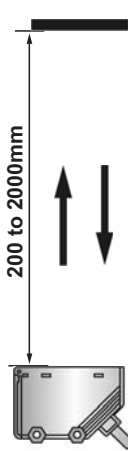





Diffuse Mode

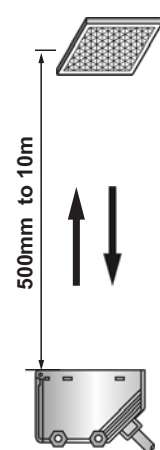



Sensing Mode	Appearance	Supply Voltage	Output Mode	Part Number
<p style="text-align: center;">Infrared 860nm</p>  <p style="text-align: center;">Diffuse Mode Sensing Distance: 200 to 2000mm</p>	<p>2m Cable</p> 	10 to 30V DC	NPN L.O./D.O.	<u>RP68-D2000N-CY9G3U2</u>
			PNP L.O./D.O.	<u>RP68-D2000P-CY9G3U2</u>
			NPN/PNP L.O./D.O.	<u>RP68-D2000D-CY9G4U2</u>
			NPN with Timing	<u>RP68-D2000N-CY9G3U2-T</u>
			PNP with Timing	<u>RP68-D2000P-CY9G3U2-T</u>
			NPN/PNP with Timing	<u>RP68-D2000D-CY9G4U2-T</u>
		12~240V DC/ 24~240V AC	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-D2000R-CY9C4L2</u>
			SPDT Relay with Timing (4-wire)	<u>RP68-D2000R-CY9C4L2-T</u>
			Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-D2000S-CY9C4L2</u>
			Solid State Isolated Relay with Timing (4-wire)	<u>RP68-D2000S-CY9C4L2-T</u>
	SPST Solid-State L.O./D.O. (2-wire)		<u>RP68-D2000C-CY9G2U2</u>	
	<p>Quick Disconnect swivel 90°</p> 	10 to 30V DC (Euro Style)	NPN L.O./D.O.	<u>RP68-D2000N-CY9Q4UE-S</u>
			PNP L.O./D.O.	<u>RP68-D2000P-CY9Q4UE-S</u>
			NPN/PNP L.O./D.O.	<u>RP68-D2000D-CY9Q4UE-S</u>
			NPN with Timing	<u>RP68-D2000N-CY9Q4UE-TS</u>
			PNP with Timing	<u>RP68-D2000P-CY9Q4UE-TS</u>
			NPN/PNP with Timing	<u>RP68-D2000D-CY9Q4UE-TS</u>
		12~240V DC/ 24~240V AC (Micro Style)	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-D2000R-CY9Q4LM-S</u>
			SPDT Relay with Timing (4-wire)	<u>RP68-D2000R-CY9Q4LM-TS</u>
			Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-D2000S-CY9Q4LM-S</u>
Solid State Isolated Relay with Timing (4-wire)			<u>RP68-D2000S-CY9Q4LM-TS</u>	
SPST Solid-State L.O./D.O. (2-wire)	<u>RP68-D2000C-CY9Q4UM-S</u>			
<p>6" Pigtail</p> 	10 to 30V DC (Euro Style)	NPN L.O./D.O.	<u>RP68-D2000N-CY9P4UE</u>	
		PNP L.O./D.O.	<u>RP68-D2000P-CY9P4UE</u>	
		NPN/PNP L.O./D.O.	<u>RP68-D2000D-CY9P4UE</u>	
		NPN with Timing	<u>RP68-D2000N-CY9P4UE-T</u>	
		PNP with Timing	<u>RP68-D2000P-CY9P4UE-T</u>	
		NPN/PNP with Timing	<u>RP68-D2000D-CY9P4UE-T</u>	
	12~240V DC/ 24~240V AC (Micro Style)	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-D2000R-CY9P4LM</u>	
		SPDT Relay with Timing (4-wire)	<u>RP68-D2000R-CY9P4LM-T</u>	
		Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-D2000S-CY9P4LM</u>	
		Solid State Isolated Relay with Timing (4-wire)	<u>RP68-D2000S-CY9P4LM-T</u>	
SPST Solid-State L.O./D.O. (2-wire)		<u>RP68-D2000C-CY9P4UM</u>		

Note:

