Compact Pre-wired Photomicrosensor with Built-in Amplifier (Non-modulated)

EE-SX91

Meeting Customer Needs with Compact Sensors that Mount with M3 Screws

- Both light-ON and dark-ON outputs (antivalent outputs) provided.
- A compact size and choice of five models for a wide range of applications.
- Compact NPN and PNP output models.
- Mount using M3 or M2 screws.
- Indicator is visible from many directions for installation in any location.
- Maximum load current of 100 mA.
- Models with connectors simplify wiring and maintenance.
- Flexible robot cables are standard on all models.

Features

A Compact Size and Choice of Five Models for a Wide Range of Applications

Select any of five models to minimize the space required.

Compact NPN and PNP Output Models

Both NPN and PNP output models are available for use according to system requirements.

Maximum Load Current of 100 mA

Output control of up to 100 mA is supported for either NPN or PNP outputs.

Models with Connectors Simplify Wiring and Maintenance

Using models with connectors allows wiring to be used as it is, with no need to replace anything but sensors.

Flexible Robot Cables: Standard on All Models

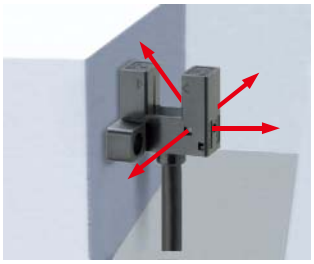
Robot Cables are effective for moving parts, and are provided as standard equipment with all models.

Both Light-ON and Dark-ON Outputs

Both light-ON and dark-ON outputs are provided on all models, allowing outputs to be switched by simply changing the wiring according to the application.

Indicator Visible from Many Directions for Installation in Any Location

The light indicator can be checked from up to four directions.



Mount Using M3 or M2 Screws

The EE-SX91 can be mounted using M3 or M2 screws, so it can easily replace an existing compact sensor mounted with M2 screws.

Ordering Information

List of Models

Models with Robot Cables

Infrared light

Appearance	Sensing method	Sensing distance		Output configuration	Indicator mode	Connecting method (Cable length)	Model	
							NPN output	PNP output
Standard 	Through-beam type (with slot)		5 mm (slot width)	Light-ON Dark-ON (2 outputs)	Lit when light is incident	Pre-wired models (1 m)	**EE-SX910-R**	**EE-SX910P-R**
						Models with connectors (0.3 m)	**EE-SX910-C1J-R**	**EE-SX910P-C1J-R**
L-shaped 						Pre-wired models (1 m)	**EE-SX911-R**	**EE-SX911P-R**
						Models with connectors (0.3 m)	**EE-SX911-C1J-R**	**EE-SX911P-C1J-R**
F-shaped 						Pre-wired models (1 m)	**EE-SX912-R**	**EE-SX912P-R**
						Models with connectors (0.3 m)	**EE-SX912-C1J-R**	**EE-SX912P-C1J-R**
R-shaped 						Pre-wired models (1 m)	**EE-SX913-R**	**EE-SX913P-R**
						Models with connectors (0.3 m)	**EE-SX913-C1J-R**	**EE-SX913P-C1J-R**
U-shaped 						Pre-wired models (1 m)	**E-SX914-R**	**EE-SX914P-R**
						Models with connectors (0.3 m)	**EE-SX914-C1J-R**	**EE-SX914P-C1J-R**

Accessories (Order Separately)

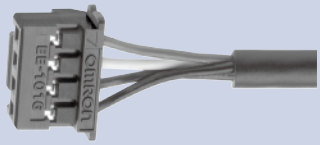
Connector with Robot Cable

Type	Cable length	Model	Remarks
Connector with Cable	2 m	**EE-1016-R**	Connector with lock, AWG26, 4-core Robot Cable

