

# Photodiode modules



C10439 series

## Integrates photodiode for precision photometry with low-noise amp

The C10439 series photodiode modules are high-precision photodetectors that integrate a photodiode and a current-to-voltage amplifier. The output from these photodiode modules is an analog voltage and can be easily checked with a voltmeter, etc. Since their sensitivity is switchable between two ranges (High/Low), highly accurate output can be obtained by selecting the proper sensitivity range that matches the light level to be detected.

### Features

- Voltage output for easy handling
- Two-range (High/Low) switching function
- Only half size of a business card
- Can be mounted on optical bench rod (M4)

### Applications

- Precision photometry
- Light source power monitors
- Fluorescence detection of printed matter
- Illuminometers
- Color difference meters
- Brix meter
- Flowmeters, etc.

### Selection guide

Type no.	Photodiode type	Photosensitive area (mm)	Peak sensitivity wavelength (mm)	Dimensions (mm)	Conversion impedance $Z_t$ (V/A)		Frequency bandwidth -3 dB (Hz)	
					H range	L range	H range	L range
C10439-01	Si	2.4 × 2.4	960	19 × 46 × 52	1 × 10 <sup>9</sup>	1 × 10 <sup>7</sup>	10	1 k
C10439-02		5.8 × 5.8						
C10439-03		10 × 10						
C10439-07		2.4 × 2.4						
C10439-08		5.8 × 5.8						
C10439-09	10 × 10	InGaAs	1550	19 × 50 × 52	1 × 10 <sup>6</sup>	1 × 10 <sup>4</sup>	1 k	100 k*1
C10439-10	φ1							
C10439-11	φ3							

\*1: Output amplitude 2 Vp-p

### Recommended conditions/Absolute maximum ratings

Type no.	Supply voltage $V_{cc}$		Current consumption $I_{cc}$ Max. Dark state (mA)	Capacitive load $C_L$ Min. (pF)	Output resistance $Z_o$ (Ω)	Absolute maximum ratings		
	(V)					Supply voltage $V_{cc}$ max (V)	Operating temperature $T_{opr}^{*2}$ (°C)	Storage temperature $T_{stg}^{*2}$ (°C)
	Min.	Max.						
C10439-01	±5	±12	±2	500	100	±13	0 to +50	-10 to +60
C10439-02								
C10439-03								
C10439-07								
C10439-08								
C10439-09								
C10439-10								
C10439-11								

\*2: No condensation

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

**Electrical and optical characteristics (Ta=25 °C, Vcc=±12 V, unless otherwise noted)**

Type no.	Spectral response range $\lambda$ (nm)	Peak sensitivity wavelength $\lambda_p$ (nm)	Saturation incident light level*3 (nW)		Photosensitivity*3 S (mV/nW)		Conversion impedance Zt (V/A)		Frequency bandwidth -3 dB (Hz)	
			H range	L range	H range	L range	H range	L range	H range	L range
			C10439-01	190 to 1100	960	23.6	2360	500	5	$1 \times 10^9$
C10439-02										
C10439-03										
C10439-07										
C10439-08										
C10439-09	500 to 1700	1550	23600	2360000	0.5	0.005	$1 \times 10^6$	$1 \times 10^4$	1 k	100 k*4
C10439-10										
C10439-11										

\*3:  $\lambda = \lambda_p$

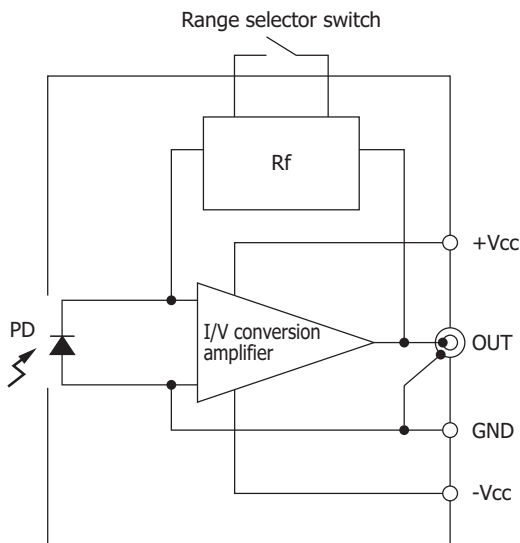
\*4: Output amplitude 2 Vp-p

Type no.	Maximum output amplitude VFS Output current Io=1 mA (V)		Dark voltage Vd Dark state (mV)		Output noise voltage*5 Vn Dark state (mVp-p)		Time drift (drift over time)*6 Dark state (mV/day)	
	Min.	Max.	Min.	Max.	Typ.	Max.	Min.	Max.
C10439-01	+Vcc - 0.5	+Vcc - 0.2	-5	+5	2	5	-0.5	+0.5
C10439-02								
C10439-03								
C10439-07								
C10439-08								
C10439-09								
C10439-10								
C10439-11								

