

EE-SPY31/41

Accurately detects objects placed in front of shiny Background.



- A shiny background can be used as long as the distance between the sensor and the background is 20 mm or more.
- Detects minute objects such as a 0.05-mm-dia. pure copper wire.
- Small dispersion in sensing distance.
- Light modulation effectively reduces external light interference.
- Wide operating voltage range: 5 to 24 VDC



Be sure to read *Safety Precautions* on page 4.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Ordering Information

Sensors

Infrared light

Appearance	Sensing method	Sensing distance		Output type	Output configuration	Model
Horizontal type 	Convergent reflective type		2 to 5 mm	NPN output	Dark-ON	EE-SPY311
Vertical type 					Light-ON	EE-SPY411
					Dark-ON	EE-SPY312
					Light-ON	EE-SPY412

Accessories (Order Separately)

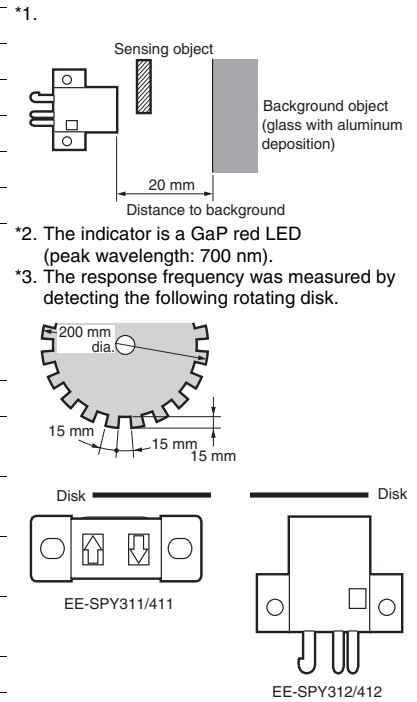
Type	Cable length	Model	
Connector		EE-1001	
		EE-1009 *	
	Connector with Cable	1 m	EE-1006 1M
			EE-1010 1M *
	Connector with Robot Cable	1 m	EE-1010-R 1M *
		2 m	EE-1010-R 2M *
NPN/PNP Conversion Connector	0.46 m (total length)	EE-2002	

Note: Refer to *Accessories* for details.

* EE-1009- or EE-1010-series Connectors have a builtin locking mechanism to prevent cable disconnection when only the cable is pulled. To remove the Connector from the Sensor, grip the top and bottom of the Connector firmly and push into the Sensor once before pulling out. The locking mechanism prevents the Connector from being removed by pulling on the cable only and enables removal only when the Connector (housing) is pulled.

Ratings and Specifications

Item	Models	EE-SPY311, EE-SPY411, EE-SPY312, EE-SPY412
Sensing distance		2 to 5 mm (Reflection factor: 90%; white paper 15 × 15 mm)
Minimum sensing object		Pure copper wire (0.05 mm dia.)
Distance to background *1		20 mm max. (glass with aluminum deposition)
Differential distance		0.2 mm (with a sensing distance of 3 mm, horizontally)
Light source		GaAs infrared LED with a peak wavelength of 940 nm
Indicator *2		Light indicator (red)
Supply voltage		5 to 24 VDC ±10%, ripple (p-p): 5% max.
Current consumption		Average: 15 mA max., Peak: 50 mA max.
Control output		NPN voltage output: Load power supply voltage: 5 to 24 VDC Load current: 80 mA max. OFF current: 0.5 mA max. 80 mA load current with a residual voltage of 1.0 V max. 10 mA load current with a residual voltage of 0.4 V max.
Response frequency *3		100 Hz min.
Ambient illumination		3,000 lx max. with incandescent light or sunlight on the surface of the receiver
Ambient temperature range		Operating: -10 to +55°C Storage: -25 to +65°C
Ambient humidity range		Operating: 5% to 85% Storage: 5% to 95%
Vibration resistance		Destruction: 10 to 50 Hz, 1.5-mm double amplitude for 2 h each in X, Y, and Z directions
Shock resistance		Destruction: 500m/s ² for 3 times each in X, Y, and Z directions
Degree of protection		IEC IP50
Connecting method		Special connector (soldering not possible)
Weight		Approx. 2.6 g
Material	Case	Polycarbonate
	Holder	Polybutylene phthalate (PBT)