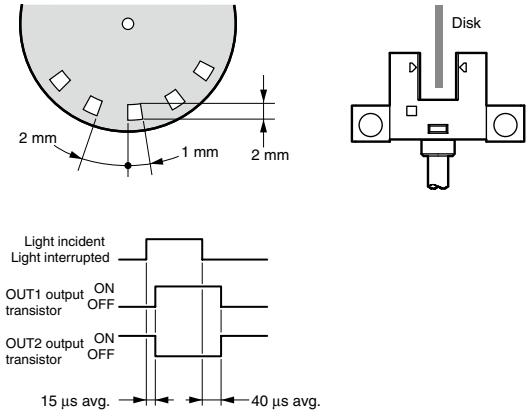
Ratings and Specifications

Item			Type	Standard	L-shaped	F-shaped	R-shaped	U-shaped
	NPN models		Pre-wired models	EE-SX910-R	EE-SX911-R	EE-SX912-R	EE-SX913-R	EE-SX914-R
			Models with connectors	EE-SX910-C1J-R	EE-SX911-C1J-R	EE-SX912-C1J-R	EE-SX913-C1J-R	EE-SX914-C1J-R
	PNP models		Pre-wired models	EE-SX910P-R	EE-SX911P-R	EE-SX912P-R	EE-SX913P-R	EE-SX914P-R
			Models with connectors	EE-SX910P-C1J-R	EE-SX911P-C1J-R	EE-SX912P-C1J-R	EE-SX913P-C1J-R	EE-SX914P-C1J-R
Supply voltage				5 to 24 VDC ±10%, ripple (p-p): 10% max.				
Current consumption				15 mA max.				
Sensing distance				5 mm (slot width)				
Differential distance				0.025 mm max.				
Light source				GaAs infrared LED				
Sensing object				Opaque: 1.2 × 0.8 mm min.				
Control output				Load power supply voltage: 5 to 24 VDC Load current: 100 mA max. 100 mA load current with a residual voltage of 1.0 V max. 5 mA load current with a residual voltage of 0.4 V max.				
Indicator				Light indicator (red LED)				
Protection circuits				Power supply reverse polarity protection; output reverse polarity protection				
Response frequency				3 kHz min. (8 kHz average) Light incident: 15 μs average; light interrupted: 40 μs average*				
Ambient illumination				1,000 lx max. with fluorescent light on the surface of the receiver				
Ambient temperature range				Operating: –25 to 55°C Storage: –30 to 80°C (with no icing or condensation)				
Ambient humidity range				Operating: 5% to 85% Storage: 5% to 95% (with no icing or condensation)				
Vibration resistance (Destruction)				10 to 2,000 Hz 0.75-mm single amplitude for 2.5 h (15-min periods, 10 cycles) each in X, Y, and Z directions				
Shock resistance (Destruction)				500 m/s^2 for 3 times each in X, Y, and Z directions				
Connecting method				Pre-wired Models (standard cable length: 1 m), Models with Connectors (standard cable length: 0.3 m)				
Enclosure rating				IEC IP50				
Weight (packaged)			Pre-wired Models	Approx. 17 g				
			Models with Connectors	Approx. 7 g				
Materials	Housing			Polybutylene phthalate (PBT)				
	Emitter/receiver			Polycarbonate (PC)				

Applicable Connector

Item		Product: Connector with Cable
		Model: EE-1016-R
Appearance		
Contact resistance		25m Ω max. (at 10 mA DC and 20 mV max.)
Insertion strength		20 N max.
Surplus strength (housing holding strength)		15 N min.
Cable length		2 m
Ambient temperature range		-25 to 85°C
Materials	Housing	Nylon
	Contact	Phosphor bronze

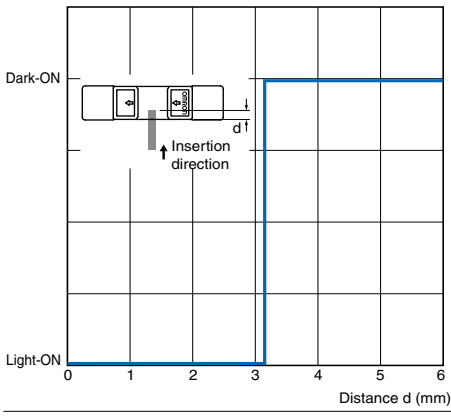
* The response frequency was measured by detecting the following rotating disk. The response times for light incidence and light interruption are shown in the timing chart.



