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AQ2150 Optical Multimeter

■ Hand-held Design Brings Peak Performance to the Field



Introduction

The AQ2150 Optical Multimeter is designed for use in the field, with small size, light weight and ease of use. Swapping the LD/LED light source units (8 types), sensor units (5 types) and return loss units (2 types) makes it possible to use this handy instrument as an optical power meter, stabilized light source, loss test set or return loss measurement system. With hand-held size and a weight of approx. 450g, you can use it anywhere. And because it does not require an external power supply, it really shines in the field. Select the power source optimum for your needs at the time – AC adapter, AA cells or Ni-Cd battery pack (option).

Features

● Handles a variety of applications

- Optical fiber loss measurement
- Optical component measurement
- Free-space beam power measurement
- Near-end fault localization
- Return loss measurement for optical connectors and components
- High-output measurement

● Switchable LD/LED unit line-up

You can switch between 1310 and 1550nm by touching a button, meaning that you don't have to halt work to exchange plug-in units.

● Compact, lightweight

- Approx. 88(W) x 205(H) x 43(D) mm
- Approx. 450g (base unit with DC pack, sensor unit and LED unit)

● Three power sources

- AC adapter
- Four AA alkaline cells
- AP2104 Ni-Cd Battery Pack (option)

● Long-term battery operative

- Powermeter mode
  Approx. 15 hours (alkaline cells)
  Approx. 20 hours (optional AP2104 Ni-Cd battery pack)
- Loss test mode (LD drive)
  Approx. 10 hours (optional AP2104 Ni-Cd battery pack)

● Fast charging

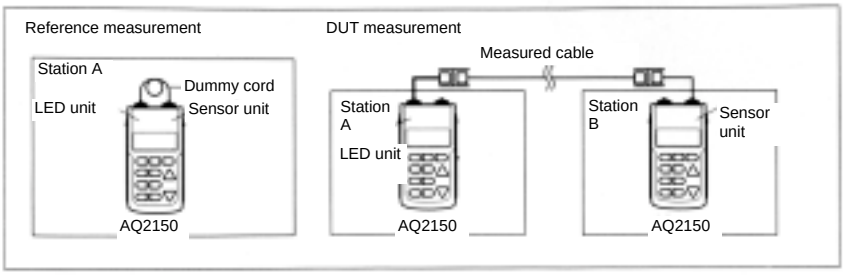
The optional AP2103 Charger can quick-charge your unit in about an hour. All you have to do to get ready for work in the field is plug it in an hour before you leave. Includes overcharging protect function.

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Examples

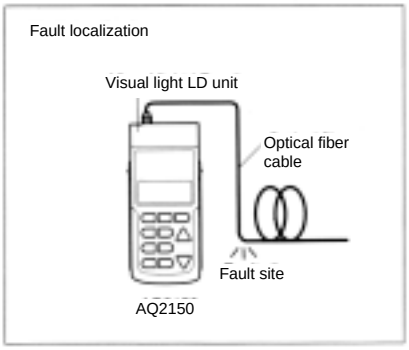
Optical fiber loss measurement

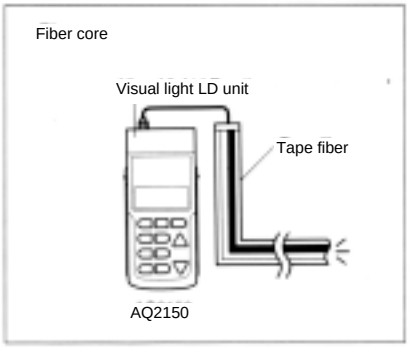
Optical fiber loss measurement requires the light source unit and the sensor unit. Both LED and LD light source units are available in designs with either 1310nm, 1550nm, or both wavelength For long optical fiber cables, please use the AQ4251 (131/155) LD Unit. Because it is switchable there is no need to swap units, and because it handles both wavelength you never have to worry about leaving one unit behind.



Localization of near-end faults

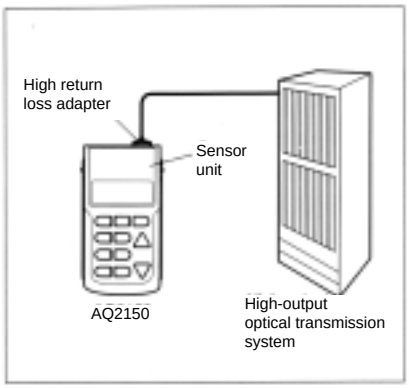
Now it is possible to visually detect near-end faults on short fibers, undetectable with ODTR systems and without using complex He-Ne lasers. This can also be used for a selected fiber within a bundle.





