

**Perfect for use in R&D and production lines of next-generation optical discs and for evaluation of blue-violet and high-power lasers**



- A wide selection of optical sensors for different use
  - Three-wavelength optical sensors covering 405/650/780nm
  - Blue-violet optical sensors for 405nm laser measurement
  - High-power optical sensors for high-power laser measurement
  - Low-price general-purpose optical sensors
  - Both thin type and cylindrical type available
- Optical power calibration wavelengths: 405/650/780nm
- 5½-digit display and 0.001dB resolution
- USB interface

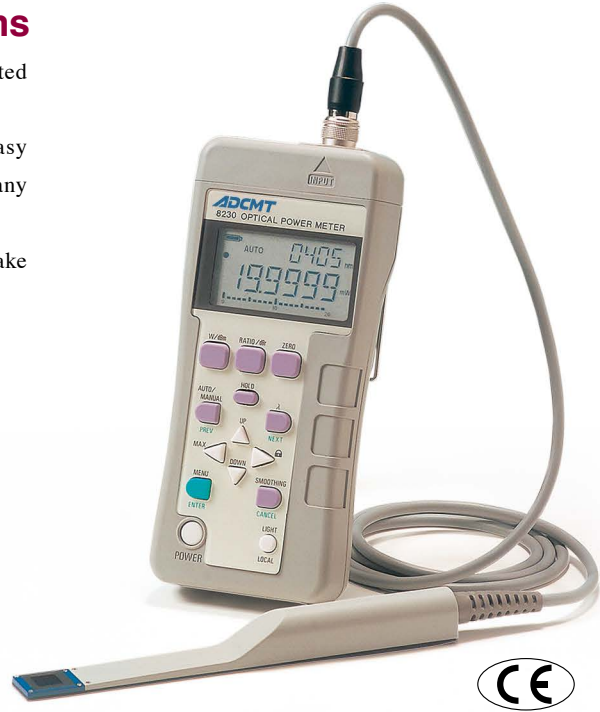
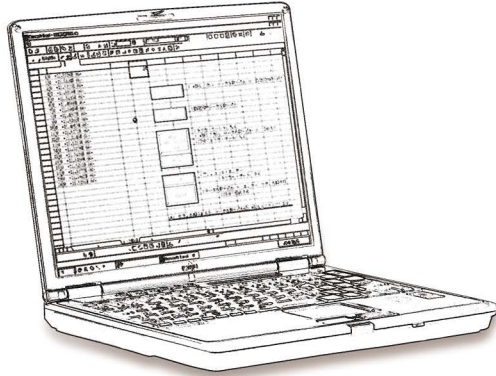


## ■ Ideal for Making Automated Systems

The 8230 is an optical power meter optimal for building up automated production lines of Blu-ray Disc, DVD, CD and other optical pickups.

It is equipped with a USB interface as standard, which allows easy establishment of automated systems at a low price without adding any external unit.

In addition, the latest USB driver is available from our website to make your operation easier.



## ■ Nine Types of Optical Sensors to Meet Various Applications

### ● Blue-violet sensors to measure lasers of Blu-ray Disc

To measure blue-violet lasers precisely, the 82312 and 82322 blue-violet sensors have realized a maximally flat wavelength sensitivity characteristic. This saves time in performing sensitivity correction at each measurement and always offers high-accuracy measurement results.

## 405nm (Blu-ray)

### ● Three-wavelength sensors to measure lasers with different wavelengths

The 82314A, 82324A and 82314W sensors are capable of measuring all lasers of 405nm wavelength for Blu-ray Disc, 650 nm wavelength for DVD and 780nm wavelength for CD. In the range from 400 to 420nm wavelengths in particular, sensitivity correction is unnecessary because of the flat wavelength sensitivity characteristic. In other wavelength ranges, the wavelength sensitivity values stored in the sensor help easy operation.

