

C10443 series

Integrates a 2-PSD for precision photometry or a 4-segment Si photodiode with low-noise amp in a compact case

PSD modules contain a high-precision two-dimensional PSD (position sensitive detector) or a 4-segment Si photodiode and a low-noise amplifier, and are able to perform accurate distance measurement. Using a PSD module (excluding the C10443-06) with a dedicated signal processing unit C10460 allows obtaining distance information easily.

Features

- Easy handling
- High precision analog voltage output
- Only half size of a business card: 34 (W) × 44 (H) × 40 (D) mm

Applications

- Optical axis alignment
- Distance sensors
- Two-dimensional measurement
- Three-dimensional measurement
- Length measurement
- Liquid level sensors
- Distortion measurement
- Displacement sensor

Selection guide

Type no.	Detector type	Photosensitive area (mm)	Peak sensitivity wavelength λ_p (nm)	Dimensions (mm)	Frequency bandwidth f_c -3 dB (Hz)
C10443-01	Two-dimensional PSD	4 × 4	960	34 × 44 × 40	16 k
C10443-02		9 × 9			
C10443-03		12 × 12	920		
C10443-04					
C10443-06	4-segment photodiode	10 × 10	960		160 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)	Absolute maximum ratings		
	Min.	Max.		Supply voltage Vcc max (V)	Operating temperature*1 Topr (°C)	Storage temperature*1 Tstg (°C)
C10443-01	±5	±12	±2	±13	0 to +50	-10 to +60
C10443-02						
C10443-03						
C10443-04			±15			
C10443-06						

*1: 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 (Typ. Ta=25 °C, Vcc=±12 V, unless otherwise noted)

Type no.	Spectral response range λ (nm)	Peak sensitivity wavelength λ_p (nm)	Saturation incident light level*2 (μW)	Photosensitivity*2 S (mV/ μW)	Position detection error*3 E (μm)		Position resolution*4 ΔR $\Sigma=10\text{ V}$ (μm)
					Typ.	Max.	
C10443-01	320 to 1100	960	167	-60	± 70	± 150	0.5
C10443-02							
C10443-03	320 to 1060	920			± 150	± 250	1.4
C10443-04							
C10443-06	320 to 1100	960	139	-72	-	-	-

*2: $\lambda = \lambda_p$

*3: Reference value. Values may vary depending on operating environment. Position detection error is specified within a circular range of 80% from the center of the photosensitive area to the edge.

Recommended light spot size: $\phi 0.2\text{ mm}$ or more

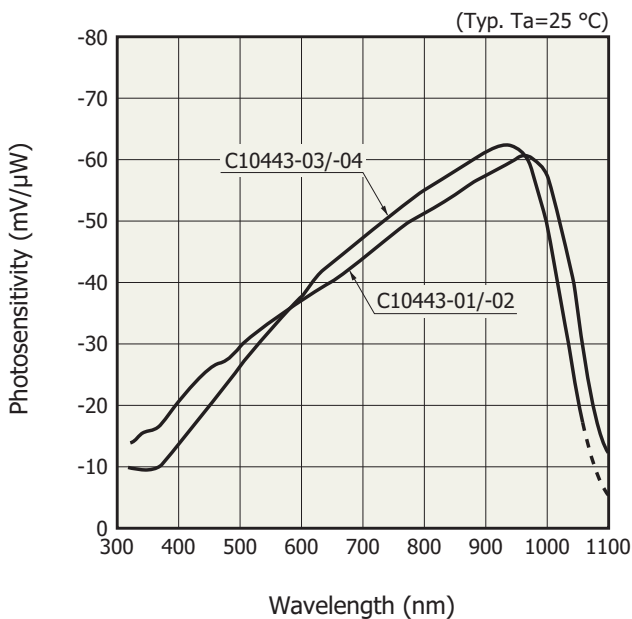
*4: Reference value. Values may vary depending on operating environment. Σ is the sum of each output voltage and calculated as follows. $\Sigma = V_{X1} + V_{X2} + V_{Y1} + V_{Y2}$

