

# 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 $\lambda_p$ (nm)	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	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							
C10439-14	InAsSb	0.7 × 0.7	3500	19 × 50 × 52	1 × 10 <sup>7</sup>	1 × 10 <sup>6</sup>	100	1 k

### Recommended conditions/Absolute maximum ratings (Ta=25 °C unless otherwise noted)

Type no.	Supply voltage Vcc (V)		Current consumption Icc Max. Dark state (mA)	Capacitive load CL Min. (pF)	Output resistance Zo (Ω)	Absolute maximum ratings		
	Min.	Max.				Supply voltage Vcc max (V)	Operating temperature Topr*2 (°C)	Storage temperature Tstg*2 (°C)
	C10439-01	±5				±12	±2	500
C10439-02								
C10439-03								
C10439-07								
C10439-08								
C10439-09								
C10439-10								
C10439-11								
C10439-14								

\*2: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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 λ (nm)	Peak sensitivity wavelength λp (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 × 10 <sup>9</sup>
C10439-02										
C10439-03	23600	2360000	0.5			0.005	1 × 10 <sup>6</sup>	1 × 10 <sup>4</sup>	1 k	100 k*4
C10439-07										
C10439-08										
C10439-09										
C10439-10	500 to 1700	1550	11800	1180000	1	0.01				
C10439-11										

\*3: λ=λp

\*4: Output amplitude 2 Vp-p

Type no.	Cutoff wavelength λc (μm)	Peak Spectral response λp (μm)	Photosensitivity*5 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
C10439-14	5.3	3.5	0.045	0.0045	1 × 10 <sup>7</sup>	1 × 10 <sup>6</sup>	100	1 k

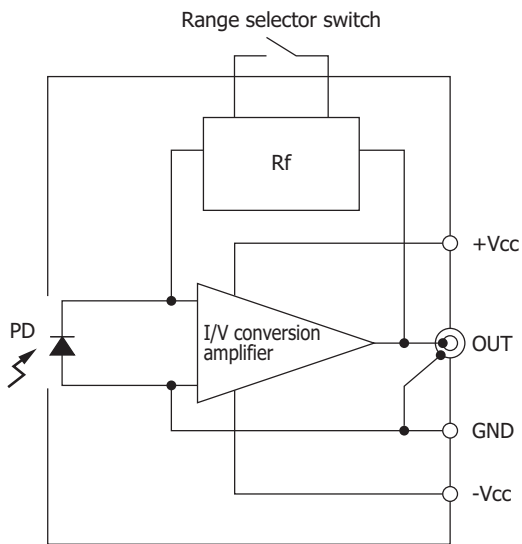
\*5: λ=λp, uniform irradiation on the entire photosensitive area

Type no.	Maximum output amplitude VFS Output current $I_o=1$ mA (V)		Dark voltage Vd Dark state (mV)		Output noise voltage*6 Vn Dark state (mVp-p)		Time drift (drift over time)*7 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	-60	+60						
C10439-14								

\*6: Within frequency band

\*7: Dark voltage variation per day, measured at 25 °C after a 10-minute warm-up after power-on

