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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

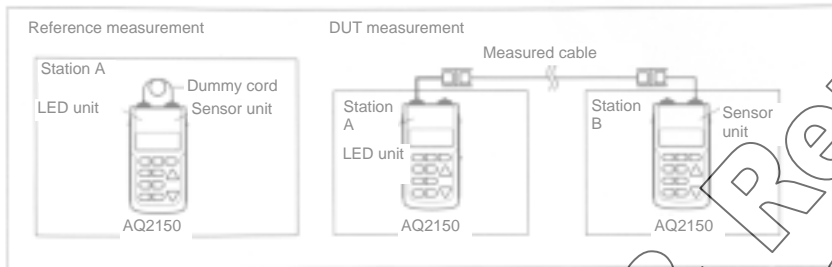
The optional AP2103 Charger can quick-charge your unit in about an hour. All you have to do to get ready for work in the field is plug it in an hour before you leave. Includes overcharging protect function.

## Examples

### Optical fiber loss measurement

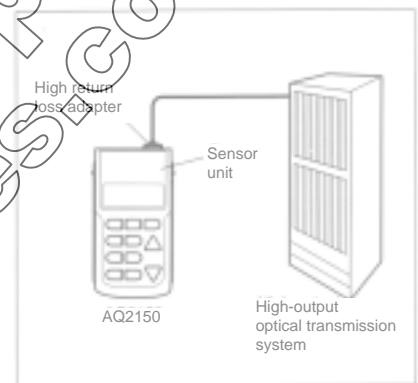
Optical fiber loss measurement requires the light source unit and the sensor unit. Both LED and LD light source units are available in designs with either 1310nm, 1550nm, or both wavelength For long optical fiber cables,

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.



### High-output measurement

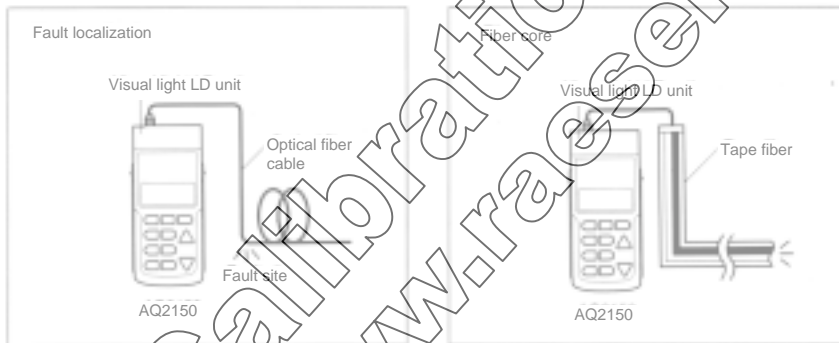
It is possible to measure up to +21dBm without shut down function for high-output optical transmission system when using high return loss adapter AQ9432 (FC) Connector Adapter for AQ2752/2752B Sensor Unit. When high return loss adapter is used for system with shut down function, low-output is gained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



### 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.



### Optical component measurement

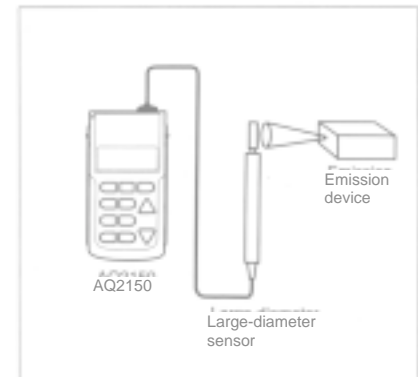
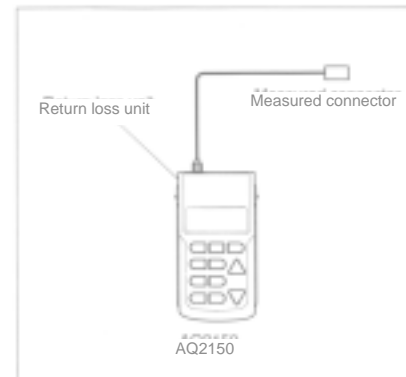
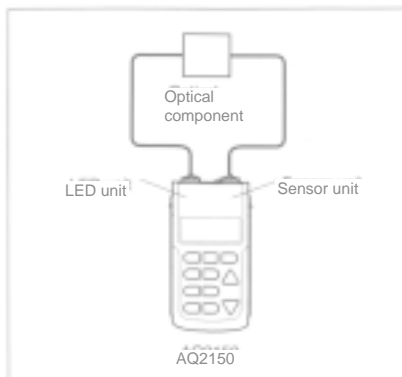
Measurement of optical components also requires the light source unit and the sensor unit. With the 1310/1550nm switchable LD unit, loss can be measured up to 60dB.