\*5: Within frequency band

\*6: Dark voltage variation per day, measured at 25 °C after a 10-minute warm-up after power-on

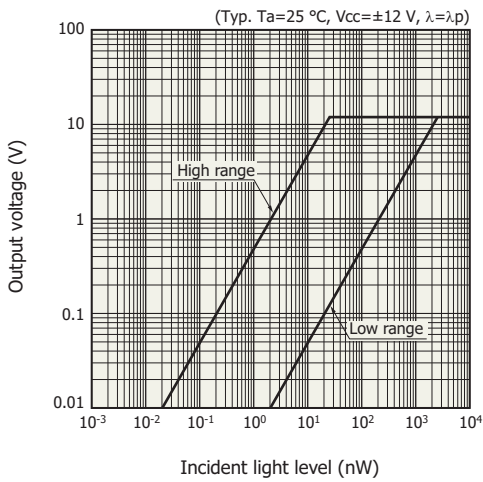
**Block diagram**



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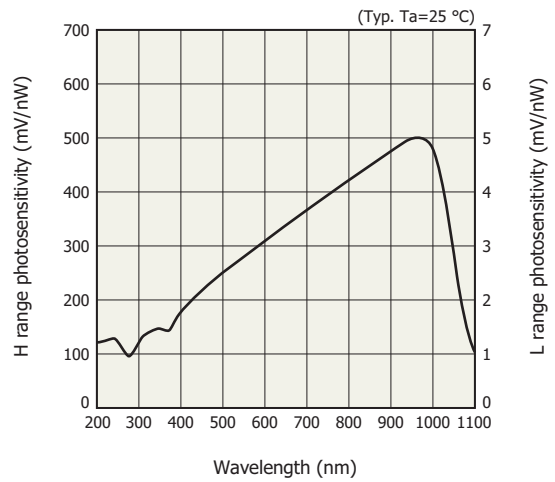
C10439-01/-02/-03