Coming Soon : Part numbers with underline

In Preparation: Part numbers with a line through the middle

Retroreflective Mode with Polarizing Filter

Sensing Mode	Appearance	Supply Voltage	Output Mode	Part Number
<p style="text-align: center;">Red Light 700nm</p>  <p style="text-align: center;">Retroreflective Mode with Polarizing Filter Sensing Distance: 10m (Note)</p>	<p>2m Cable</p> 	10 to 30V DC	NPN L.O./D.O.	<u>RP68-L010MN-CY6G3U2-PF</u>
			PNP L.O./D.O.	<u>RP68-L010MP-CY6G3U2-PF</u>
			NPN/PNP L.O./D.O.	<u>RP68-L010MD-CY6G4U2-PF</u>
			NPN with Timing	<u>RP68-L010MN-CY6G3U2-TP</u>
			PNP with Timing	<u>RP68-L010MP-CY6G3U2-TP</u>
			NPN/PNP with Timing	<u>RP68-L010MD-CY6G4U2-TP</u>
		12~240V DC/ 24~240V AC	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-L010MR-CY6G4L2-PF</u>
			SPDT Relay with Timing (4-wire)	<u>RP68-L010MR-CY6G4L2-TP</u>
			Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-L010MS-CY6G4L2-PF</u>
			Solid State Isolated Relay with Timing (4-wire)	<u>RP68-L010MS-CY6G4L2-TP</u>
			SPST Solid-State L.O./D.O. (2-wire)	<u>RP68-L010MC-CY6G2U2-PF</u>
	<p>Quick Disconnect swivel 90°</p> 	10 to 30V DC (Euro Style)	NPN L.O./D.O.	<u>RP68-L010MN-CY6Q4UE-PS</u>
			PNP L.O./D.O.	<u>RP68-L010MP-CY6Q4UE-PS</u>
			NPN/PNP L.O./D.O.	<u>RP68-L010MD-CY6Q4UE-PS</u>
			NPN with Timing	<u>RP68-L010MN-CY6Q4UE-PT</u>
			PNP with Timing	<u>RP68-L010MP-CY6Q4UE-PT</u>
			NPN/PNP with Timing	<u>RP68-L010MD-CY6Q4UE-PT</u>
		12~240V DC/ 24~240V AC (Micro Style)	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-L010MR-CY6Q4LM-PS</u>
			SPDT Relay with Timing (4-wire)	<u>RP68-L010MR-CY6Q4LM-PT</u>
			Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-L010MS-CY6Q4LM-PS</u>
			Solid State Isolated Relay with Timing (4-wire)	<u>RP68-L010MS-CY6Q4LM-PT</u>
			SPST Solid-State L.O./D.O. (2-wire)	<u>RP68-L010MC-CY6Q4UM-PS</u>
<p>6" Pigtail</p> 	10 to 30V DC (Euro Style)	NPN L.O./D.O.	<u>RP68-L010MN-CY6P4UE-PF</u>	
		PNP L.O./D.O.	<u>RP68-L010MP-CY6P4UE-PF</u>	
		NPN/PNP L.O./D.O.	<u>RP68-L010MD-CY6P4UE-PF</u>	
		NPN with Timing	<u>RP68-L010MN-CY6P4UE-TP</u>	
		PNP with Timing	<u>RP68-L010MP-CY6P4UE-TP</u>	
		NPN/PNP with Timing	<u>RP68-L010MD-CY6P4UE-TP</u>	
	12~240V DC/ 24~240V AC (Micro Style)	SPDT Relay L.O./D.O. (4-wire)	<u>RP68-L010MR-CY6P4LM-PF</u>	
		SPDT Relay with Timing (4-wire)	<u>RP68-L010MR-CY6P4LM-TP</u>	
		Solid State Isolated Relay L.O./D.O. (4-wire)	<u>RP68-L010MS-CY6P4LM-PF</u>	
		Solid State Isolated Relay with Timing (4-wire)	<u>RP68-L010MS-CY6P4LM-TP</u>	
		SPST Solid-State L.O./D.O. (2-wire)	<u>RP68-L010MC-CY6P4UM-PF</u>	

Note:

Coming Soon : Part numbers with underline
 In Preparation: Part numbers with a line through the middle
 Note: Used with RE-8484 (supplied with sensor) reflector.