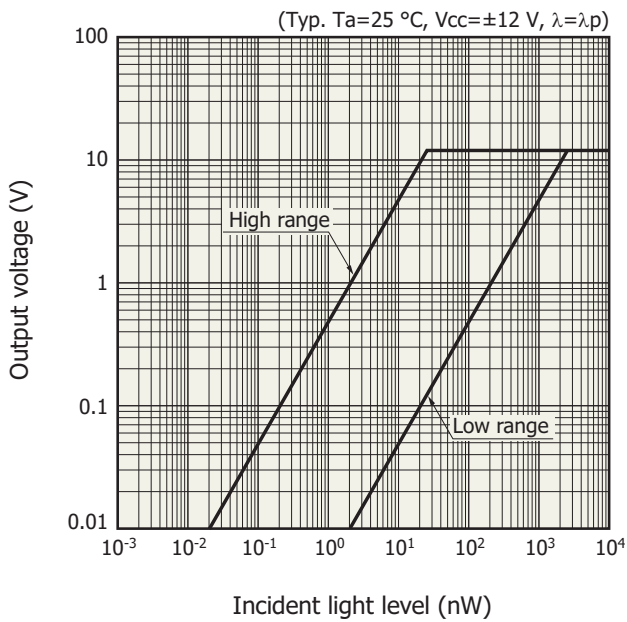
**Block diagram**



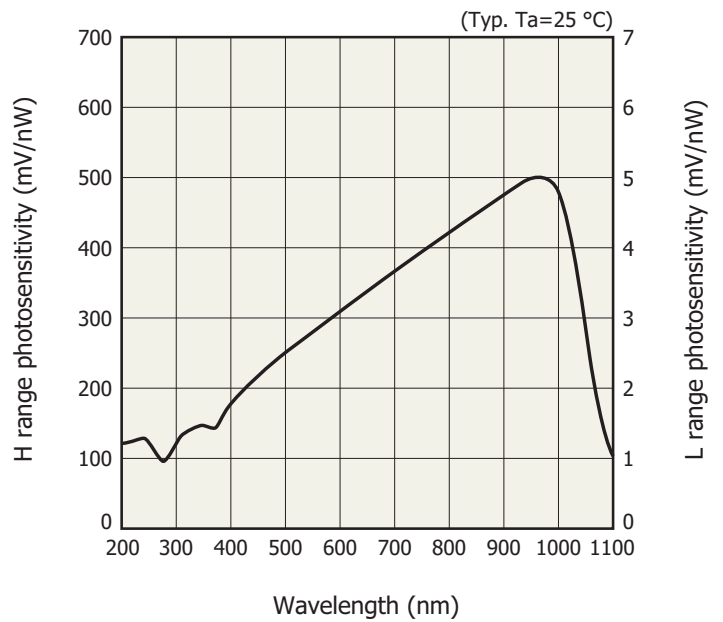
KACCC0364EA

C10439-01/-02/-03

Output voltage vs. incident light level

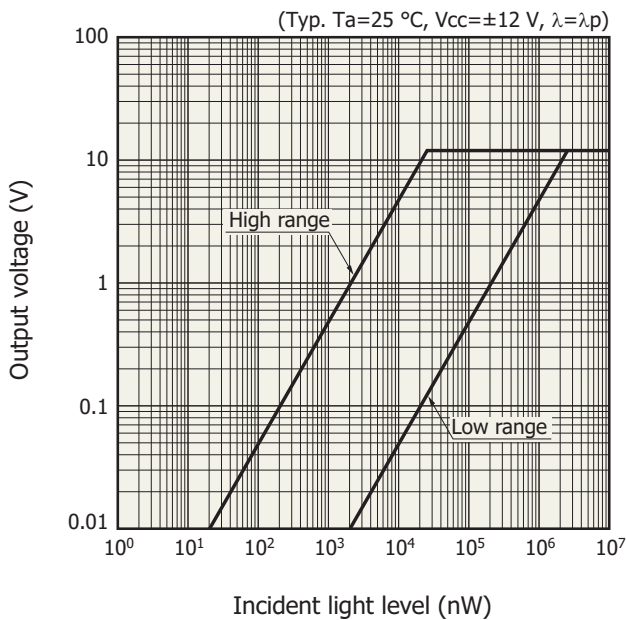


Spectral response

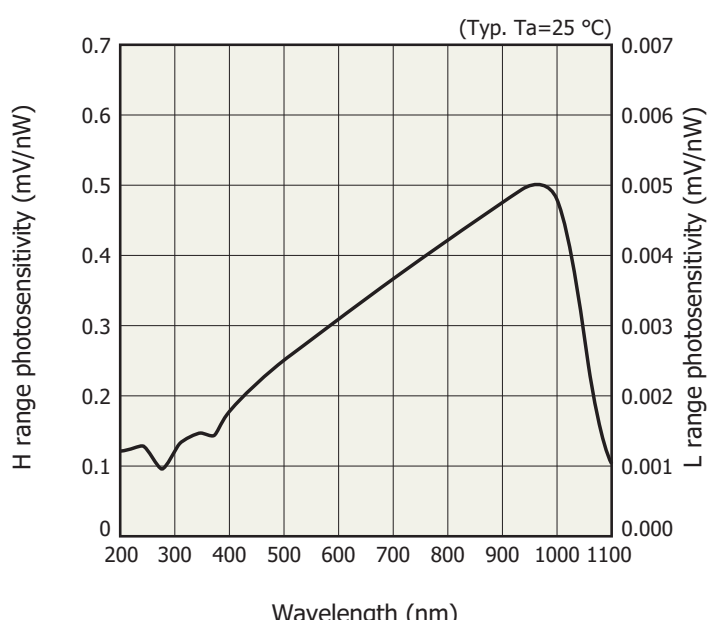