## 405nm 650nm 780nm

### ● High-power sensors to measure high-power lasers for write

The power output of a laser disc for write such as CD-RW exceeds 100mW at the peak even with a pickup installed. The 82313 and the 82323 are high-power sensors capable of measuring up to

200mW with high accuracy. These sensors have high linearity up to 200mW approximately even at beam spot of 0.1mm diameter.

## 200mW

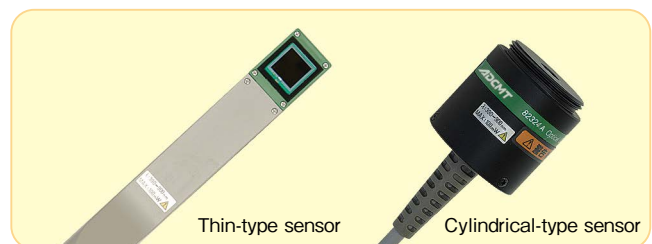
### ● Low-priced and easy-to-use general-purpose sensors

The 82311 and the 82321 are low-price general-purpose sensors that can be used in a wide wavelength range from 390nm to 1100nm.

The calibration wavelength is 780nm and the correction value is stored in the sensors. Sensitivity correction of other wavelengths is also available by using the options.

### ● Both thin types and cylindrical types

Two shapes of sensors can be selected for each purpose. Thin types of sensors are convenient for measuring optical power in a limited space with a pickup installed, and cylindrical types of sensors are used for measuring the output power from a fiber with an optical bench.



## Specifications

All accuracies are guaranteed for one year at a temperature of  $+23 \pm 5^{\circ}\text{C}$  and a relative humidity of 70% or less.

### Sensor Specifications (Sold Separately)

Model	82311 (General-purpose)	82312 (Blue-violet)	82313 (High-power)
Wavelength range	390 to 1100nm	390 to 450nm	390 to 1100nm
Power range	Display in dBm	-60 to +17dBm	-50 to +23dBm
	Display in W	1nW to 50mW	10nW to 200mW
	Beam spot	3mm dia. or more	1mm dia. or more
Light receiving element	Si Photodiode		
Light receiving area	Approx. 9.5mm × 9.5mm	Approx. 10mm × 10mm	Approx. 8.5mm dia.
Effective light receiving area <sup>*1</sup>	Approx. 8.5mm × 8.5mm		Approx. 6mm dia.
Calibration wavelength <sup>*2</sup>	780nm	405nm	650nm
Measurement accuracy (at 1mW input)	±2.5% (at calibration wavelength)		
	(±3.5%)* <sup>3</sup> (400 to 1000nm)	±3.5% (390 to 450nm)	±3.5% (400 to 1000nm)
Wavelength sensitivity correction range	390 to 1100nm	390 to 450nm	390 to 1100nm
Shape	Thin type		
Separation from a sensor section <sup>*4</sup>	Impossible	Possible	Possible
Dimensions (width) × (height) × (thickness of the light receiving section) mm	18×180×3.2	18×180×3.7	18×180×5

Model	82321 (General-purpose)	82322 (Blue-violet)	82323 (High-power)
Wavelength range	390 to 1100nm	390 to 450nm	390 to 1100nm
Power range	Display in dBm	-60 to +17dBm	-50 to +23dBm
	Display in W	1nW to 50mW	10nW to 200mW
	Beam spot	3mm dia. or more	1mm dia. or more
Light receiving element	Si Photodiode		
Light receiving area	Approx. 8.5mm dia.		
Effective light receiving area <sup>*1</sup>	Approx. 6.5mm dia.		Approx. 6mm dia.
Calibration wavelength <sup>*2</sup>	780nm	405nm	650nm
Measurement accuracy (at 1mW input)	±2.5% (at calibration wavelength)		
	(±3.5%)* <sup>3</sup> (400 to 1000nm)	±3.5% (390 to 450nm)	±3.5% (400 to 1000nm)
Wavelength sensitivity correction range	390 to 1100nm	390 to 450nm	390 to 1100nm
Shape	Cylindrical type		
Dimensions (width) × (height) mm	38×40		