I/O Circuit Diagrams

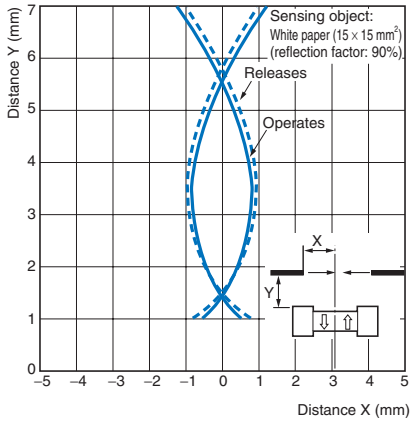
NPN Output

Model	Output configuration	Timing charts	Output circuit
EE-SPY411 EE-SPY412	Light-ON	<p>Incident Interrupted</p> <p>Light indicator (red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load 1 (relay) Operates Releases</p> <p>Load 2 H L</p>	<p>* Voltage output (when the sensor is connected to a transistor circuit)</p>
EE-SPY311 EE-SPY312	Dark-ON	<p>Incident Interrupted</p> <p>Light indicator (red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load 1 (relay) Operates Releases</p> <p>Load 2 H L</p>	

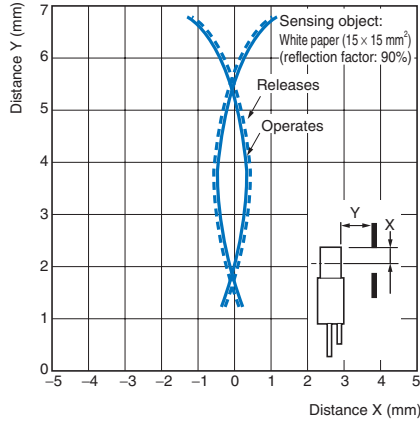
Engineering Data (Reference Value)

Operating Range Characteristics

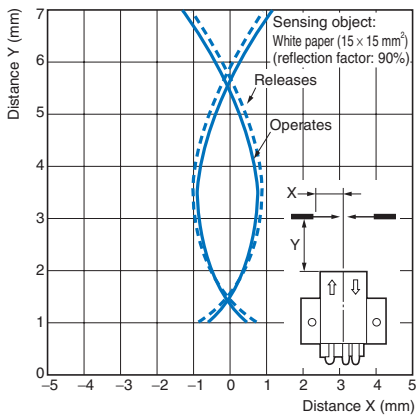
EE-SPY311/411



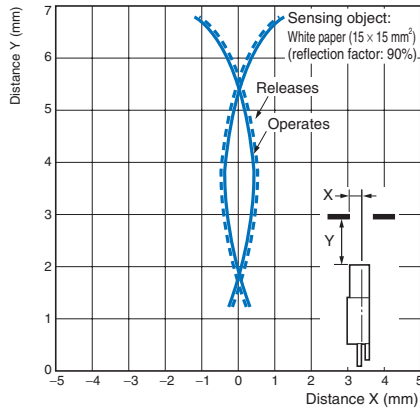
EE-SPY311/411



EE-SPY312/412

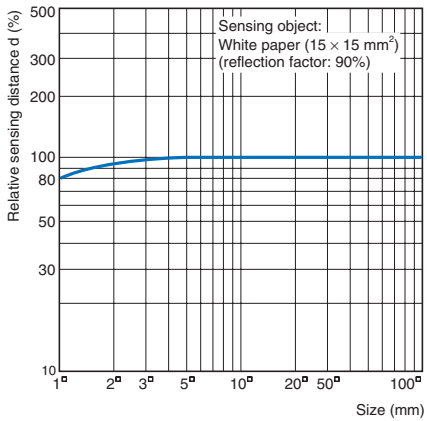


EE-SPY312/412



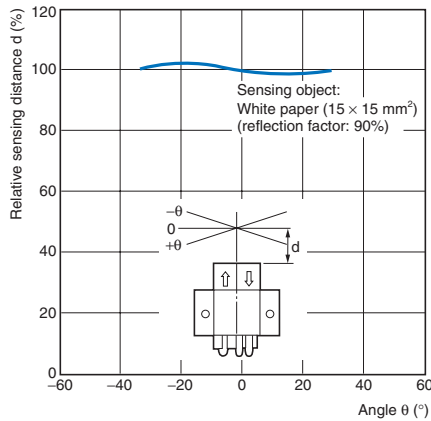
Sensing Distance vs. Object Area Characteristics