C10439-07/-08/-09

Output voltage vs. incident light level

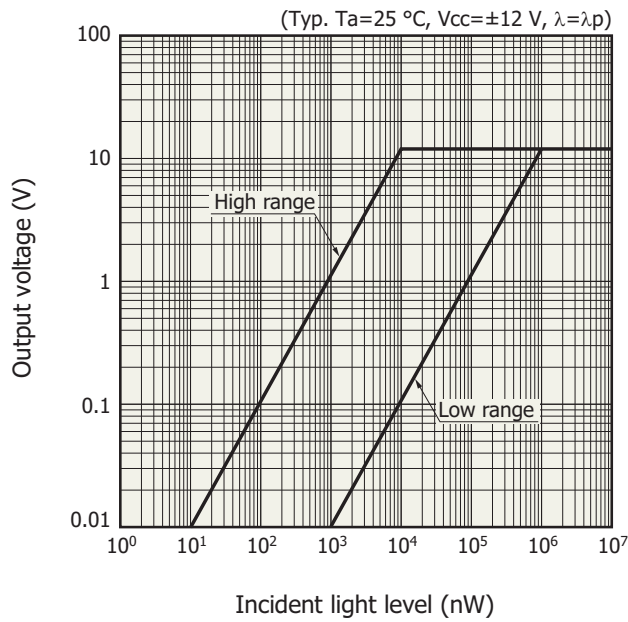


Spectral response

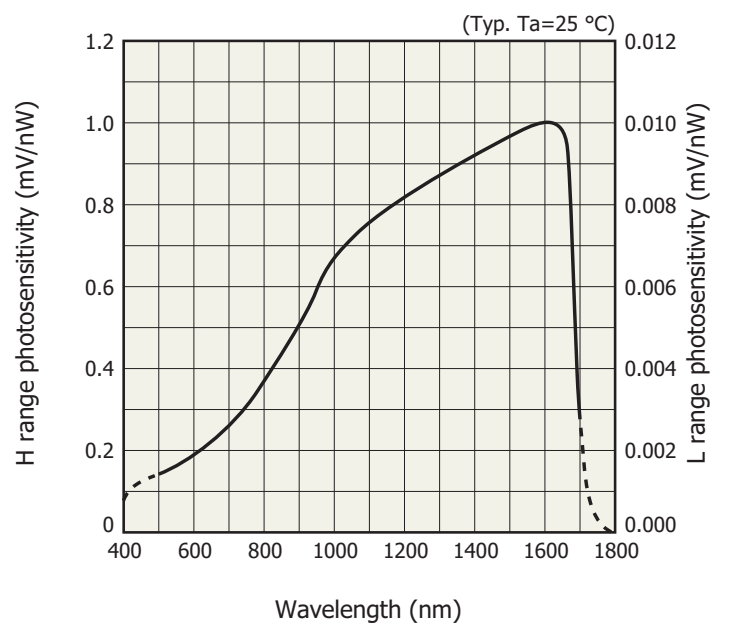


C10439-10/-11

Output voltage vs. incident light level

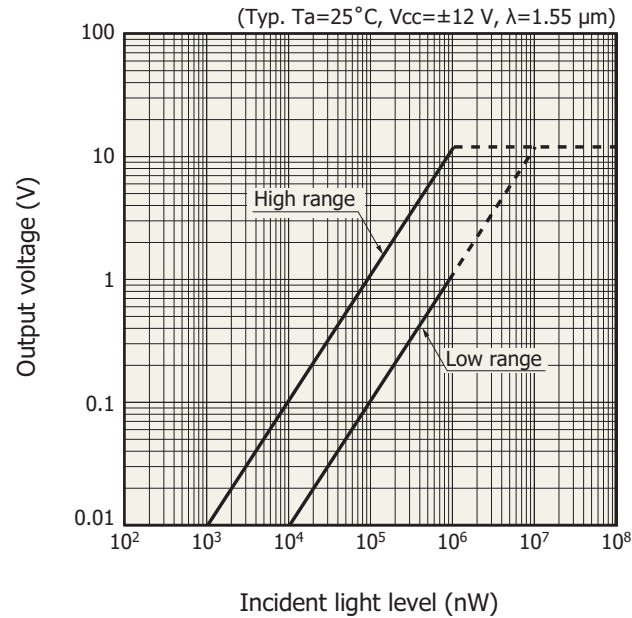


Spectral response

