- Applicable number of fibers: 12 or 24-Fiber
- Applicable fiber: SMF (9.5/125 μm)
MMF (GI, 50/125 μm)
- Applicable sensor: AQ23291A/AQ23295A
- Compatible with both with and without guide pins



MPO Connector Adapter (AQ9340-16)

- Applicable number of fibers: 16 or 32-Fiber
- Applicable fiber: MMF (GI, 50/125 μm)
- Applicable sensor: AQ23295A
- Compatible with both with and without guide pins



Ribbon fiber Adapter (AQ9436C)

- Applicable number of fibers: 2, 4, 8, or 12-Fiber
- Applicable fiber: SMF (9.5/125 μm)
MMF (GI, 50/125 μm)
- Applicable sensor: AQ23291A/AQ23295A
- Supports ribbon fiber holders for fusion splicers



MT Connector Adapter (AQ9440C)

- Applicable number of fibers: 2, 4, 8, 12 or 24-Fiber
- Applicable fiber: SMF (9.5/125 μm)
MMF (GI, 50/125 μm)
- Applicable sensor: AQ23291A/AQ23295A



NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.

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Yokogawa's approach to preserving the global environment

- Yokogawa's electrical products are developed and produced in facilities that have received ISO14001 approval.
- In order to protect the global environment, Yokogawa's electrical products are designed in accordance with Yokogawa's Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment.
Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.

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YOKOGAWA TEST & MEASUREMENT CORPORATION
Global Sales Dept. /E-mail: tm@cs.jp.yokogawa.com

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