EE-SPY□□□□



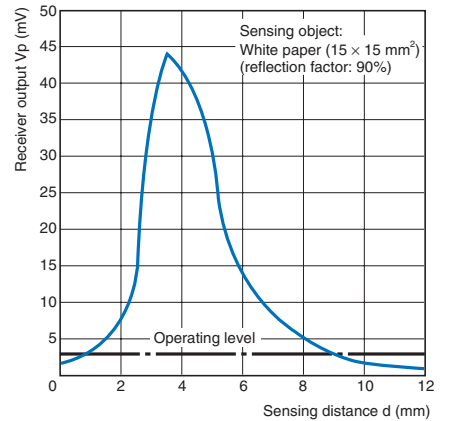
Sensing Angle vs. Sensing Distance Characteristics

EE-SPY312/412



Receiver Output vs. Sensing Distance Characteristics

EE-SPY□□□□



Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



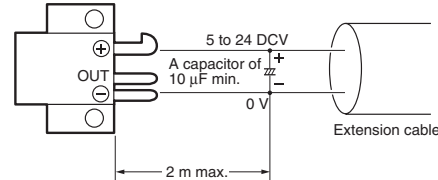
Precautions for Correct Use

Make sure that this product is used within the rated ambient environment conditions.

● **Wiring**

- Connection is made using a connector. Do not solder to the pins (leads).

- When extending the cable, use an extension cable with conductors having a total cross-section area of 0.3 mm². The total cable length must be 2 m maximum.
- To use a cable length longer than 2 m, attach a capacitor with a capacitance of approximately 10 μF to the wires as shown below. The distance between the terminal and the capacitor must be within 2 m. (Use a capacitor with a dielectric strength that is at least twice the Sensor's power supply voltage.)



- Make sure the total length of the power cable connected to the product is less than 10 m even if a capacitor is inserted.

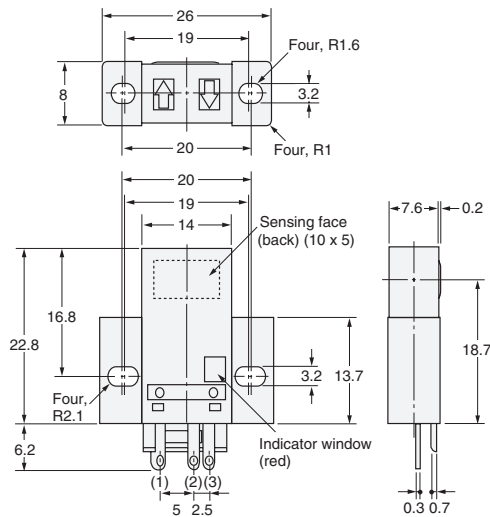
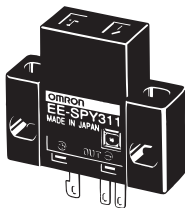
(Unit: mm)

Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

Sensors

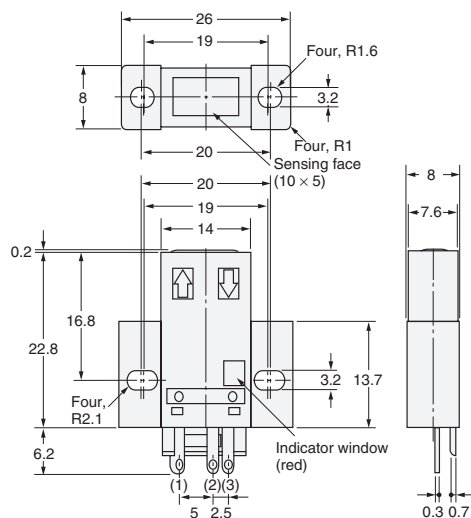
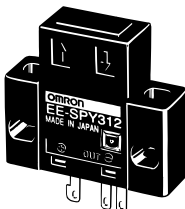
EE-SPY311
EE-SPY411



Terminal Arrangement

(1)	+	V _{CC}
(2)	OUT	OUTPUT
(3)	-	GND (0 V)

EE-SPY312
EE-SPY412



Terminal Arrangement

(1)	+	V _{CC}
(2)	OUT	OUTPUT
(3)	-	GND (0 V)

Accessories (Order Separately)

* Refer to *Accessories* for details.

Terms and Conditions Agreement

Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

Limitation on Liability; Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Omron:](#)

[EE-SPY412](#) [EE-SPY411](#) [EE-SPY312](#) [EE-SPY311](#)

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru