

# Signal processing circuits for PSD



C9068-01

C9069-01

## Digital output for connection with PC

The C9068-01 (for one-dimensional PSD) and C9069-01 (for pin-cushion type two-dimensional PSD) are DC signal processing circuits specifically designed for position measurement using PSD. Digital output allows direct connection with a personal computer through a serial (RS-232C) interface. The C9068-01 and C9069-01 are capable of detecting accurate positions of a spot light regardless of light intensity.

A D/A conversion signal is also output for monitoring, and when a voltmeter is connected to this D/A conversion output, the output voltage value directly represents position data. (Output voltage represents the distance from the center of PSD. 1 V=1 mm)

### Features

- Digital output
- Serial (RS-232C) connection with PC
- D/A conversion signal output for monitoring
- Easy handling due to single +12 V supply operation
- No complicated adjustment required

### Applications

- Displacement measurement
- Testing using PSD
- PSD performance evaluation

### Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Supply voltage	Vs max	+13	V
Operating temperature*1	Topt	0 to +40	°C
Storage temperature*1	Tstg	-10 to +60	°C
PSD input current	Ipin max	$9 \times 10^{-4}$	A
Supply current	Iin max	2	A

\*1: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environments, 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, Vs=+12 V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Conversion impedance	Zt	-	$1 \times 10^5$	-	V/A
Feedback capacitance	Cf	-	100	-	pF
Input photocurrent*2	C9068-01	$1 \times 10^{-5}$	-	$9 \times 10^{-5}$	A
	C9069-01	$1 \times 10^{-5}$	-	$9 \times 10^{-5}$	A
Signal conversion time*3	-	5	-	-	ms
Digital output format	-	Conforms to RS-232C (position signal, light level monitor output) 12-bit			-
D/A conversion maximum output amplitude voltage	Vfs	-	-	±10	V
Operating supply voltage	Vs	+11.5	+12	+12.5	V
Current consumption	Is	-	200	-	mA

\*2: Photocurrent Ip (total input signals) from PSD mounted on the C9068-01 or C9069-01 circuit board

\*3: Output response time versus spot light position change

\*4: A power supply of approximately 12 V and 1.25 A is recommended. The electric current for operating this product varies depending on the use environment. Please check in advance.

### Combination with a PSD

A PSD is installed (soldered) on the signal processing circuit.

Note: PSDs are sold separately.

#### ■ C9068-01 (applicable PSD: one-dimensional PSD)

Type no.	Photosensitive area size (mm)	Position resolution* <sup>5</sup> * <sup>6</sup> (μm)	Package (mm)	Installation on board	External attachment* <sup>7</sup>
S3931	6 × 1	1.5	Ceramic (9.2 × 4.8)	○	○
S3932	12 × 1	3	Ceramic (15.2 × 4.8)	○	○
S8543	24 × 0.7	5.9	Ceramic (36.7 × 4)	×	○* <sup>8</sup>
S4583-04	3 × 1	0.8	Plastic	×	○* <sup>8</sup>
S4584 series	3.5 × 1	0.9	Plastic	×	○* <sup>8</sup>
S3274-05	3.5 × 1	0.9	Plastic	×	○* <sup>8</sup>
S7105 series	4.2 × 1	1.1	Plastic	×	○* <sup>8</sup>
S15430-01CT/-02CT	1 × 6	1.5	Glass epoxy	×	○* <sup>8</sup>
S15430-03CT					

#### ■ C9069-01 (applicable PSD: two-dimensional PSD)

Type no.	Photosensitive area size (mm)	Position resolution* <sup>6</sup> * <sup>9</sup> (μm)	Package (mm)	Installation on board	External* <sup>7</sup> attachment
S2044	4.7 × 4.7	1.4	Metal (TO-8 φ14)	○	○
S5990-01	4 × 4	1.1	Ceramic chip carrier (8.8 × 10.6)	×	○* <sup>10</sup>
S5991-01	9 × 9	2.5	Ceramic chip carrier (14.5 × 16.5)	×	○* <sup>10</sup>

\*5: Reference value. Digital output  $\Sigma=5$  to 9 V. 40% range from the center to the end with respect to the PSD photosensitive length L.