Output voltage vs. incident light level



KACCB0172EA

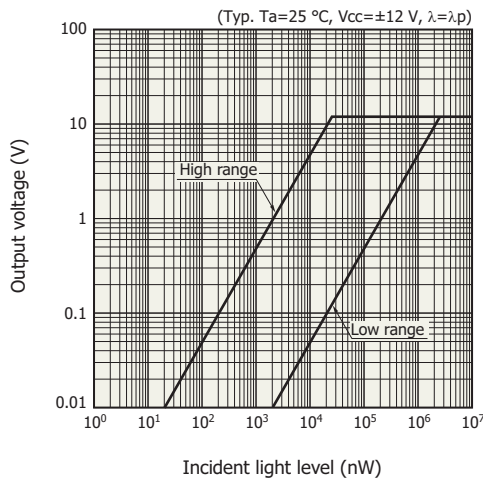
Spectral response



KACCB0345EA

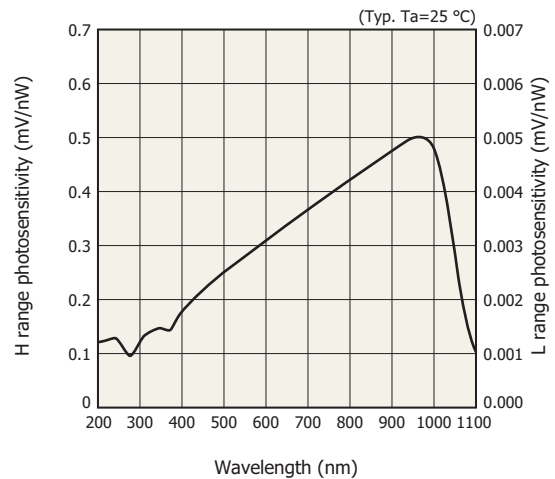
C10439-07/-08/-09

Output voltage vs. incident light level



KACCB0344EA

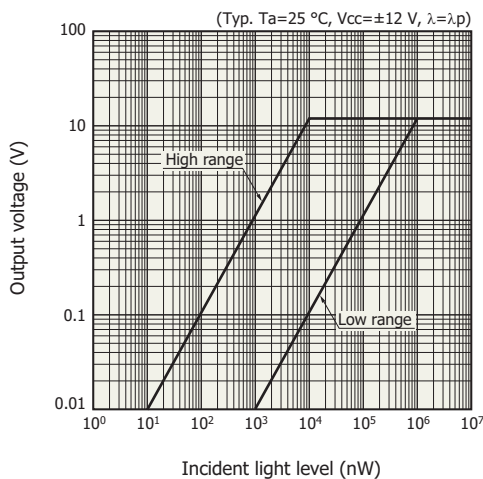
Spectral response



KACCB0346EA

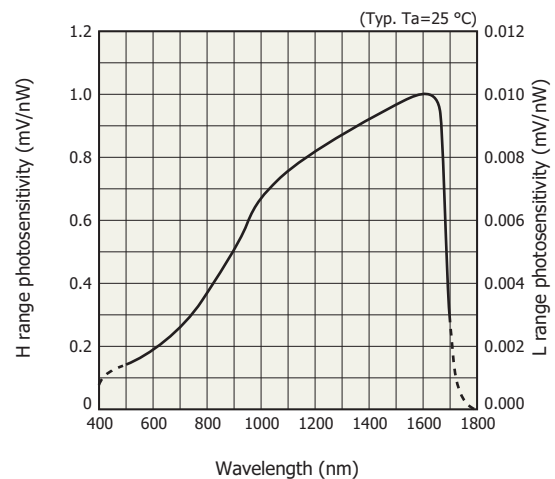
C10439-10/-11