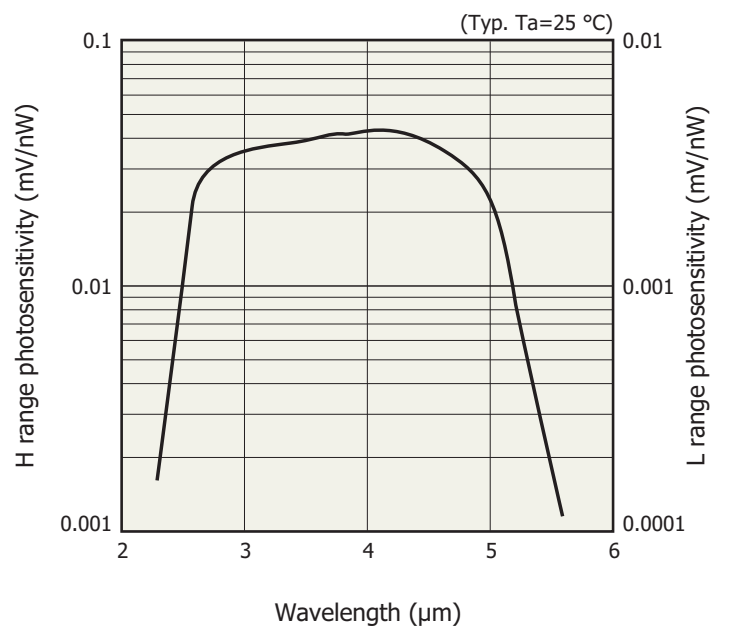


C10439-14

Output voltage vs. incident light level

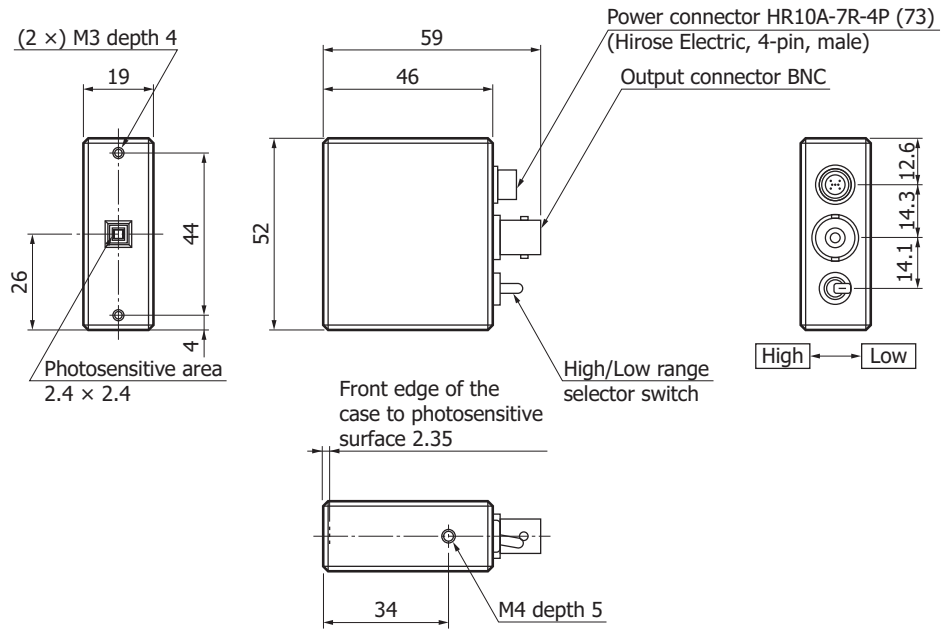


Spectral response



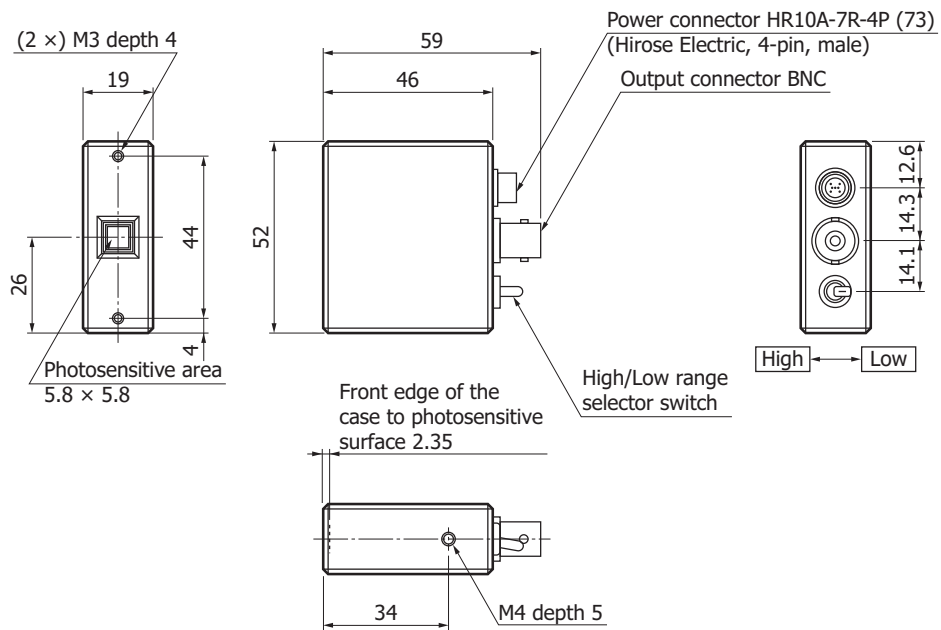
Dimensional outlines (unit: mm, tolerance unless otherwise noted: ±0.2)