Type no.	Output amplitude voltage Vout (V)		Offset voltage Vos Dark state (mV)		Output noise voltage*5 Vn Dark state (mVp-p)	Frequency bandwidth fc -3 dB (Hz)
	Min.	Max.	Min.	Max.		
C10443-01	0	-Vcc + 1.1	-5	+5	1	16 k
C10443-02						
C10443-03						
C10443-04	0	-Vcc + 2.5	-10	+10	3	160 k
C10443-06						

*5: 0 V in dark state. A negative voltage output appears when light is input.

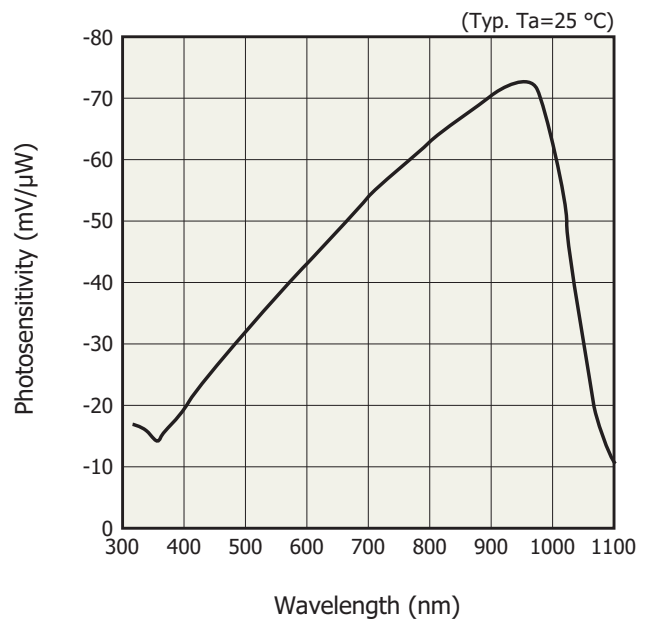
Spectral response

C10443-01/-02/-03/-04



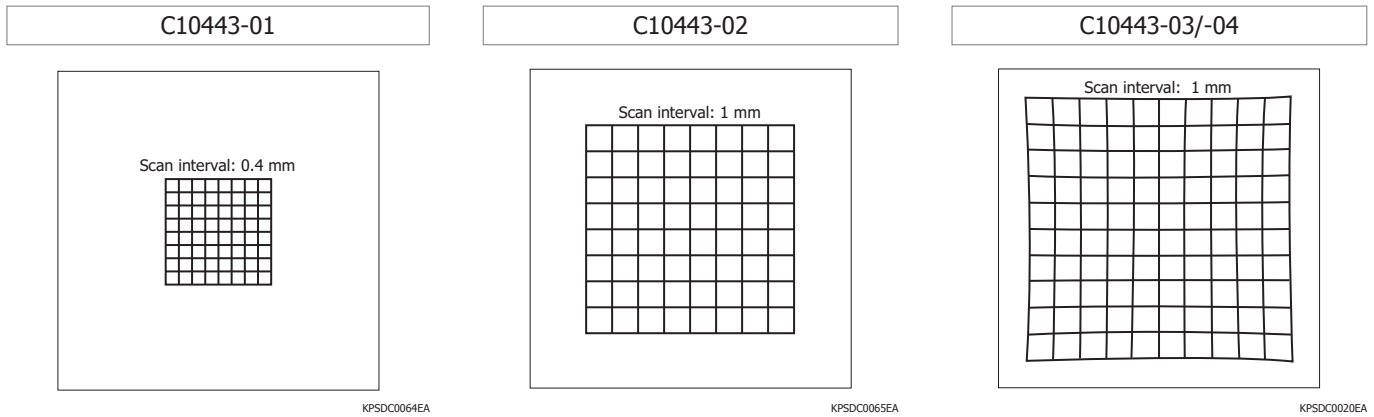
KACCB0151EA

C10443-06



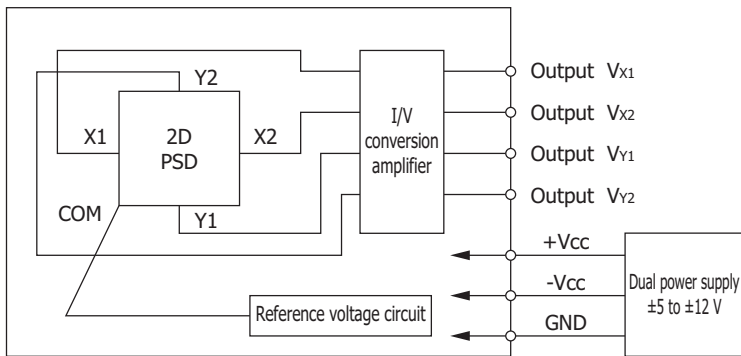