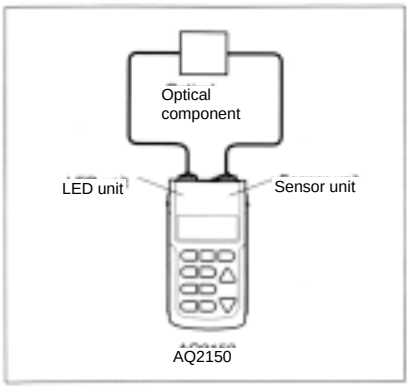
High-output measurement

It is possible to measure up to +21dBm without shut down function for high-output optical transmission system when using high return loss adapter AQ9432 (FC) Connector Adapter for AQ2752/2752B Sensor Unit. When high return loss adapter is used for system with shut down function, low-output is gained before it is connected to connector adapter and after that, it shifts to high-output. It is designed considering much of safety.



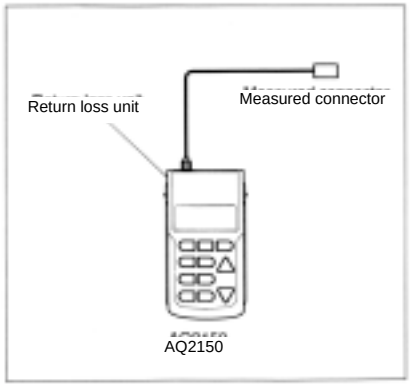
Optical component measurement

Measurement of optical components also requires the light source unit and the sensor unit. With the 1310/1550nm switchable LD unit, loss can be measured up to 60dB.



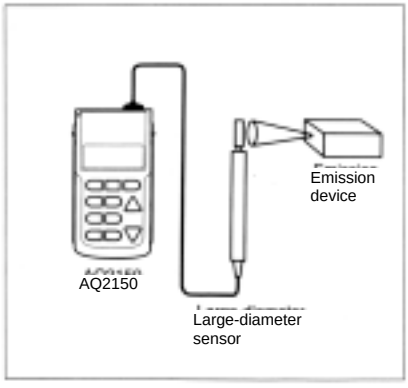
Optical connector and component return loss measurement

The return loss unit has its own internal light source, sensor and coupler, making it possible to easily measure connector reflectivity attenuation.



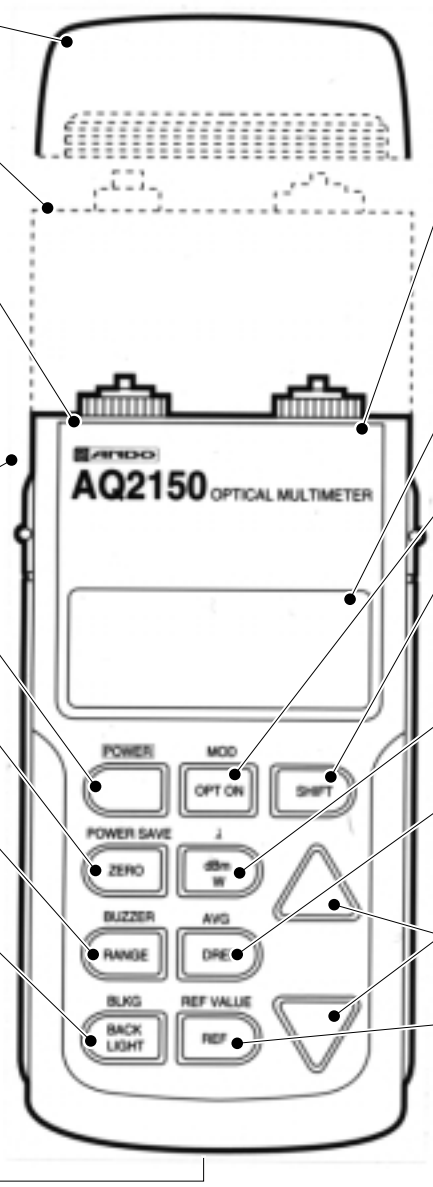
Free-space beam power measurement

When measuring light with a beam spread, such as LD or LED sources, the thin AQ2755 Sensor Unit with its large diameter is optimum. The measurement range is through +20dBm, for even high-output measurements.



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Operation panel



Protective cover

This cover protects the connectors, and can be removed for use. It can be swung back under the base unit.