Model	82314A/82314W (Three-wavelength) <sup>*5</sup>		
Wavelength range	390 to 900nm		
Wavelength	405nm	650nm	780nm
Power range	Display in dBm	-50 to +20dBm	
	Display in W	10nW to 100mW	
	Beam spot	1mm dia. or more / 2mm dia. or more	3mm dia. or more
Light receiving element	Si Photodiode		
Light receiving area	Approx. 10mm × 10mm / Approx. 18mm × 18mm		
Effective light receiving area <sup>*1</sup>	Approx. 9.5mm × 9.5mm / Approx. 15.5mm × 15.5mm		
Calibration wavelength <sup>*2</sup>	Standard	OPT82314A+22/OPT82314W+22	OPT82314A+23/OPT82314W+23
Measurement accuracy (at 1mW input)	±2.5% (at calibration wavelength)		
	±3.5% (390 to 900nm)		
Wavelength sensitivity correction range	390 to 900nm		
Shape	Thin type		
Separation from a sensor section <sup>*4</sup>	Possible		
Dimensions (width) × (height) × (thickness of the light receiving section) mm	18×180×3.7/35.1×197×3.7		

Model	82324A (Three-wavelength) <sup>*5</sup>		
Wavelength range	390 to 900nm		
Wavelength	405nm	650nm	780nm
Power range	Display in dBm	-50 to +20dBm	
	Display in W	10nW to 100mW	
	Beam spot	1mm dia. or more	3mm dia. or more
Light receiving element	Si Photodiode		
Light receiving area	Approx. 8.5mm dia.		
Effective light receiving area <sup>*1</sup>	Approx. 6.5mm dia.		
Calibration wavelength <sup>*2</sup>	Standard	OPT82324A+22	OPT82324A+23
Measurement accuracy (at 1mW input)	±2.5% (at calibration wavelength)		
	±3.5%(390 to 900nm)		
Wavelength sensitivity correction range	390 to 900nm		
Shape	Cylindrical type		
Dimensions (width) × (height) mm	38×40		

\*1: Relative sensitivity to the center is within the ±10% range. \*2: Can be added by using options. \*3: For the 82311 or 82321, Option+20 is specified.

\*4: The warranty does not include cut cables and/or damaged or degraded elements caused by connecting and disconnecting the sensor section. \*5: The software revision must be B01 or later.



## Instrument Specifications

Display resolution:	0.1pW (display in W), 0.001dB (display in dBm)
Accuracy:	The following is added to the accuracy of each sensor. (Within 24 hours after offset zero execution, unit: W)
20nW range	±(0.55% + 2000 digits)
200nW range	±(0.15% + 200 digits)
2μW to 200mW range	±(0% + 70 digits)
Display:	LCD with three-level backlight
Wavelength display:	4 digits
Power display:	5½ digits (Unit: mW, μW, nW, dBm, dBr)
Bar graph display	
Range switching:	8 ranges; auto, manual and remote
Sampling rate:	5 readings/sec or more
Wavelength sensitivity correction:	Automatic correction of sensor wavelength sensitivity by wavelength setting (in 1nm step)
Offset zero:	Sensor offset stored in the memory for automatic correction
Relative value display function:	Ratio (display in W), dBr (display in dBm)
Analog output:	Analog output according to the input signal *6
Output voltage:	0 to 2V, output resistance: 10Ω or less
Output connector:	2P mini-jack (3.5mm dia.)
USB interface:	USB 2.0 Full Speed compliant (connector mini B/female)
Auto power off:	Powers off approximately 30 minutes after any key operation or remote operation is not performed. (Function can be set ON or OFF.)
Backup function:	Stores four setting conditions.
Smoothing function:	Moving average from 2 to 100 times
Max value hold function:	Holds the maximum measured value.
Calibration wavelength selection function:	Available only with calibration wavelength option(s) installed
Wavelength preset function *7:	Registers four wavelengths of which sensitivity is corrected.
Other functions:	CF calculation (sets one correction coefficient for measured values.) Display digit selection, key lock, and battery check

\*6: The full-scale value varies depending on the sensor model, wavelength setting, correction value (CF), and range setting.

\*7: This function is available when the software revision is B00 or later.

## General Specifications

Operating environment:	Ambient temperature: 0°C to +40°C Relative humidity: 80% or less, no condensation
Storage environment:	Ambient temperature: -20°C to +70°C Relative humidity: 80% or less, no condensation
Warm-up time:	30 minutes or more (until the specified accuracy is reached.)
Power supply	
Battery drive:	AA battery × 4 *8

Service life:	60 hours (with 1mW or less power, with back light OFF, using the alkaline battery, and at +23°C±5°C)
DC input:	9V 100mA or less
AC adapter:	100-240VAC
Line frequency:	50/60Hz
Power consumption:	100-120V: 5VA or less, 220-240V: 10VA or less (when the supplied AC adapter is used.)
Dimensions:	Approx. 80 (W) × 180 (H) × 40 (D) mm
Mass:	300g or less (excluding AA batteries)

\*8: Use alkaline batteries only. Batteries are not included.

## Supplied Accessories

AC adapter (100-240VAC):	A146001
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## Optional Accessories

USB cable (1m USB A/male-mini B/male):	A112010
Analog output cable (1m):	A01225
FC adapter (for 82321/82322/82323/82324A):	A08012
Power cable (UL/CSA):	CC014001
Power cable (EN):	CC014002
Power cable (CCC):	CC014003

Option	Standard	Opt.94	Opt.95	Opt.96
Applicable standard	JIS	CCC	UL/CSA	EN
Rated	125V/7A	250V/2.5A	125V/3A	250V/2.5A

## Wavelength Sensitivity Correction Option and Calibration Wavelength Option

Wavelength sensitivity correction option:

The wavelength sensitivity of each sensor is measured and corrected when calibrating. (The 82311/82321 of the standard specification is corrected by using the typical value.)

Calibration wavelength option:

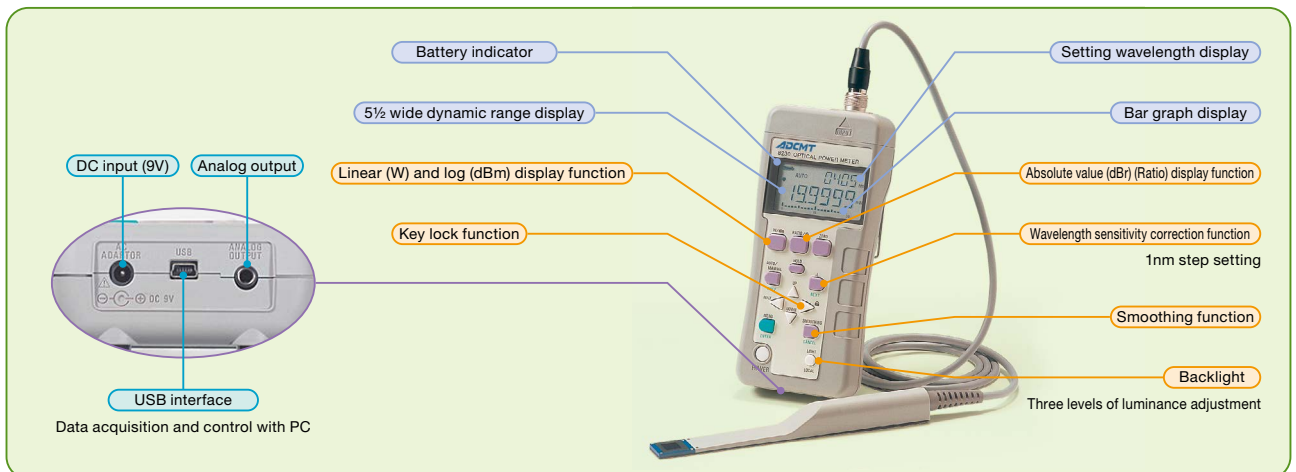
The calibration is performed at wavelengths other than the standard specification. (Multiple wavelengths can be specified.)

Option	82311	82312	82313
Wavelength sensitivity correction	OPT82311+20	Standard specification	Standard specification
Calibration wavelength	405nm	OPT82311+21	Standard specification
	650nm	OPT82311+22	Standard specification
	780nm	Standard specification	OPT82313+23

Option	82321	82322	82323
Wavelength sensitivity correction	OPT82321+20	Standard specification	Standard specification
Calibration wavelength	405nm	OPT82321+21	Standard specification
	650nm	OPT82321+22	Standard specification
	780nm	Standard specification	OPT82323+23

Option	82314A	82314W	82324A	
Wavelength sensitivity correction	Standard specification	Standard specification	Standard specification	
Calibration wavelength	405nm	Standard specification	Standard specification	
	650nm	OPT82314A+22	OPT82314W+22	OPT82324A+22
	780nm	OPT82314A+23	OPT82314W+23	OPT82324A+23

- Please read through the operation manual carefully before using the products.
- All specifications are subject to change without notice.



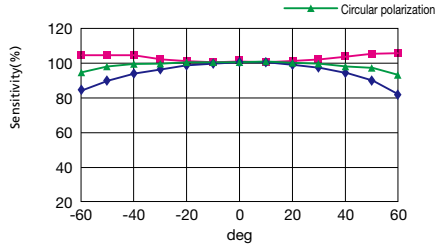
# Sensor Characteristics (Typical Values)

## General-purpose sensor

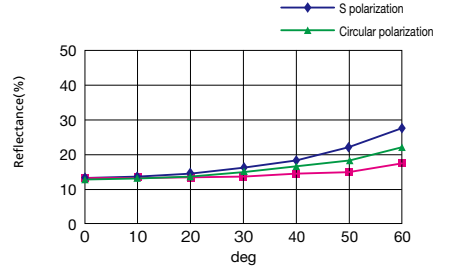


82311

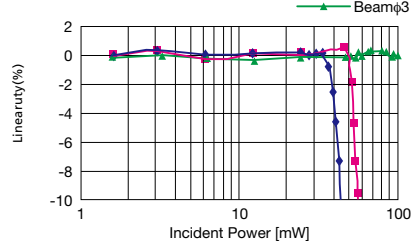
82311 Incident angle dependence (780nm)



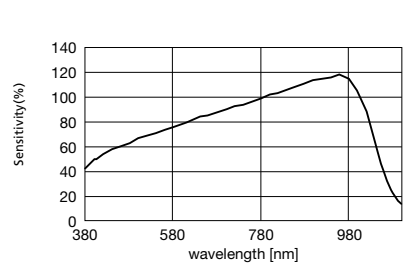
82311 Reflectance (780nm)



82311/82321 Power linearity (780nm)



82311/82321 Wavelength sensitivity



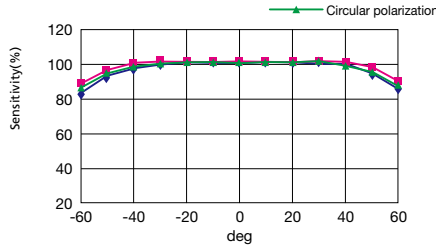
82321

## Blue-violet sensor

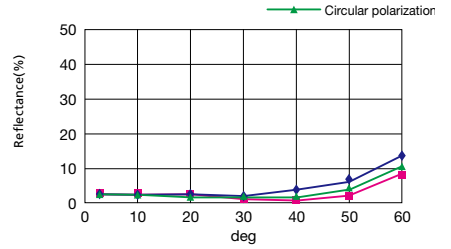


82312

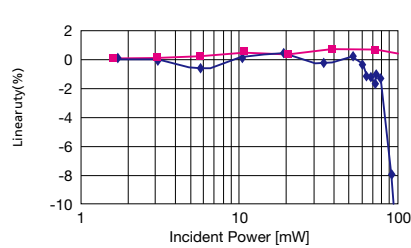
82312/82322 Incident angle dependence (407nm)



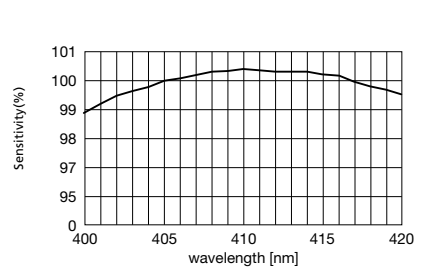
82312/82322 Reflectance (407nm)



82312/82322 Power linearity (405nm)



82312/82322 Wavelength sensitivity



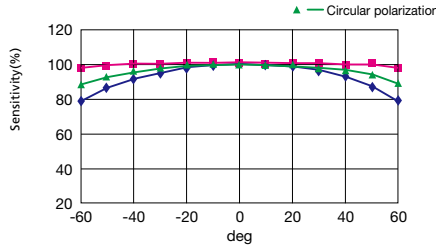
82322

## High-power sensor

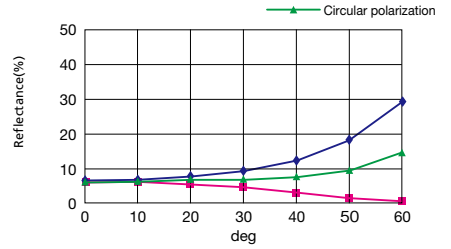


82313

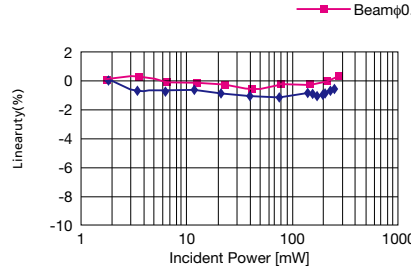
82313/82323 Incident angle dependence (780nm)



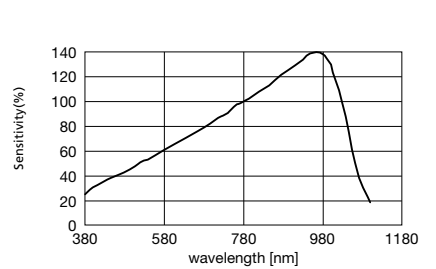
82313/82323 Reflectance (780nm)



82313/82323 Power linearity



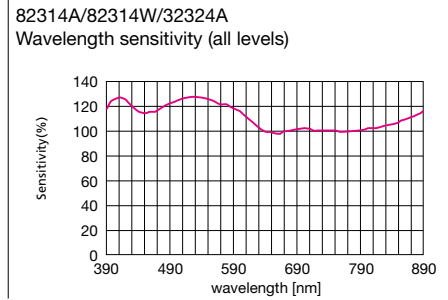
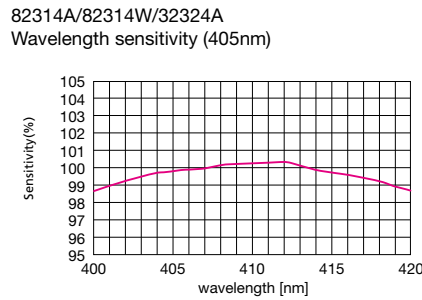
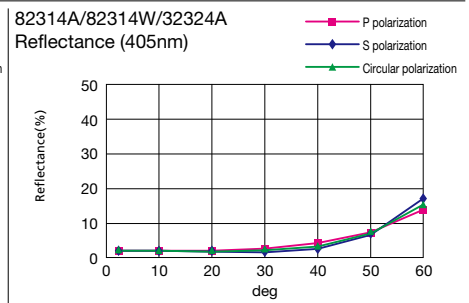
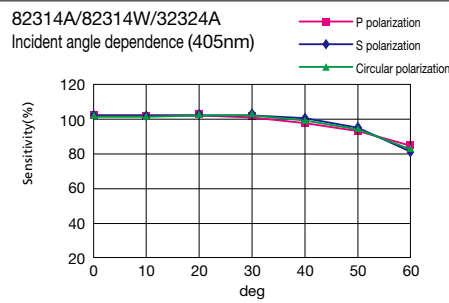
82313/82323 Wavelength sensitivity