\*6: When PSD is mounted. The position resolution may vary depending on the connection method, operating environment, and so on.

\*7: Wiring using shielded wires or AWG#26 or equivalent twisted pair wires (no longer than 30 cm) is recommended.

\*8: These PSDs cannot directly be mounted on the product. Mount the PSD on the printed circuit board prepared separately, and connect the printed circuit via the wiring to the through-holes for externally connected PSD.

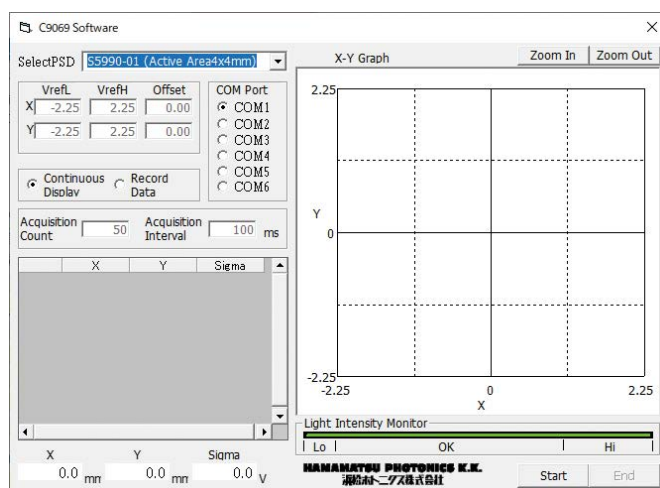
\*9: Reference value. Digital output  $\Sigma=5$  to 9 V. Within a circle with a diameter equal to 40% of PSD photosensitive area length L.

\*10: The S5990-01 or S5991-01 can be mounted on the C9069-01 using the supplied dedicated circuit board.

### Accessory sample software display example (C9069-01)

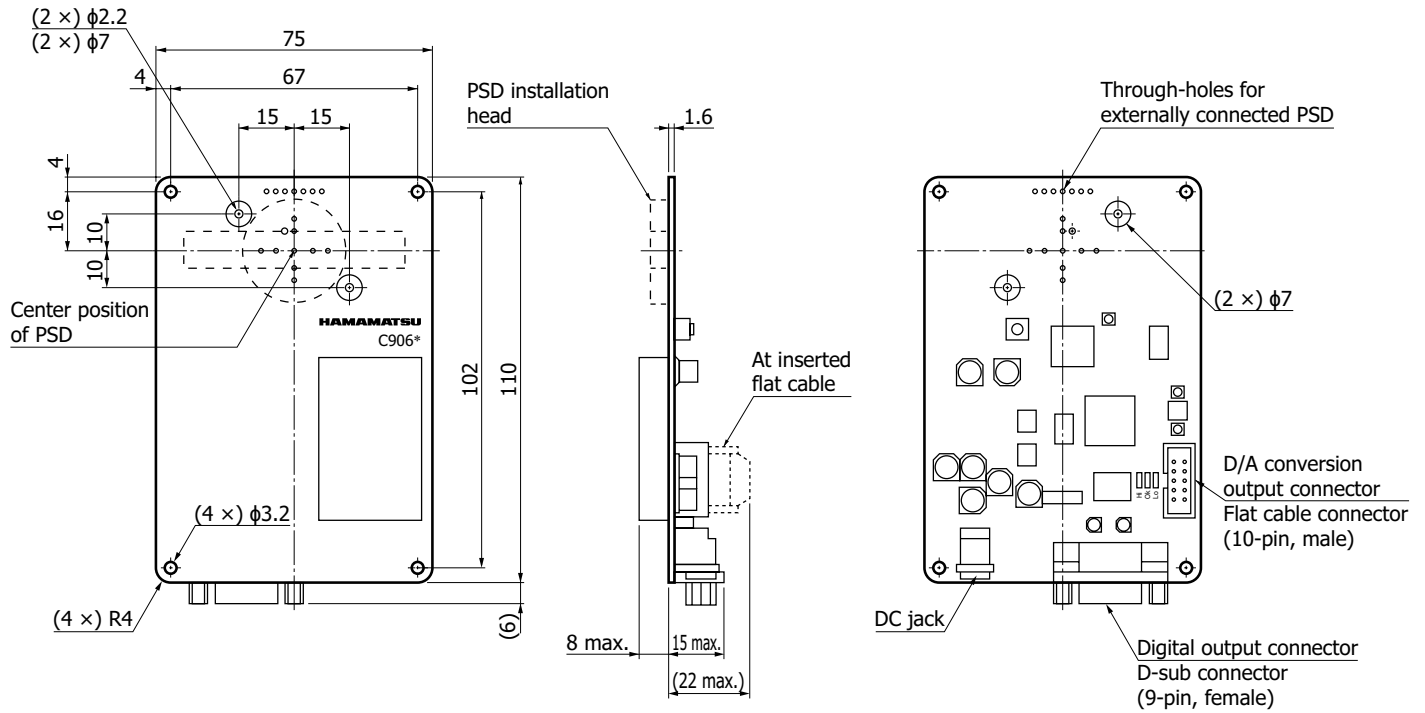
Position data is displayed in numerical values and graphs.