LD/return loss unit

Four LD units and two return loss units can be used.

LED unit

Four LED units can be used.

Unit release lever

Uses to remove a unit. There is on located on each side of the base unit.

POWER

Turns the unit on and off.

ZERO

Automatically adjusts the zero setting when the sensor is blocked.

RANGE

Toggles the measurement range between automatic and fixed.

BACK LIGHT

Toggles the backlight on the base unit on/off.

Power supply

The DC pack, alkaline cells or Ni-Cd battery pack are mounted on the rear.

Sensor unit

Any of six sensor units can be used. (Note that the AQ4252/7350 sensor units cannot be used.)

Display

Used to display measured values and parameters.

OPT ON

Toggles the light output on/off.

SHIFT

Switches between the measurement mode keys (functions written on the key tops) and the set-up mode keys (written above the key tops). (See below for details on set-up mode.)

dBm W

Toggles the measurement display units between dBm and W.

DREF

Sets the measurement when the key is pressed as the reference, and displays the next value as a relative with respect to the reference.

UP/DOWN

Used to set the wavelength sensitivity correction, REF VALUE, and buzzer.

REF

Displays the measured value as a relative with respect to the preset REF VALUE reference.

●Set-up mode

POWER/SAVE

Selects the power save time.

BUZZER

Sounds the buzzer when the measurement is above a preset threshold.

BLKG

Sets the display resolution for the measured value.

MOD

Toggles between CW light and chopped light.

λ

Used to set the light source unit wavelength and the sensor unit correction wavelength.

AVG

Toggles averaging processing on/off.

REF VALUE

Sets the reference value for display of relative value with REF key.

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Specifications

Base unit

Display	7-segment, 4-digit
Unit display	Absolute: dBm, mW, mW, nW, pW, relative: dB
Calibration factor	Correction of sensor wavelength sensitivity (5nm steps)
Ranges	Automatic or fixed (up/down)
Measurement mode	Selectable to CW light or chopped light (270Hz/1kHz/2kHz)
Optical output waveform	Selectable to CW light or chopped light (270Hz/1kHz/2kHz)
Measurement interval	Approx. 330ms
Averaging	Selectable, sequential average (10/50/100 times), on/off
Display resolution	Selectable, 0.1/0.01dB
Zero set	Automatic zero adjust
Relative measurement	Relative to reference setting value or displayed measurement value
Backlight	Backlight on while key pressed, and for 5s after release
Auto power off	Can be set to automatically shut down after 3 or 10 minutes without key operation, on/off

Battery check	Low-battery display
Buzzer function	Operates when input level exceeds preset user-defined threshold
Resume function	Returns to state existing at power off
Backup function	Backs up settings during battery replacement (about 8 hours)
Analog output	0 to approx. +2V (for each range)
Power supply	AC adapter, dry cells (AA cells), Ni-Cd battery (option), approx. 1VA
Environmental conditions	Operating temperature 0 to +50˚C, storage temperature -25 to +70˚C, humidity 85% max.
Dimensions and mass	Approx. 88(W) x 205(H) x 43(D) mm, approx. 450g (with DC pack, sensor unit and LED unit)
	Approx. 88(W) x 265(H) x 43(D) mm, approx. 650g (with dry cell battery pack and LD unit)
Accessories	DC pack, dry cell battery pack, AC adapter, analog output adapter, power cord (for AC adapter), instruction manual

Sensor unit

Model		AQ2750	AQ2751	AQ2752/2752B [1]	AQ2753	AQ2755	AQ2756
Unit name		Sensor Unit	Sensor Unit	Sensor Unit	Sensor Unit	Sensor Unit	Sensor Unit
Wavelength range		400 to 1100nm	750 to 1800nm	750 to 1700nm	750 to 1800nm	400 to 1100nm	
Reference wavelength		850nm	1310nm			850nm	
Photodetector		Si ☐ 5.8mm	Ge ϕ 5mm	InGaAs ϕ 1mm	Ge ϕ 1mm	Si ϕ 18mm	Si ☐ 10mm
Applications		Large-diameter fiber, free-space beam [2]		Small-diameter silica fiber emission [3]		Free-space beam	Large-diameter fiber, free-space beam [4]
Input type		Photodiode direct [5]		AQ9431(*) Connector Adapter: option [6]		Photodiode direct	Photodiode direct [7]
Power range	CW light	-80 to +10dBm, (10pW to 10mW)	-50 to +10dBm, (10nW to 10mW)	-80 to +10dBm, (10pW to 10mW)	-70 to +10dBm, (100pW to 10mW)	-50 to +20dBm, (10nW to 100mW)	-60 to +10dBm, (1nW to 10mW)
	Chopped light	-80 to +7dBm, (10pW to 5mW)	-60 to +7dBm, (1nW to 5mW)	-80 to +7dBm, (10pW to 5mW) [8]	-70 to +7dBm, (100pW to 5mW)	-50 to +17dBm, (10nW to 50mW)	-60 to +7dBm, (1nW to 5mW)
Noise level	CW light	-70dBm	-40dBm	-70dBm	-60dBm [9]	-40dBm	-50dBm [9]
	Chopped light	-75dBm	-50dBm	-75dBm [8]	-63dBm [9]	-45dBm	-55dBm [9]
Accuracy		± 5% (-20dBm) [10]					