C10439-01/-07



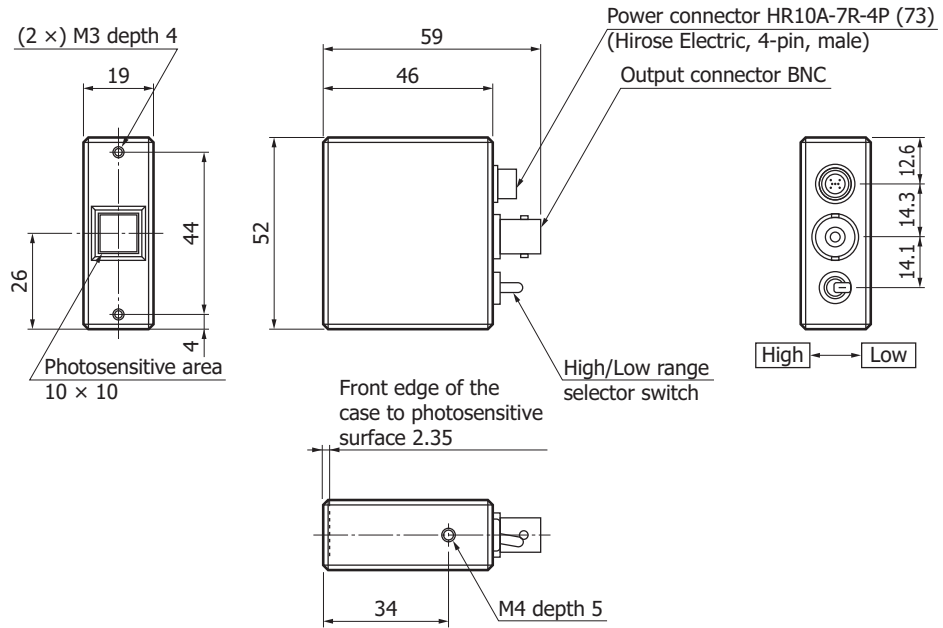
KACCA0203EB

C10439-02/-08



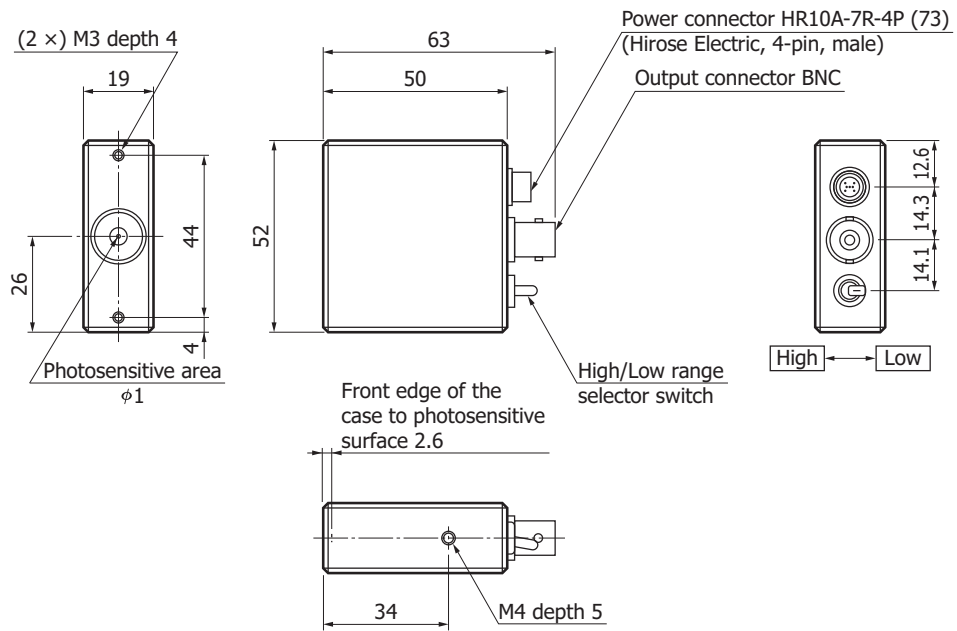
KACCA0204EB

C10439-03/-09