Specifications (DC)

Item \ Mode	Diffuse Mode	Retroreflective (with polarizing filter)
Sensing Range	0.2 to 2m	0.5 to 10m (Note)
Setting Distance	0.5 to 2m	—
Light Source (wave length)	Infrared LED (860 nm)	Red LED (700 nm)
Standard Sensing Object	white card 300x300 mm	Opaque: 80 dia. Min.
Response Time	5ms	1ms
Hysteresis (typical)	10% of setting distance	—
Spot size	70 dia. max. at 1m sensing distance	—
Reflectivity Characteristics (black/white error)	10%max. (At 1m sensing distance)	—
Current Consumption	60 mA max.	50 mA max.
Directional Angle	—	Sensor: 1° to 5° ; Reflector: 40° min.
Output Type	NPN, PNP, NPN/PNP	
Supply Voltage	10 to 30V DC including 10% (p-p) ripple	
Output	Load power supply voltage:30V DC max. Load current:100mA max. Residual voltage: NPN output:1.2V max. PNP output:2.0V max. Open collector output (NPN/PNP selectable)	
Operation Mode	Light-ON/Dark-ON switch selectable	
Circuit Protection	Protection from reversed power supply connection, load short-circuit, and mutual interference	
Time Options	No delay, On delay, Off delay, One-shot (with timer mode only)	
Time Settings	Adjustable, 0.1...1.5s or 0.1...15s (with timer mode only)	
Sensitivity Adjustment	One-turn potentiometer	
Ambient Illumination (receiver side)	Incandescent lamp: 30000 lx max. Sunlight: 10000 lx max.	
Ambient Temperature	Operating: -25°C to 55°C (-13 to 131°F) Storage: -30°C to 70°C (-22 to 158°F) with no icing or condensation	
Relative Humidity	Operating: -35% to 85% Storage: 35% to 95% with no icing or condensation	
Insulation Resistance	20 MΩ min. At 500V DC	
Dielectric Strength	1000VAC, 50/60 Hz for 1 min	
Vibration Resistance	10 to 55Hz, 1.5mm double amplitude for 2 hours each in X, Y and Z axes	
Shock Resistance	500 m/s ² 3 times each in X, Y, and Z axes	
Degree of Protection	IP 67	
Connection	Cable type: 2m PVC cable ; Connector type: Micro-style connector; Pigtail type: See Pigtail Series or our Cables & Connectors catalogue.	
Weight (packed state)	Approx. 50g	Approx. 150g
Material	Housing: PBT (polybutylene terephthalate); Lens: Acrylic (PMMA); Mounting bracket: Stainless steel (SUS 304), order separately	

Note: Used with RE-8484 (supplied with sensor) reflector.

Specifications (AC/DC)