KACCB0349EA

Example of position detectability (Ta=25 °C, λ=900 nm, light spot size: φ0.2 mm)



Block diagram

C10443-01/-02/-03/-04



Conversion formula

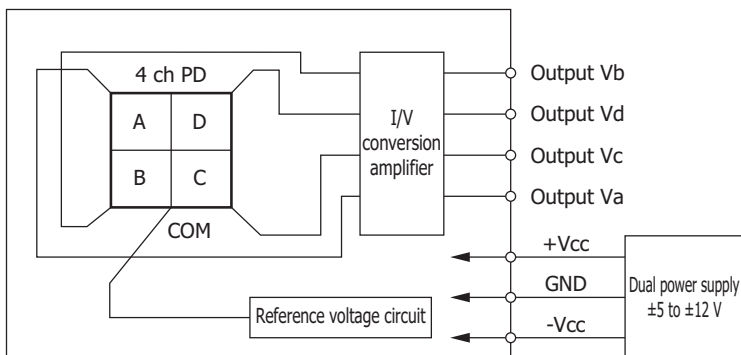
$$x = \frac{(V_{X2} + V_{Y1}) - (V_{X1} + V_{Y2})}{V_{X1} + V_{X2} + V_{Y1} + V_{Y2}} \times \frac{L}{2}$$

$$y = \frac{(V_{X2} + V_{Y2}) - (V_{X1} + V_{Y1})}{V_{X1} + V_{X2} + V_{Y1} + V_{Y2}} \times \frac{L}{2}$$

x, y: Position (mm) of light spot relative to center of PSD photosensitive area
 L: 4.5 mm (C10443-01)
 10 mm (C10443-02)
 14 mm (C10443-03/-04)

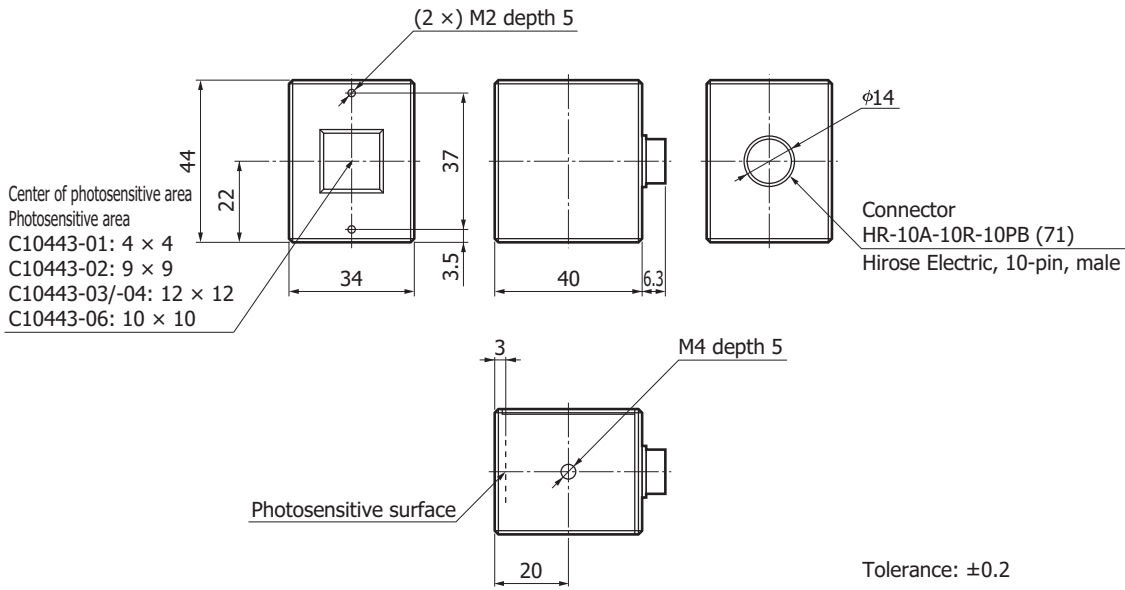
KACCC0345EA

C10443-06



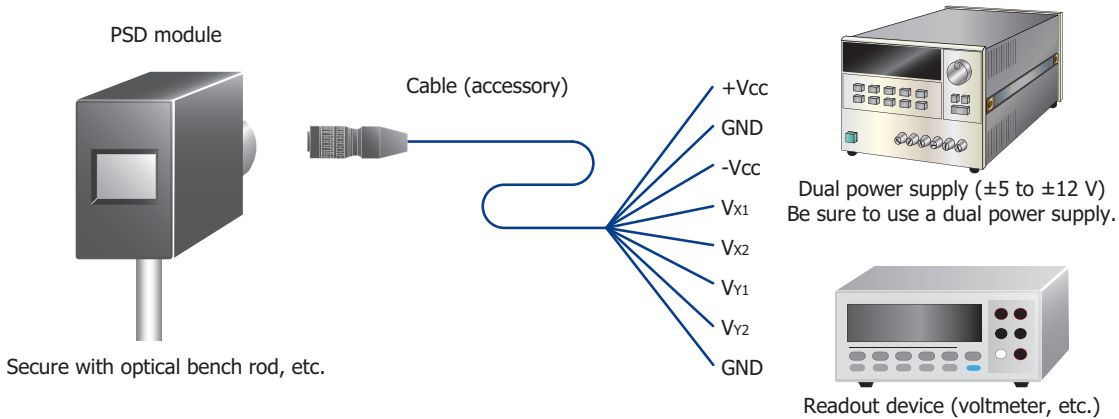
KACCC0753EB

Dimensional outline (unit: mm)



KACCA0193EB

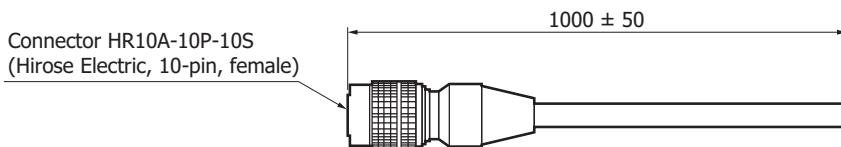
Connection example



KACCC0349EE

Accessories (unit: mm)

- Instruction manual
- Cable (One end of cable is cut off.)



KACCA0338EA

Options (sold separately)

Signal processing unit for PSD module C10460

This unit converts PSD module output into position signals. The position signals are output as both analog and digital signals. With the analog signal, simply connect a voltmeter to the connector, and the readout voltage will display the position information [output voltage (V) = position relative to the PSD center (mm), excluding C10443-06]. With the digital signal, use a serial connection (RS-232C) to connect with a PC. Use the supplied sample software to easily retrieve position information into a PC. For the specifications, refer to the C10460 datasheet.

■ Dimensions: 150 × 100 × 30 mm

■ Applicable PSD modules

- C10443-01
- C10443-02
- C10443-03
- C10443-04 (When used in combination with C10460, the cutoff frequency is 13.5 kHz.)

Note: C10443-06 is not supported.



Related information

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.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

HAMAMATSU

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