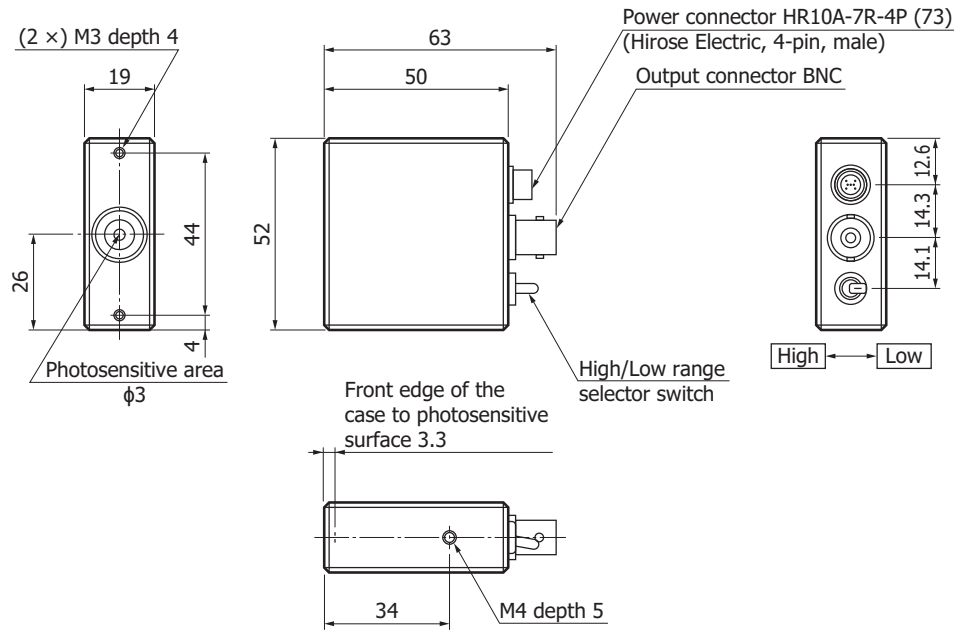
KACCA0205EB

C10439-10



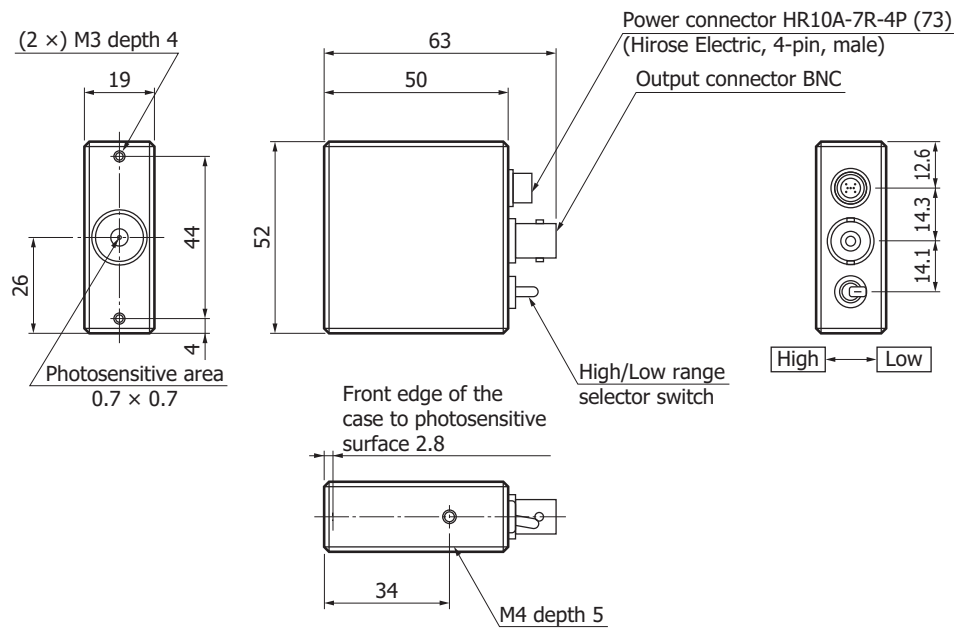
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C10439-11