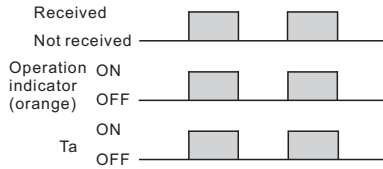
Item \ Mode	Diffuse	Retroreflective (with polarizing filter)
Sensing Range	0.2 to 2m	0.5 to 10m (Note)
Setting Distance	0.5 to 2m	———
Light Source (wave length)	Infrared LED (860 nm)	Red LED(700 nm)
Standard Sensing Object	white card 300x300mm	Opaque: 80 dia. Min.
Hysteresis (typical)	10% of setting distance	———
Spot Size	70 dia. max. at 1m sensing distance	———
Directional Angle	———	Sensor: 1° to 5° ; Reflector: 40° min.
Reflectivity Characteristics (black/white error)	10% max.(at 1m sensing distance)	———
Supply Voltage	12-240V DC 10% including 10%(p-p)max. Ripple 24-240V AC 10% at 50/60Hz	
Output Type	SPDT EM Relay, Solid State Isolated N.O., SPST solid-state relay	
Current Consumption	< 30 mA (no load)	
Response Time	SPDT EM Relay output:30ms; Solid State Isolated Relay output:2ms; SPST solid-state output:8ms	
Output (max. load current)	Relay output: SPDT,3A (cos φ = 1) max. At 250V AC or 3A max. At 30V DC Solid State Isolate Relay. : 300mA at 240V DC/AC SPST SCR solid-state relay:750 mA to 50°C ambient, 500mA to 70°C ambient	
Operation Mode	SPST EM Relay and Solid State Isolated Relay.: Light or Dark switching selectable via switch SPST solid-state relay: Light/Dark operate select switch	
Circuit Protection	Protection from mutual interference (SPST Solid State output with short circuit protections)	
Time Options	No delay, On delay, Off delay, One-shot (with timer mode only)	
Time Settings	Adjustable, 0.1...1.5s or 0.1...15s (with timer mode only)	
Sensitivity Adjustment	One-turn potentiometer	
Ambient Illumination (receiver side)	Incandescent lamp: 30000 lx max. Sunlight: 10000 lx max.	
Ambient Temperature	Operating: -25°C to 55°C (-13 to 131°F) Storage: -30°C to 70°C (-22 to 158°F) with no icing or condensation	
Relative Humidity	Operating: -35% to 85% Storage: 35% to 95% with no icing or condensation	
Insulation Resistance	20 MΩ min. At 500V DC	
Dielectric Strength	1000VAC, 50/60 Hz for 1 min	
Vibration Resistance	10 to 55Hz, 1.5mm double amplitude for 2 hours each in X, Y and Z axes	
Shock Resistance	500 m/s ² 3 times each in X, Y, and Z axes	
Degree of Protection	IP 67	
Connection	Cable type: 2m PVC cable ; Connector type: Micro-style connector; Pigtail type: See Pigtail Series or our Cables & Connectors catalogue.	
Weight (packed state)	Approx. 50g	Approx. 150g
Material	Housing: PBT (polybutylene terephthalate); Lens: Acrylic (PMMA); Mounting bracket: Stainless steel (SUS 304), order separately	

Note: Used with RE-8484 (supplied with sensor) reflector.

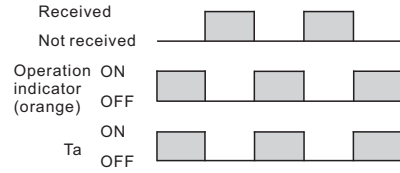
Timing Characteristics & Connection Diagrams

Timing Characteristics

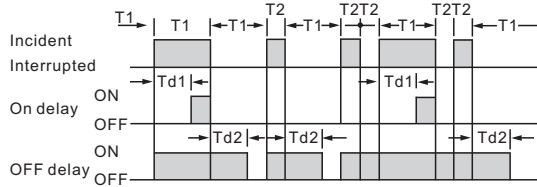
Without timer function (Light-ON)



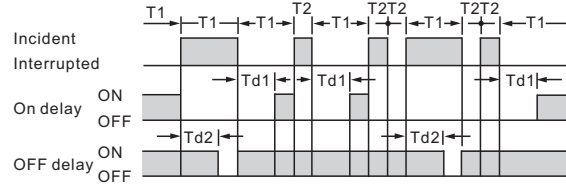
Without timer function (Dark-ON)



With Timer function (Light-ON)

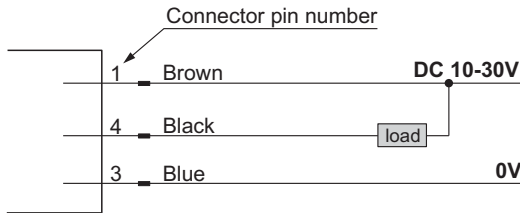


With Timer function (Dark-ON)

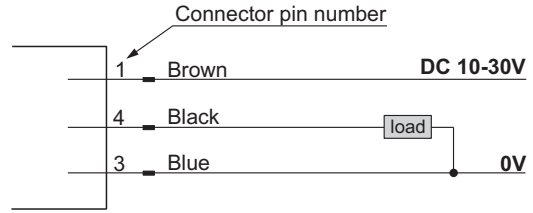


Note: **Td1, Td2**: Delay time (0 to 5s)
T1: A period longer than the delay time.
T2: A period shorter than the delay time.
 For ON-and OFF-delay timers, Td1 and Td2 are independently variable.