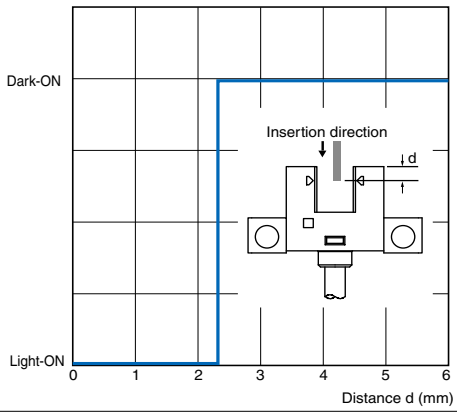
Engineering Data (Typical)

Sensing Position Characteristics

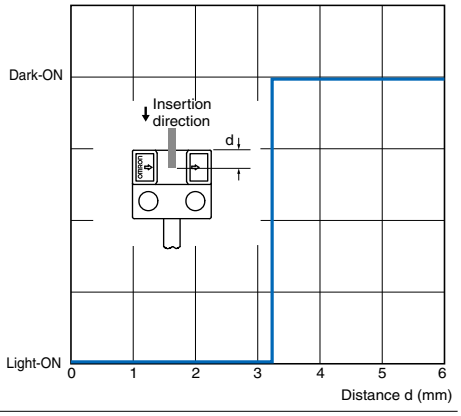
EE-SX910



EE-SX910

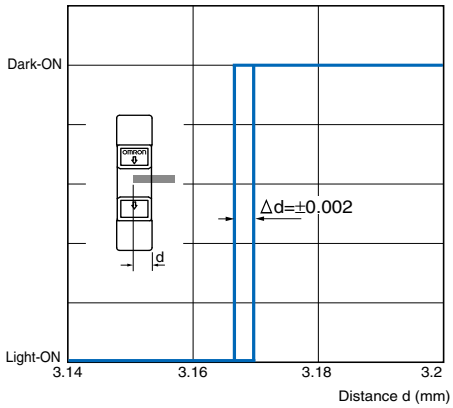


EE-SX911



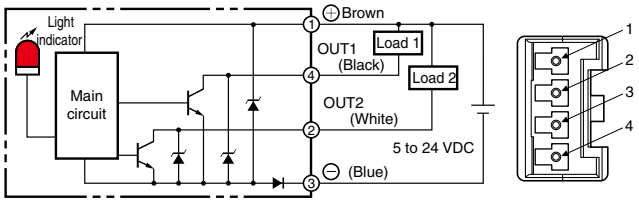
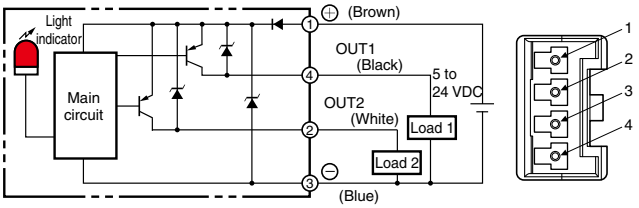
Repeated Sensing Position Characteristics

EE-SX910



Vcc = 24 V, No. of repetitions: 20, Ta = 25°C
(Differential distance = 0.025 mm max.)