### Optical connector and component return loss measurement

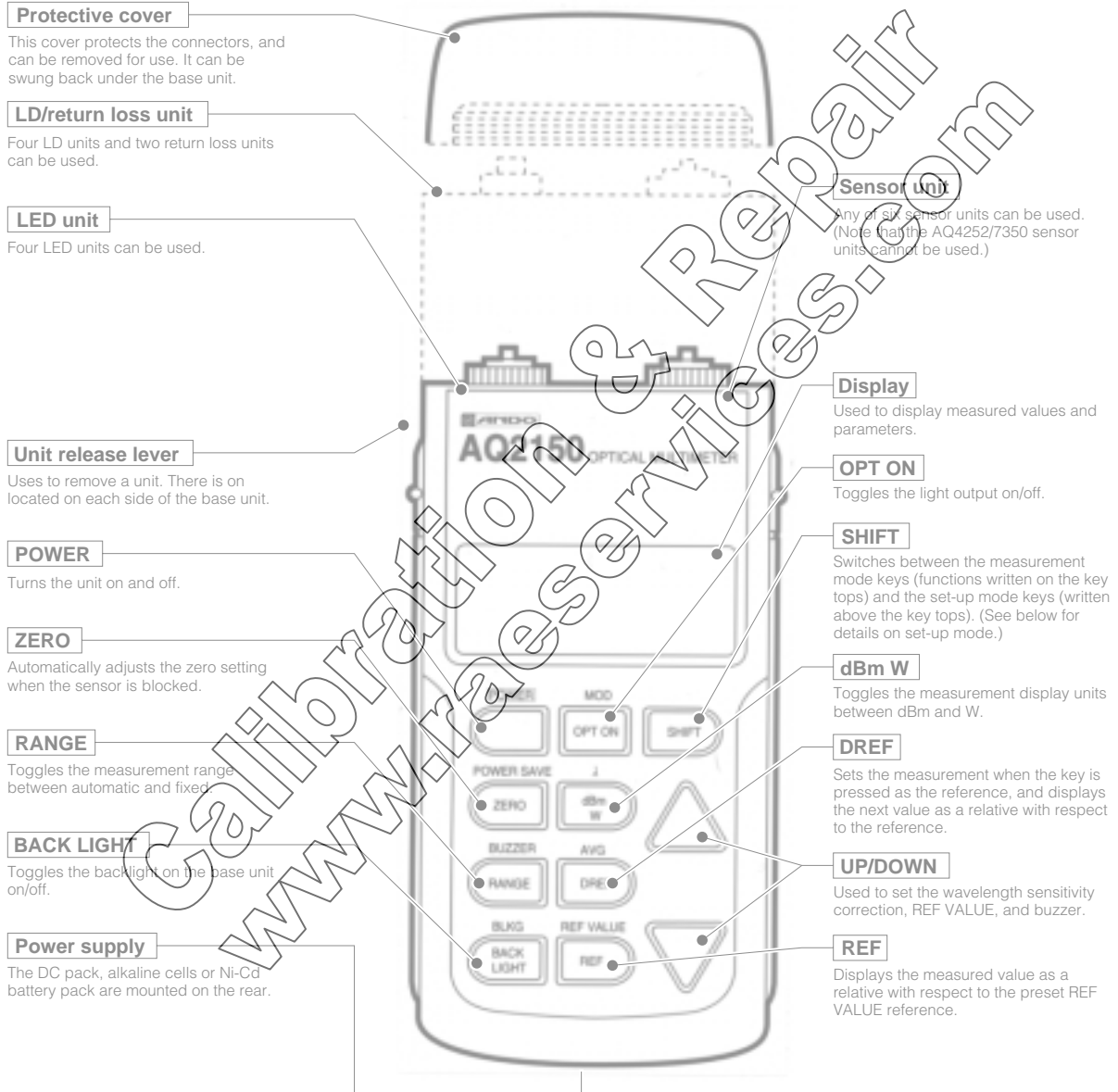
The return loss unit has its own internal light source, sensor and coupler, making it possible to easily measure connector reflectivity attenuation.

### 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.



## Operation panel



### 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.

## 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. +5V (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 42(D) mm, approx. 450g (with DC pack, sensor unit and LED unit) Approx. 88(W) x 265(H) x 42(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 <sup>1)</sup>	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 φ5mm	InGaAs φ1mm	Ge φ5mm	Si φ18mm	Si 10mm
Applications	Large-diameter fiber, free-space beam <sup>2)</sup>		Small-diameter silica fiber emission <sup>3)</sup>		Free-space beam	Large-diameter fiber, free-space beam <sup>4)</sup>
Input type	Photodiode direct <sup>5)</sup>					
Power range	AQ9431(*) Connector Adapter: option <sup>6)</sup>					
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) <sup>9)</sup>	-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 <sup>9)</sup>	-40dBm	-50dBm <sup>9)</sup>
Chopped light	-75dBm	-50dBm	-75dBm <sup>9)</sup>	-63dBm <sup>9)</sup>	-45dBm	-55dBm <sup>9)</sup>
Accuracy	±0.5% (-20dBm) <sup>10)</sup>					

#### 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 AQ9431(\*) Connector Adapter (option). Please refer to order information for details.
- 2) Applicable optical fiber core diameter 200μm, NA 0.22. 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 (\* Specify connector type, FC standard). For information on other connectors, please consult your vendor or our sales offices.
- 8) Exclusively applicable to AQ2752. 9) Ta=23°C. 10) Ta=23°C, CW light, at reference wavelength.

### Light source unit (LED)

Model	AQ4250 (131)	AQ4250 (131)	AQ4250 (155)	AQ4250 (131/155)
Unit name	LED Unit	LED Unit	LED Unit	LED Unit
Emission device	LED			
Center wavelength	1310 ± 30nm <sup>1)</sup>	1310 ± 30nm <sup>1)</sup>	1550 ± 35nm <sup>1)</sup>	1310/1550 ± 35nm <sup>1)</sup>
Applicable fiber	GI (50/125mm)	GI (50/125mm) / SM (10/125mm)	SM (10/125mm)	SM (10/125mm)
Spectral halfwidth <sup>2)</sup>	5nm or less	140nm or less	200nm or less	140nm or less (1310nm), 200nm or less (1550nm)
Optical output level <sup>3)</sup>	GI SM	-12dBm or more -40dBm or more	-43dBm or more	-42dBm or more (1310nm), -45dBm or more (1550nm)
Optical output level stability	Temperature stability Time stability	0.3dB or less <sup>4)</sup>	±0.02dB or less <sup>5)</sup>	0.3dB or less <sup>5)</sup>
Optical connector	AQ9433(*) Connector Adapter: option <sup>7)</sup>			

#### 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 <sup>1)</sup>	1550 ± 20nm <sup>1)</sup>	1310 / 1550 ± 20nm <sup>1)</sup>
Applicable fiber	SM (10/125mm)		
Spectral halfwidth <sup>2)</sup>	5nm or less	10nm or less	5nm or less (1310nm), 10nm or less (1550nm)
Optical output level <sup>3)</sup>	GI SM	-6dBm or more	-7dBm or more
Optical output level stability	Temperature stability Time stability	1.0dB or less <sup>4)</sup>	1.0dB or less <sup>5)</sup>
Optical connector	AQ9434(*) Universal Adapter: option <sup>7)</sup>		

#### Notes

- 1) Ta=23°C, CW light. 2) Spectral halfwidth indicated as RMS (2σ, -20dB), Ta=23°C, CW light. 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 (visible light LD)

Model	AQ4252 (063)	
Unit name	Visible Light LD Unit	
Emission device	LD	
Wavelength	635 ± 10nm <sup>1)</sup>	
Applicable fiber	SM (10/125µm)	
Spectral width <sup>2)</sup>	10nm or less	
Optical output level <sup>3)</sup>	GI	—
	SM	-3 ± 1.5dBm
Optical connector	AQ9434(*) Universal Adapter: option <sup>5)</sup>	

**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 <sup>1)</sup>	1550 ± 20nm <sup>1)</sup>
Dynamic range	40dB <sup>2)</sup>	
Relative measurement accuracy	±0.5dB or less (0 to 40dB) <sup>3)</sup>	
Self-reflective attenuation	65dB or more <sup>4)</sup>	
Applicable fiber	SM (10/125µm)	
Optical connector	AQ9434(*) Universal Adapter: option <sup>5)</sup>	

**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 AQ9431(*) Connector Adapter (option) (*: FC standard)
AQ4250(085) LED Unit	
AQ4250(131) LED Unit	Select AQ9431(*) Connector Adapter (option)
AQ4250(155) LED Unit	(*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ4250(131/155) LED Unit	
AQ4251(131) LD Unit	
AQ4251(155) LD Unit	
AQ4251(131/155) LD Unit	Select AQ9434(*) Universal Adapter (option)
AQ4252(063) Visible Light LD Unit	(*: Specify FC, SC, ST, DIN or HMS-10/A connector)
AQ7350(131) Return Loss Unit	
AQ7350(155) Return Loss Unit	

Model & product name	Notes
AQ9432(*) 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

## Configuration examples