NPN output type



PNP output type

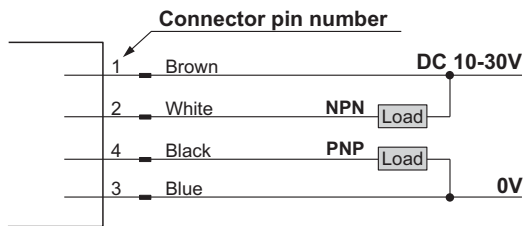


Connector pin position

Euro-style



NPN/PNP output type



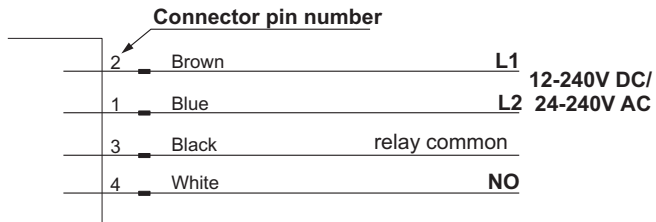
Connector pin position

Euro-style



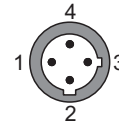
Connection Diagrams

SPDT Relay output type



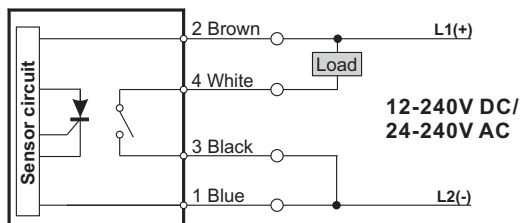
Connector pin position

Micro-style

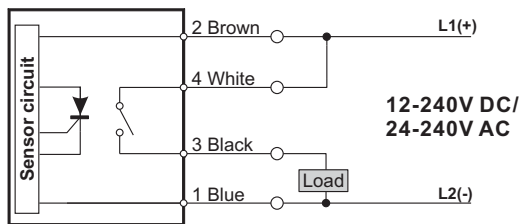


- 1.Red/black(L2)
- 2.Red/white (L1)
- 3.Red (relay common)
- 4.Green (N.O.)

Solid State Isolated Relay output type

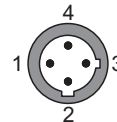


OR



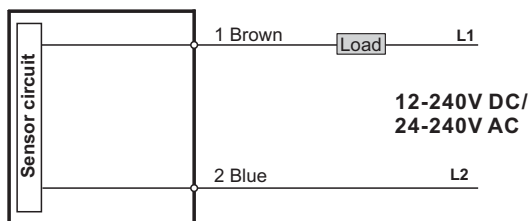
Connector pin position

Micro-style



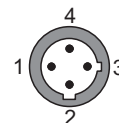
- 1.Red/black(L2)
- 2.Red/white (L1)
- 3.Red (Output)
- 4.Green (Output)

SPST Solid-State output type



Connector pin position

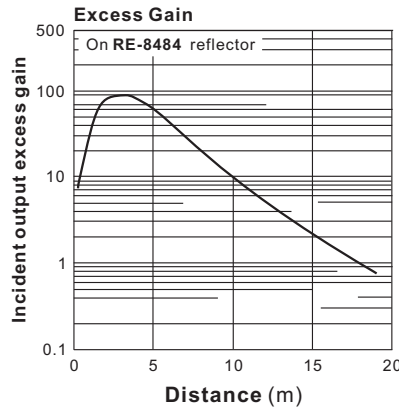
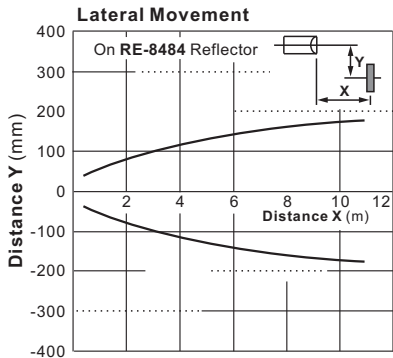
Micro-style