KACCA0328EA

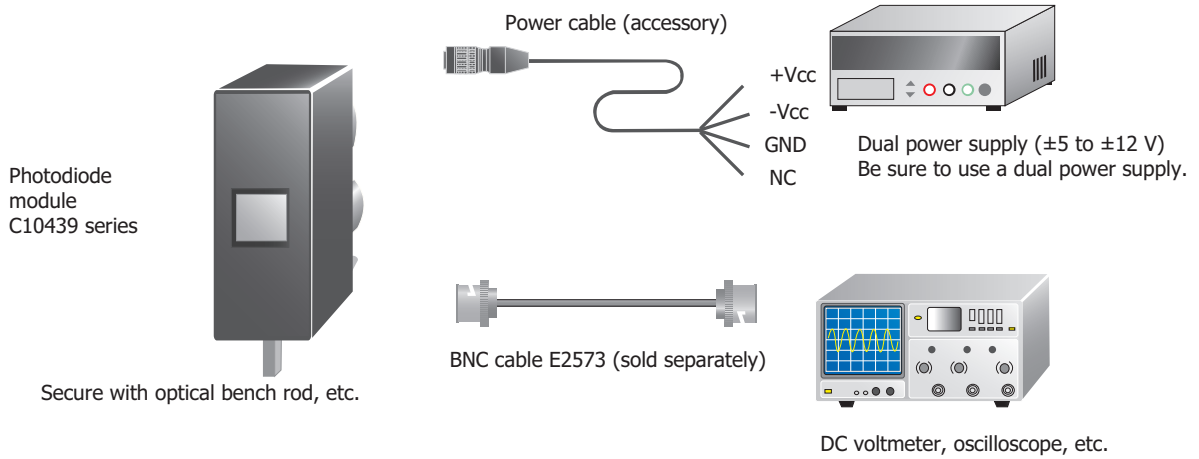
C10439-14



KACCA0376EA



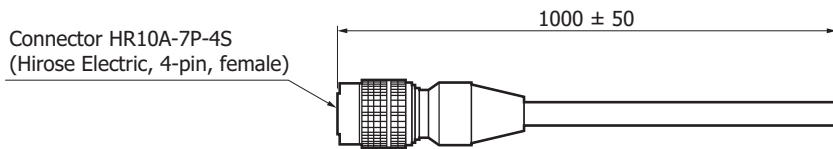
**Connection example**



KACCC0365EB

**Accessories (unit: mm)**

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



KACCA0194EA

Options (sold separately, unit: mm)

Optical fiber adapter A12781 series

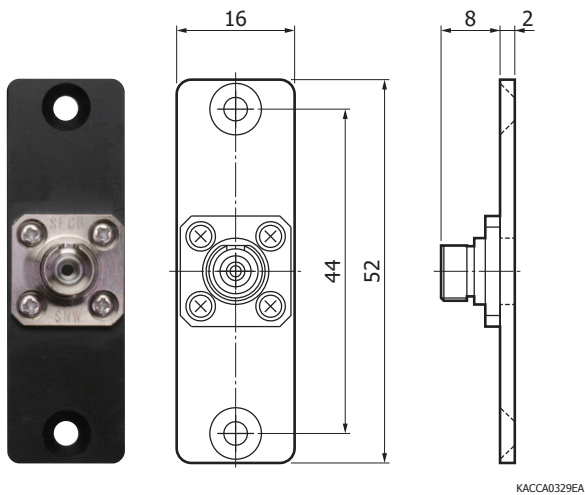
This adapter is used to connect an optical fiber to the photodiode module.