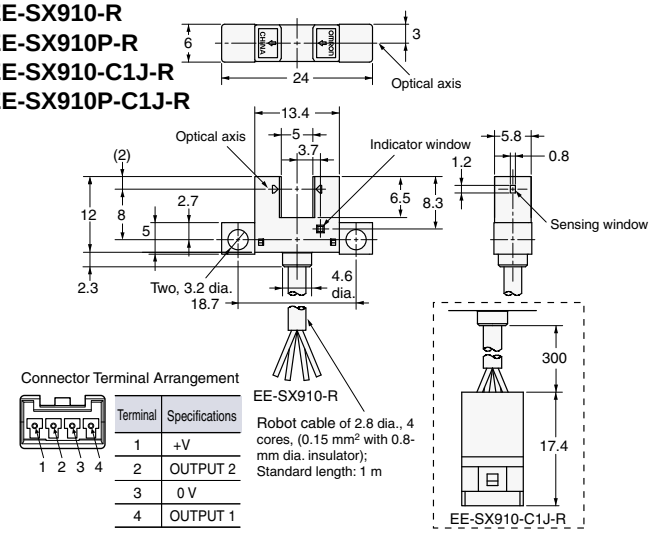
I/O Circuit Diagrams

Output type	Model	Output transistor operation status	Timing charts	Output circuit
NPN output	EE-SX910-R EE-SX910-C1J-R EE-SX911-R EE-SX911-C1J-R EE-SX912-R EE-SX912-C1J-R EE-SX913-R EE-SX913-C1J-R EE-SX914-R EE-SX914-C1J-R	OUT1: Light-ON OUT2: Dark-ON	Light incident Light interrupted Light indicator (red) ON / OFF Output 1 transistor ON / OFF	
PNP output	EE-SX910P-R EE-SX910P-C1J-R EE-SX911P-R EE-SX911P-C1J-R EE-SX912P-R EE-SX912P-C1J-R EE-SX913P-R EE-SX913P-C1J-R EE-SX914P-R EE-SX914P-C1J-R		Load 1 (relay) Operates / Releases Output 2 transistor ON / OFF Load 2 (relay) Operates / Releases	

Dimensions (Unit: mm)