Notes
1) Select AQ2752 or 2752B in accordance with modulation frequency caused in case of installation, etc. AQ2752: CW, 270Hz, 1kHz, 2kHz or 100MHz or more. AQ2752B: CW, or 10kHz or more. Can also be used with AQ9432(*) Connector Adapter (option). Please refer to order information for details.
2) Applicable optical fiber core diameter ≦200μm, NA≦0.44. 3) Applicable optical fiber core diameter ≦62.5μm, NA≦0.275. 4) Applicable optical fiber core diameter≦0.4mm, NA≦0.5.
5) Can also be used with AQ9431(*) Connector Adapter. (*: Specify FC, SC, ST, DIN or HMS-10/A connector.)
6) * Specify FC, SC, ST, DIN or HMS-10/A connector. For information on other connectors, please consult your vendor or our sales offices.
7) Can also be used with AQ9317(*) Connector Adapter. *: connector type. FC standard. For information on other connectors, please consult your vendor or our sales offices.
8) Exclusively applicable to AQ2752. 9) At 0 to +40˚C. 10) Ta=23˚C, CW light, At reference wavelength.

Light source unit (LED)

Model		AQ4250 (085)	AQ4250 (131)	AQ4250 (155)	AQ4250 (131/155)
Unit name		LED Unit	LED Unit	LED Unit	LED Unit
Emission device		LED			
Center wavelength		850 ± 30nm [1]	1310 ± 30nm [1]	1550 ± 35nm [1]	1310/1550 ± 35nm [1]
Applicable fiber		GI (50/125mm)	GI (50/125mm) / SM (10/125mm)	SM (10/125mm)	
Spectral halfwidth [2]		60nm or less	140nm or less	200nm or less	140nm or less (1310nm), 200nm or less (1550nm)
Optical output level [3]	GI	-15dBm or more	-25dBm or more	—	
	SM	—	-40dBm or more	-43dBm or more	-42dBm or more (1310nm), -45dBm or more (1550nm)
Optical output level stability	Temperature stability	0.3dB or less [4]		0.3dBm or less [5]	
	Time stability	± 0.02dB or less [6]			
Optical connector		AQ9433(*) Connector Adapter: option [7]			

Notes
1) Ta=23˚C, CW light. 2) Spectral halfwidth indicated as FWHM. 3) CW light. 4) 0 to 50˚C (8 hours). 5) 0 to 40˚C (8 hours).
6) Constant temperature, 5 minutes (one point between 20 and 30˚C). 7) * Specify FC, SC, ST, DIN or HMS-10/A connector. For information on other connectors, please consult your vendor or the manufacturer.

Light source unit (LD)

Model		AQ4251 (131)	AQ4251 (155)	AQ4251 (131/155)
Unit name		LD Unit	LD Unit	LD Unit
Emission device		LD		
Center wavelength		1310 ± 20nm [1]	1550 ± 20nm [1]	1310 / 1550 ± 20nm [1]
Applicable fiber		SM (10/125mm)		
Spectral halfwidth [2]		5nm or less	10nm or less	5nm or less (1310nm), 10nm or less (1550nm)
Optical output level [3]	GI	—		
	SM	-6dBm or more		-7dBm or more
Optical output level stability	Temperature stability	1.0dB or less [4]		1.0dB or less [5]
	Time stability	± 0.05dB or less [6]		
Optical connector		AQ9434(*) Universal Adapter: option [7]		

Notes
1) Ta=23˚C, CW light. 2) Spectral halfwidth indicated as RMS (2σ, -20dB), Ta =23˚C, CWlight 3) CW light. 4) 0 to 50˚C (8 hours). 5) 0 to 40˚C (8 hours).
6) Constant temperature, 5 minutes (one point between 20 and 30˚C). 7) * Specify FC, SC, ST, DIN or HMS-10/A connector. For information on other connectors, please consult your vendor or the manufacturer.