Compatible OS: Microsoft® Windows® 10 Pro (32-bit, 64-bit)



Note: Microsoft, Windows, and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

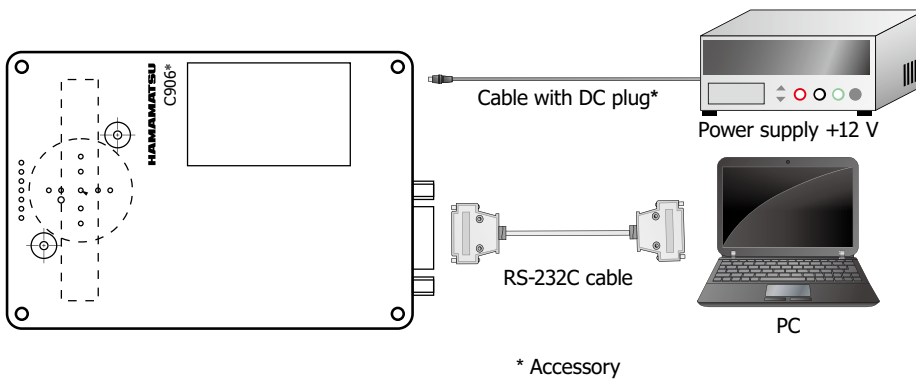
**Dimensional outline (unit: mm)**



Tolerance unless otherwise noted: ±0.3

KACCA0494EA

**Connection example**



\* Accessory

KACCC1178EA

**Accessories**

- Instruction manual
- Sample software (CD-ROM)
- Cable with DC plug
- Flat cable (48 cm) with connector for D/A conversion signal output
- Attachment board for S5990-01/S5991-01 (C9069-01 only)

Note: RS-232C cable is not supplied. Prepare an off-the-shelf cable (straight) with 9-pin D-sub connectors (male to female).

## Related information

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

### ■ Precautions

- Disclaimer

### ■ Technical notes

- PSD
- PSD signal processing circuits, PSD modules

Information described in this material is current as of January 2023.

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](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, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218

Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: [info@hamamatsu.de](mailto:info@hamamatsu.de)

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 E-mail: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

United Kingdom: HAMAMATSU PHOTONICS UK LIMITED: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: HAMAMATSU PHOTONICS NORDEN AB: Torshamnsgatan 35, 16440 Kista, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: HAMAMATSU PHOTONICS ITALIA S.R.L.: Strada della Moia, 1 int. 6 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

China: HAMAMATSU PHOTONICS (CHINA) CO., LTD.: 1201, Tower B, Jiaming Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: [hpc@hamamatsu.com.cn](mailto:hpc@hamamatsu.com.cn)

Taiwan: HAMAMATSU PHOTONICS TAIWAN CO., LTD.: 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: [info@hamamatsu.com.tw](mailto:info@hamamatsu.com.tw)