Photomicrosensors

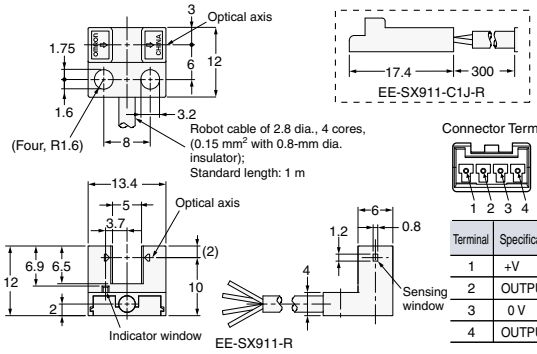
EE-SX910-R
EE-SX910P-R
EE-SX910-C1J-R
EE-SX910P-C1J-R



Connector Terminal Arrangement

Terminal	Specifications
1	+V
2	OUTPUT 2
3	0 V
4	OUTPUT 1

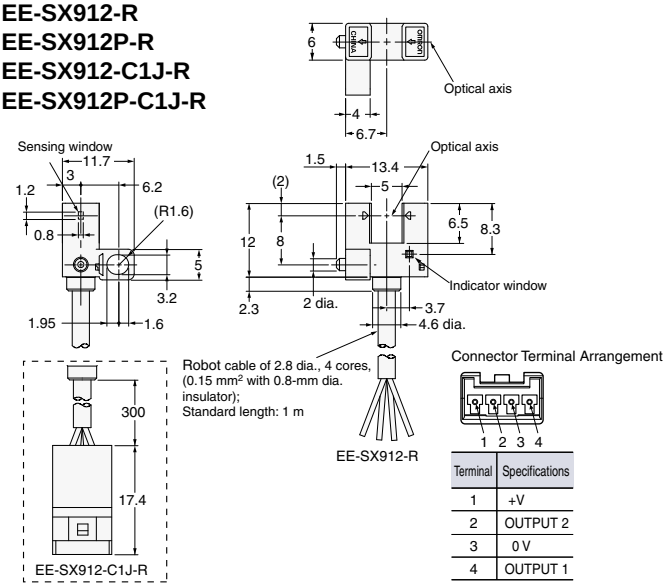
EE-SX911-R
EE-SX911P-R
EE-SX911-C1J-R
EE-SX911P-C1J-R



Connector Terminal Arrangement

Terminal	Specifications
1	+V
2	OUTPUT 2
3	0 V
4	OUTPUT 1

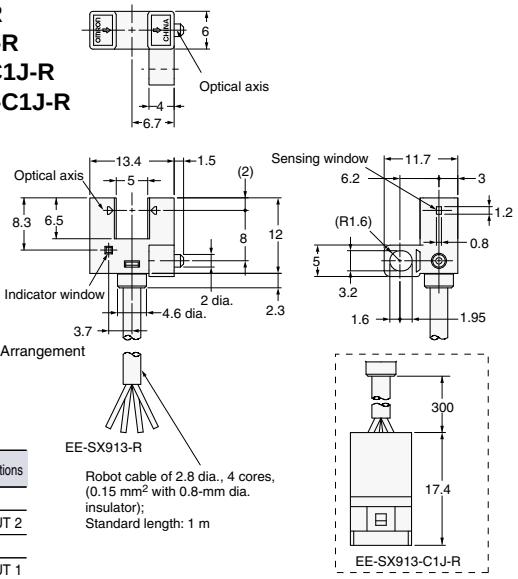
EE-SX912-R
EE-SX912P-R
EE-SX912-C1J-R
EE-SX912P-C1J-R



Connector Terminal Arrangement

Terminal	Specifications
1	+V
2	OUTPUT 2
3	0 V
4	OUTPUT 1

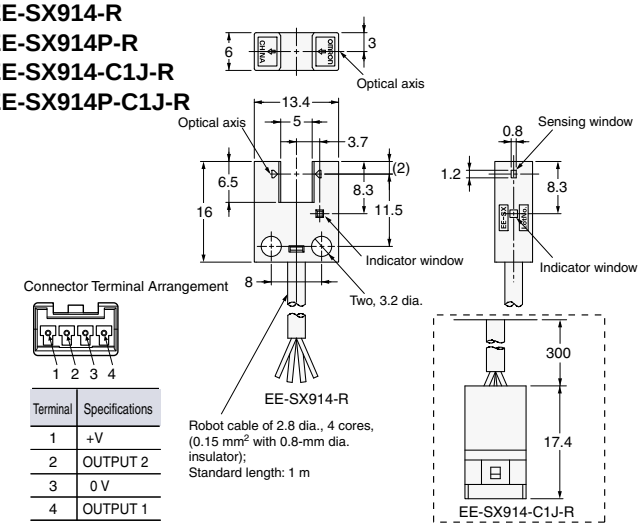
EE-SX913-R
EE-SX913P-R
EE-SX913-C1J-R
EE-SX913P-C1J-R



Connector Terminal Arrangement

Terminal	Specifications
1	+V
2	OUTPUT 2
3	0 V
4	OUTPUT 1

EE-SX914-R
EE-SX914P-R
EE-SX914-C1J-R
EE-SX914P-C1J-R



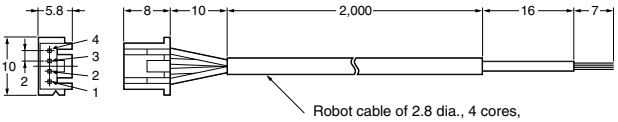
Connector Terminal Arrangement

Terminal	Specifications
1	+V
2	OUTPUT 2
3	0 V
4	OUTPUT 1

Accessories (Order Separately)

Connector with Robot Cable

EE-1016-R



Terminal Arrangement

①	⊕	Brown
②	OUTPUT 2	White
③	⊖	Blue
④	OUTPUT 1	Black