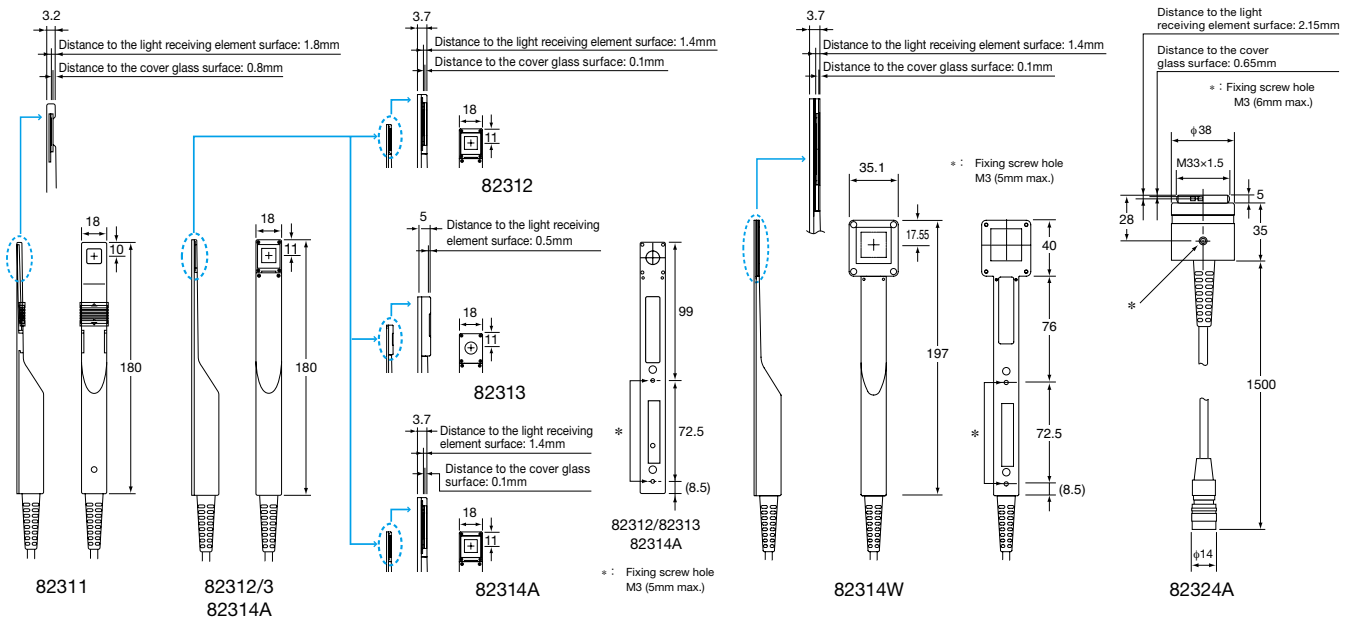
82323

## Sensor Characteristics (Typical Values)

### Three-wavelength sensor



## Dimensional Drawing



**ADCMT**® ADC CORPORATION

E-mail : [kcc@adcmt.com](mailto:kcc@adcmt.com) URL : <https://www.adcmt.com>

### Head Office (R&D Center)

77-1, Miyako Namegawa-machi, Hiki-gun,  
Saitama 355-0812, Japan  
Phone: +81-493-56-4433 Fax: +81-493-57-1092

### East Branch (Sales Dept.)

Okabe-building, 3-515, Onari-cho, Omiya-ku, Saitama-shi,  
Saitama 330-0852, Japan  
Phone: +81-48-651-4433 Fax: +81-48-651-4432