Output voltage vs. incident light level



KACCB0347EA

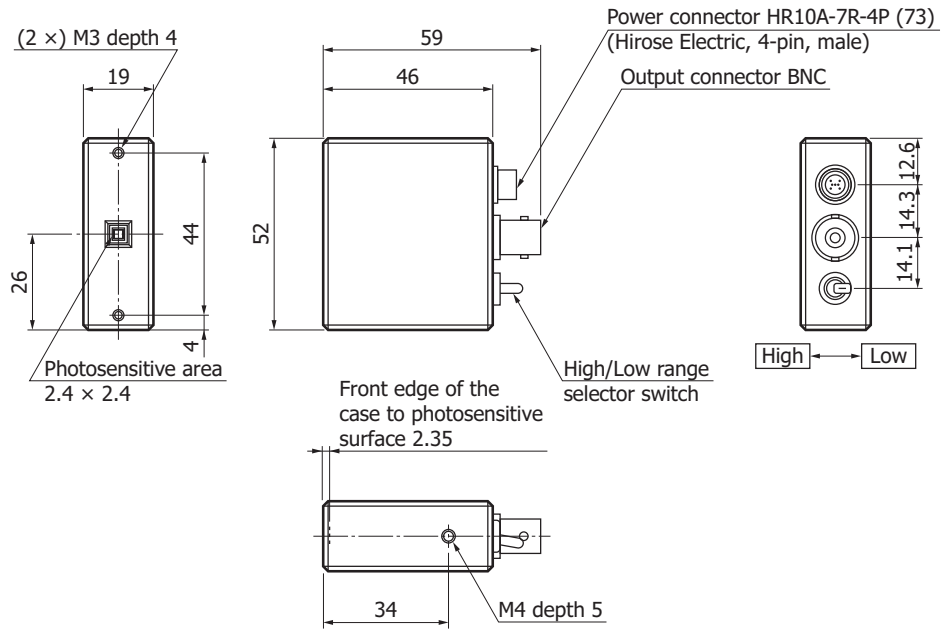
Spectral response



KACCB0348EA

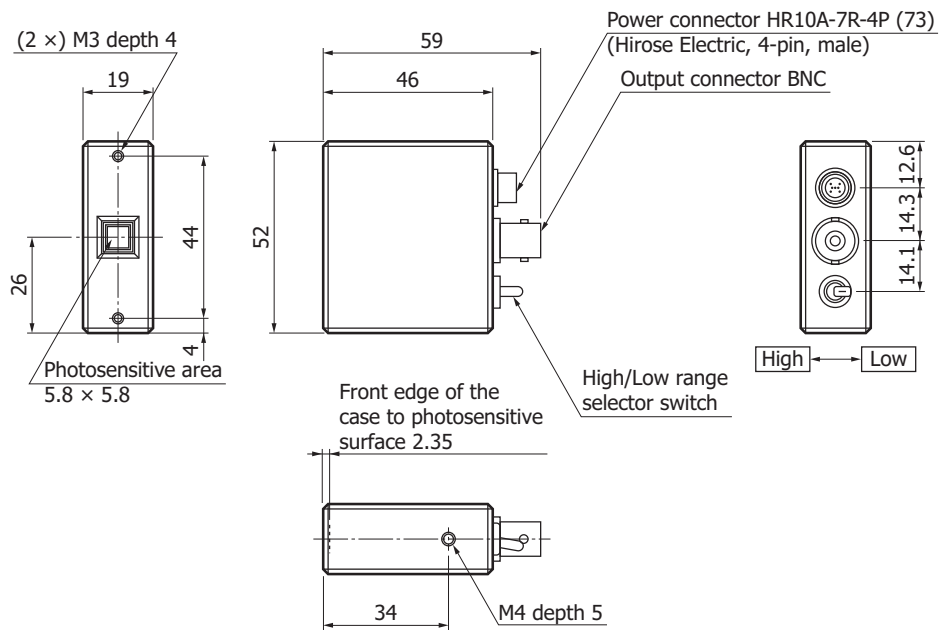
Dimensional outlines (unit: mm, tolerance:  $\pm 0.2$  mm unless otherwise noted)

C10439-01/-07



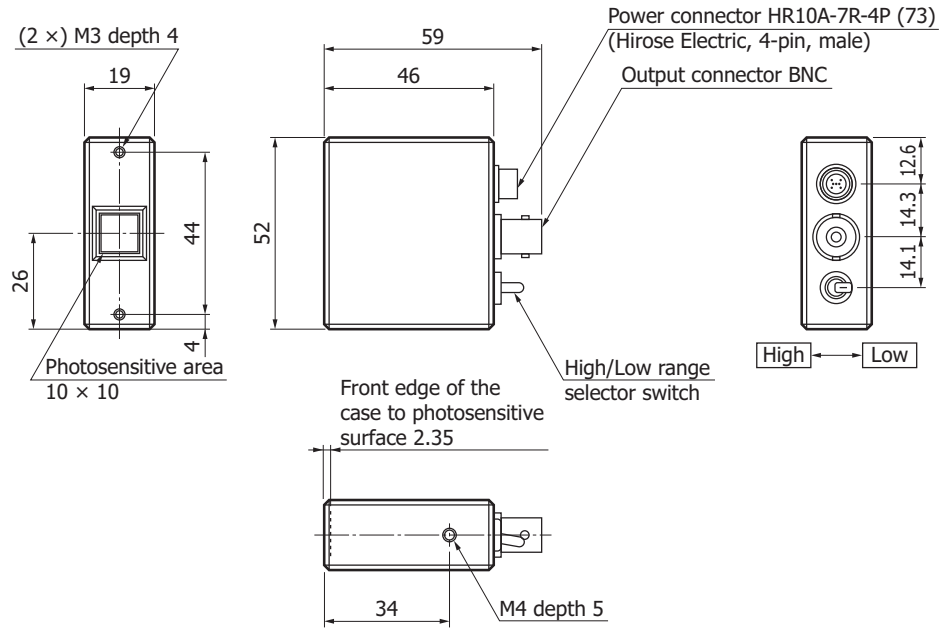
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C10439-02/-08



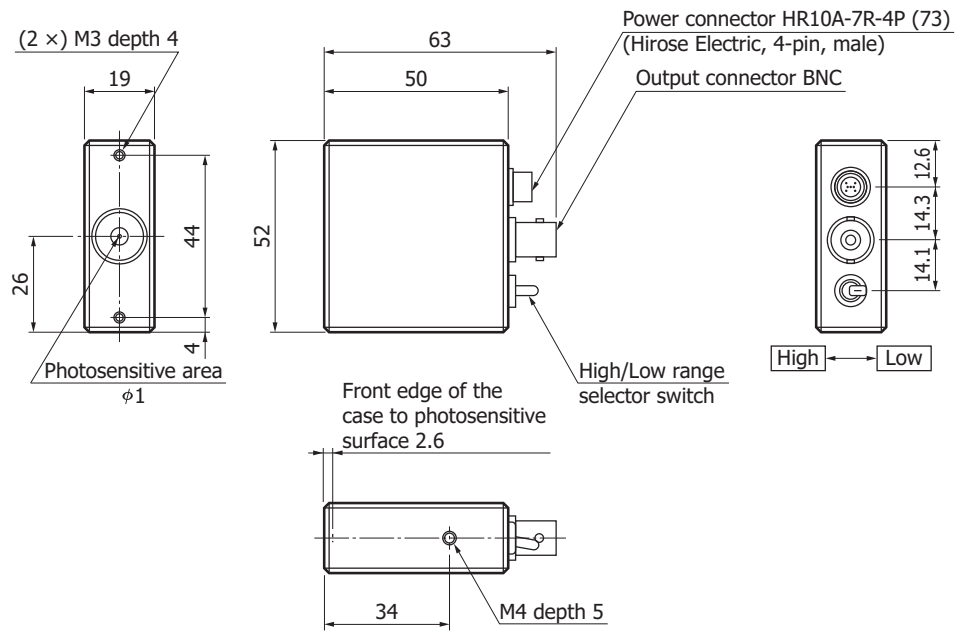
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C10439-03/-09



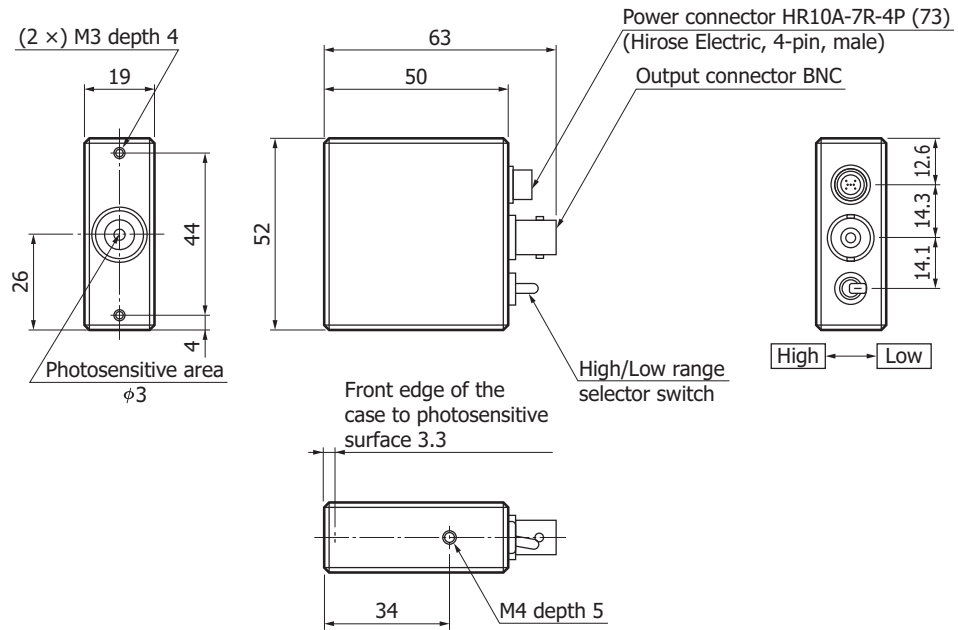
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C10439-10



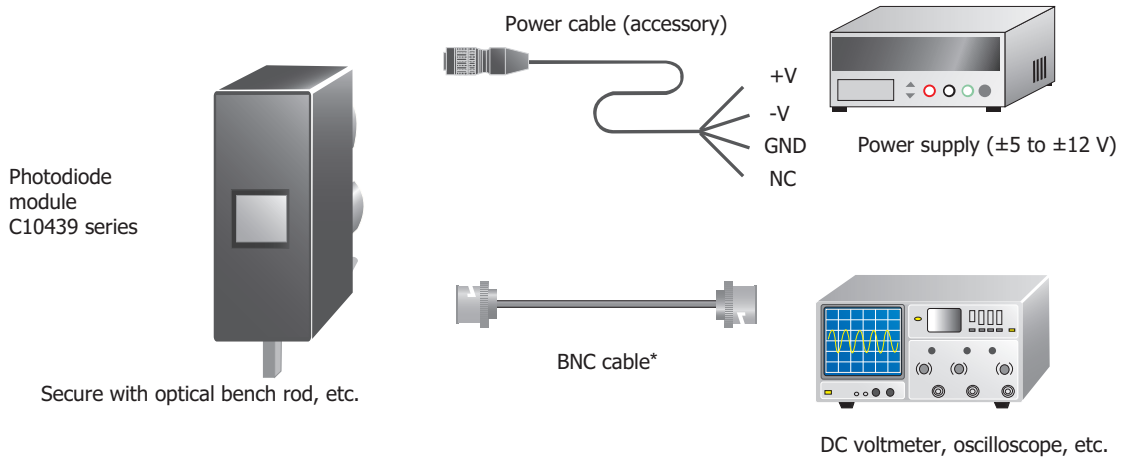
KACCA0327EA

C10439-11



KACCA0328EA

**Connection example**

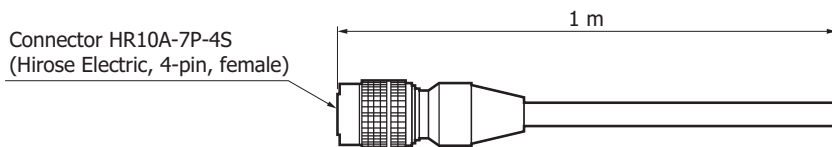


\* BNC cable is not included.

KACCC0365EB

■ Accessory

- Cable for power supply (no connector on one end)



KACCA0194EA

Options (sold separately, unit: mm)

Optical fiber adapter A12781 series

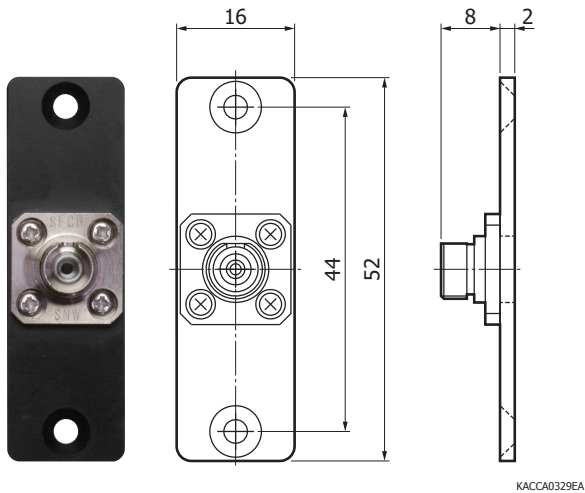
This adapter is used to connect an optical fiber to the photodiode module.

Three connector types are available: FC, SC, and SMA.

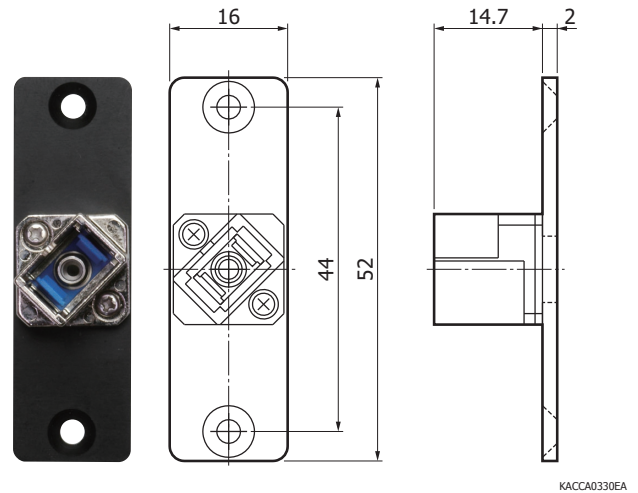
Note:

- The optical fiber is not included.
- It may not be possible to monitor the total light level depending on the combinations of the photodiode, optical fiber, and fiber adapter that you are using. Select the appropriate components by carefully designing the optical system.

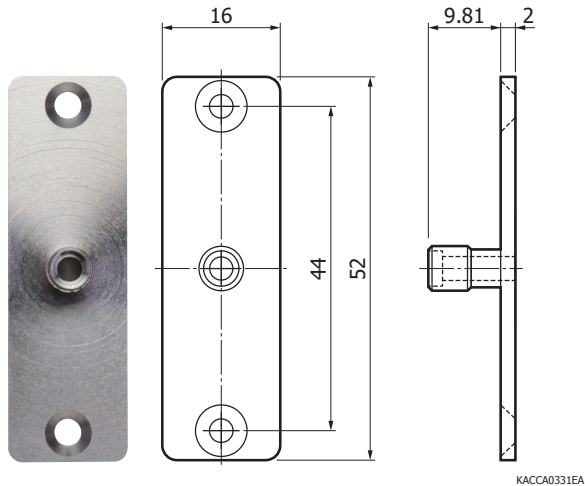
■ A12781-01 (for FC type optical fiber)



■ A12781-02 (for SC type optical fiber)

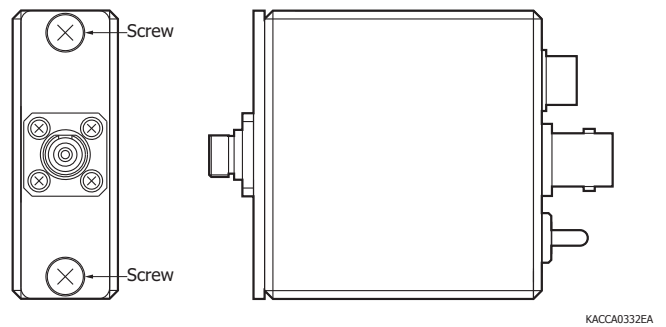


■ A12781-03 (for SMA type optical fiber)



<Assembly procedure>

Fix the optical fiber adapter in place using the M3 screw holes in the front of the case. (M3 screws are supplied with the adapter.)



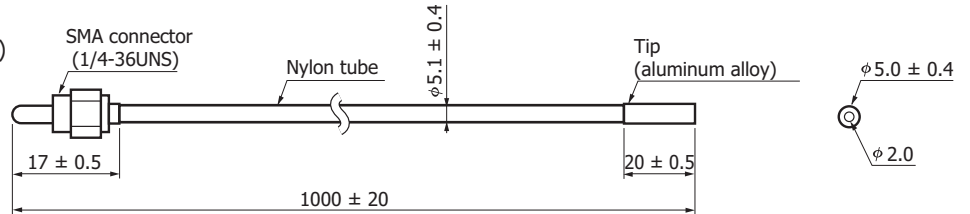
Optical fiber (SMA type) A9511

This SMA type optical fiber can be used with the photodiode module. The combination of this optical fiber with the SMA type optical fiber adapter (A12781-03) makes it easy to connect an optical fiber to the photodiode module.

Note: The SMA type optical fiber adapter (A12781-03) is not included.

■ Specifications

Photosensitive diameter:  $\phi 2$  (bundled fiber)  
 Photosensitive numerical aperture: 0.56



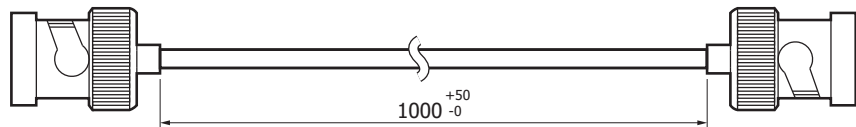
KACCA0333EA

BNC cable E2573

This cable can be used to extract signals from the photodiode module.

■ Specifications

Cable specifications: 1.5E-QEV



KACCA0334EA

Signal processing unit for photodiode module C10475

This unit converts the output from a photodiode module (C10439 series) into digital signals. High resolution digital output (16 bits) can be retrieved through a serial connection (RS-232C) from a PC. The supplied sample software can be used to easily load measurement data. For the specifications, refer to the C10475 datasheet.

■ Specifications

Size: 110 × 100 × 30 mm





## Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

- Precautions
- Notice

Information described in this material is current as of January, 2014.

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Type numbers of products listed in the delivery specification sheets or supplied as samples may have a suffix "(X)" which means preliminary specifications or a suffix "(Z)" which means developmental specifications.

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