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Light source unit (visible light LD)

Model		AQ4252 (063)
Unit name		Visible Light LD Unit
Emission device		LD
Wavelength		635 ± 10nm [1]
Applicable fiber		SM (10/125μm)
Spectral width [2]		10nm or less
Optical output level [3]	GI	—
	SM	-3 ± 1.5dBm
Optical connector		AQ9434(*) Universal Adapter: option [4]

Notes
1) Ta=23˚C, CW light.
2) Spectral halfwidth indicated as RMS (2*, -20dB). Ta=23˚C, CW light. 3) CW light.
4) * Specify FC, SC, ST, DIN or HMS-10/A connector. For information on other connectors, please consult your vendor or the manufacturer.
5) Sensor unit cannot be mounted.

Return loss unit

Model	AQ7350 (131)	AQ7350 (155)
Unit name	Return Loss Unit	Return Loss Unit
Wavelength	1310 ± 20nm [1]	1550 ± 20nm [1]
Dynamic range	40dB [2]	
Relative measurement accuracy	± 0.5dB or less (0 to 40dB) [3]	
Self-reflective attenuation	65dB or more [4]	
Applicable fiber	SM (10/125μm)	
Optical connector	AQ9434(*) Universal Adapter: option [5]	

Notes
1) Ta=23˚C.
2) Atmospheric standard, with Super-PC master connector connected to output terminal.
3) Reference reflectivity used as absolute for accuracy, including effects of self-reflective attenuation.
4) Excluding output connector reflectivity. Splitter/coupler directivity.
5) * Specify FC, SC, ST, DIN or HMS-10/A connector. For information on other connectors, please consult your vendor or the manufacturer.
6) Sensor unit cannot be mounted.

Order information

Model & product name	Notes
AQ2150 Optical Multimeter	
AQ2750 Sensor Unit	Can be used with AQ9431(*) Connector Adapter (option) (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ2751 Sensor Unit	
AQ2752/2752B Sensor Unit	Select AQ9431 (*) Connector Adapter (option) (*: Specify FC, SC, ST, DIN or HMS-10/A connector) Can be used with AQ9432 (*) Connector Adapter (option). Use for measurement which requires high output and high return loss. Capable of high output measurement up to +21dBm without operating shutdown function of system with EDFA.(*: FC, SC)
AQ2752/2752B Sensor Unit Option 01	Use with AQ9432 (*) Connector Adapter (*: FC, SC) (Cannot be removed. The power is calibrated at the factory.)
AQ2753 Sensor Unit	Select AQ9431 (*) Connector Adapter (option) (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ2755 Sensor unit	
AQ2756 Sensor Unit	Can be used with AQ9317 (*) Connector Adapter (option) (*: FC standard)
AQ4250(085) LED Unit	Select AQ9433(*) Connector Adapter (option) (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ4250(131) LED Unit	
AQ4250(155) LED Unit	
AQ4250(131/155) LED Unit	
AQ4251(131) LD Unit	Select AQ9434(*) Universal Adapter (option) (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ4251(155) LD Unit	
AQ4251(131/155) LD Unit	
AQ4252(063) Visible Light LD Unit	
AQ7350(131) Return Loss Unit	
AQ7350(155) Return Loss Unit	

Model & product name	Notes
AQ9302(*) Bare Fiber Adapter	An adapter to convert optical fiber core cord to optical fiber with plug. Easy connection to AQ9431 Sensor with connector adapter. ( ): cord diameter. For information on cord diameters, please consult your vendor or our sales offices.
AQ9431(*) Connector adapter	For sensor unit (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ9432(*) Connector Adapter	High-return loss adapter for AQ2752/2752B Sensor Unit (*: FC, SC) Return loss: 40dB or more, internal return loss board with 13dB Applicable fiber: SM (1.31μm, 1.55μm)
AQ9433(*) Connector Adapter	For LED light source unit (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ9434(*) Universal Adapter	For LD light source unit and return loss unit (*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AP2103B Charger	
AP2104 Ni-Cd Battery Pack	Requires the AP2103 Charger
AQ2008 Sensor Cable	Extension cable
AZ8115 Soft Case	Storage: Base unit (with sensor unit and LED light source unit mounted), sensor unit, light source unit, accessories (free storage) Dimensions: approx. 280(W) x 210(H) x 175(D) mm
AZ8116 Carrying Case	Storage: Base unit (with sensor unit and LED light source unit mounted), LD light source unit (or return loss unit), six connector adapters, two DC packs (or dry cell pack, Ni-Cd battery pack), AP2103 Charger, AC adapter (or base unit), cord (for AC adapter), instruction manual, fiber Dimensions: approx. 480(W) x 155(H) x 350(D) mm