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

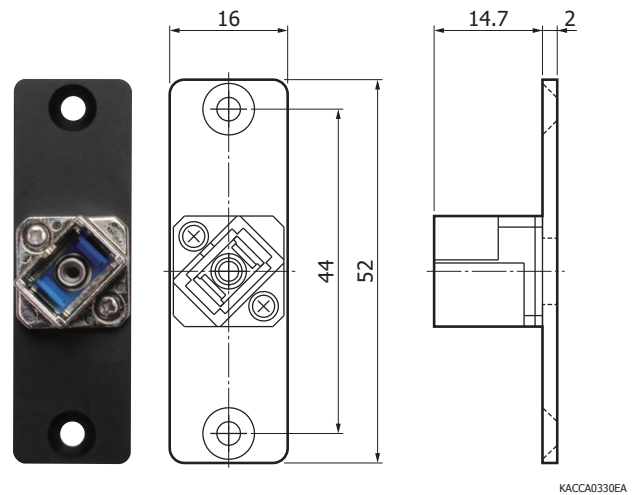
Note:

- 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.

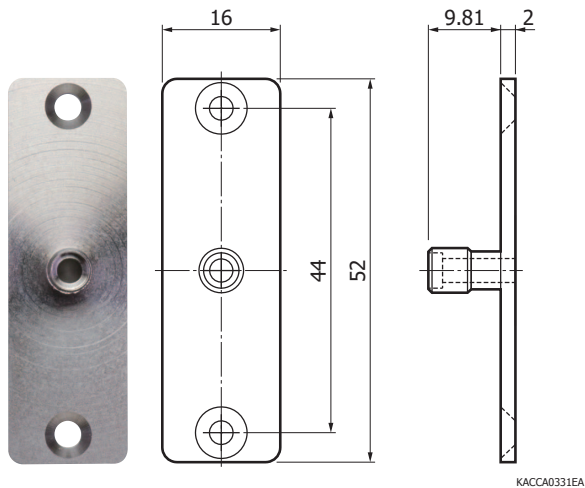
■ A12781-01 (for FC type optical fiber)



■ A12781-02 (for SC type optical fiber)

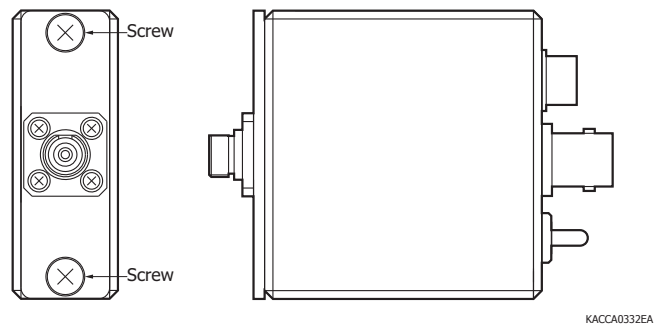


■ A12781-03 (for SMA type optical fiber)



<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

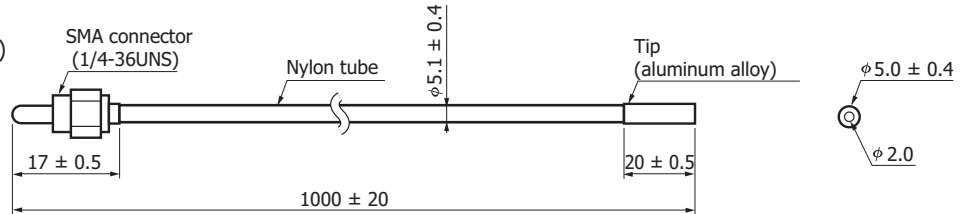
This SMA type optical fiber can be used with the photodiode module. The combination of this optical fiber with the SMA type optical fiber adapter (A12781-03) makes it easy to connect an optical fiber to the photodiode module.

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

■ Specifications

Photosensitive diameter:  $\phi 2$  (bundled fiber)

Photosensitive numerical aperture: 0.56



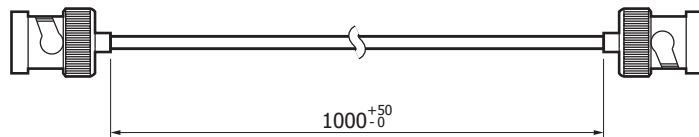
KACCA0333EA

BNC cable E2573

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

■ Specifications

Cable specifications: 1.5D-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



## Related information

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

- Precautions
- Disclaimer

Information described in this material is current as of June, 2016.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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# HAMAMATSU

[www.hamamatsu.com](http://www.hamamatsu.com)

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8

France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741

China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866