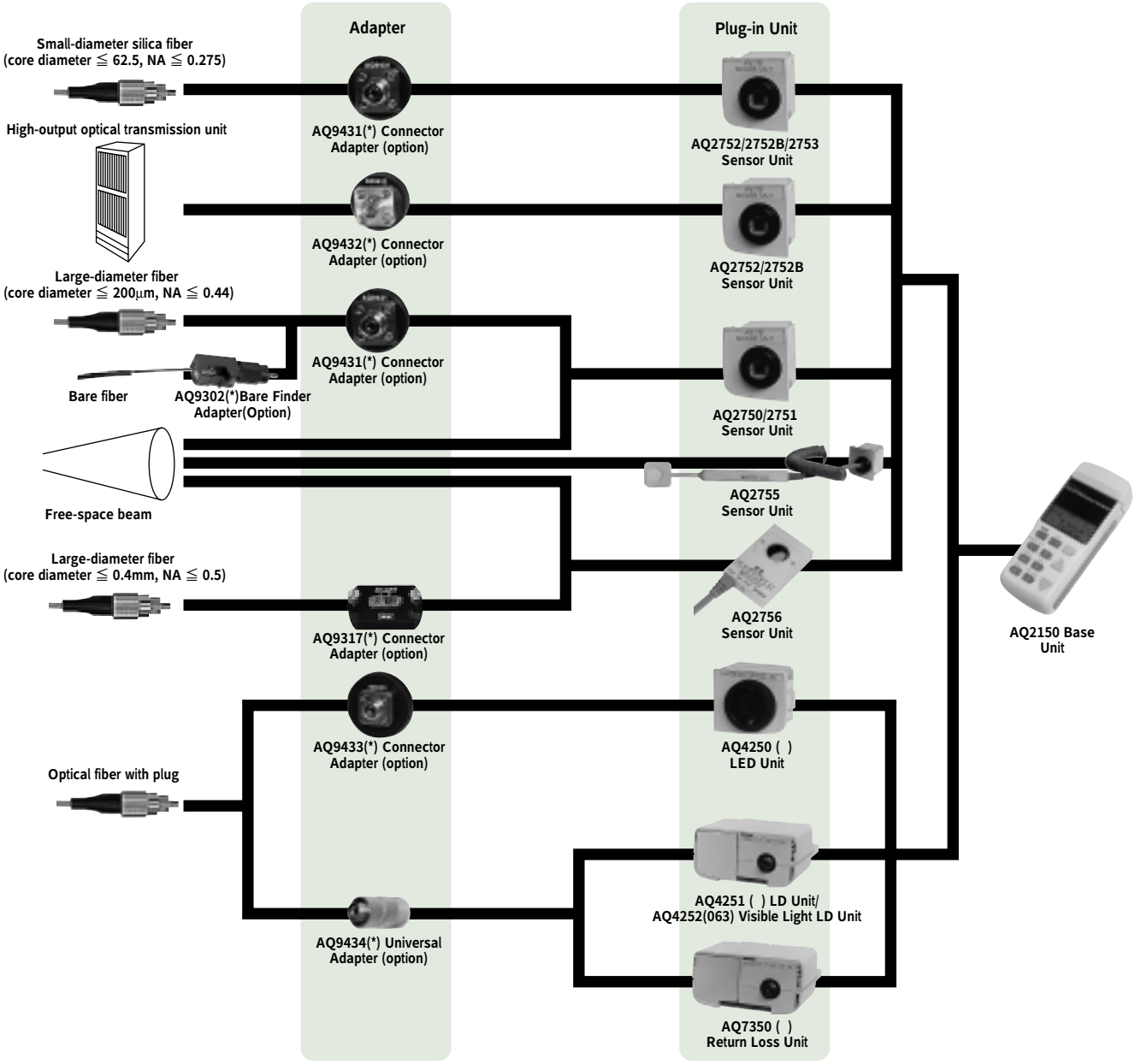
AP2103B



AZ8115

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Configuration examples



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