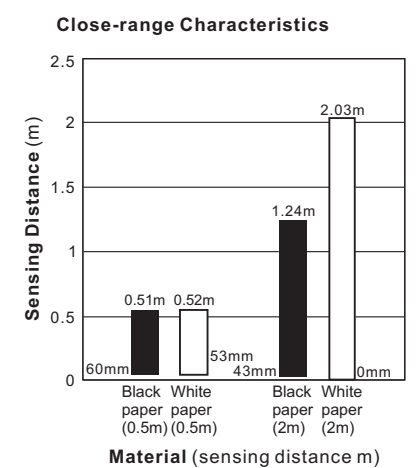
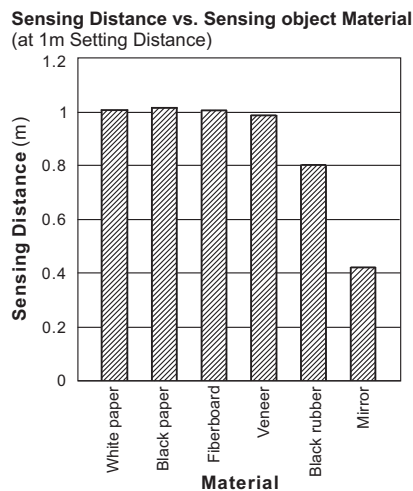
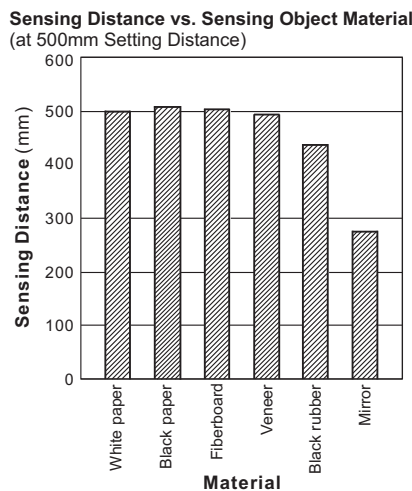
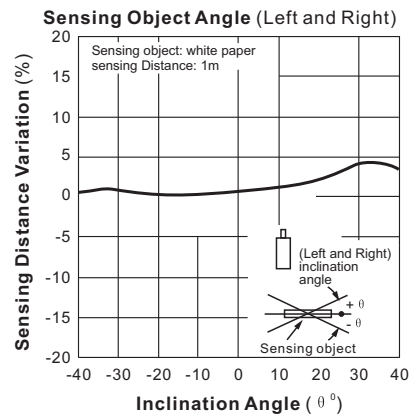
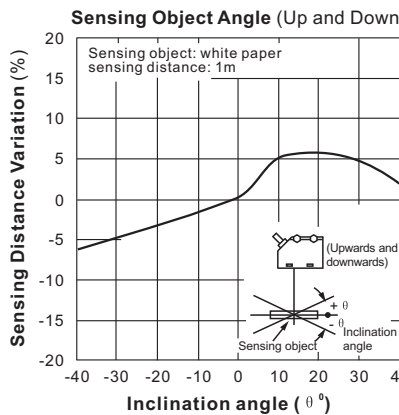
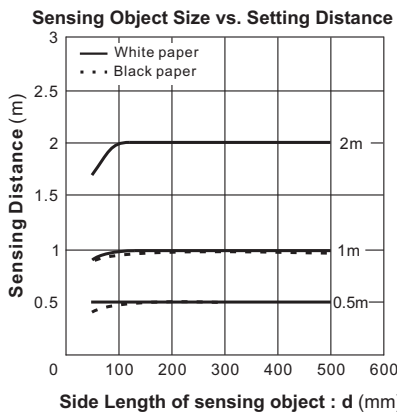
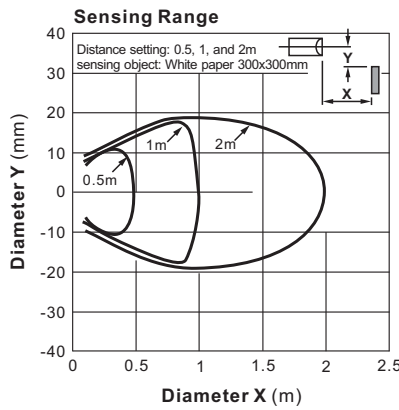
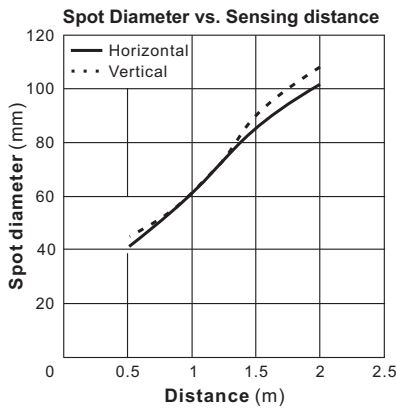
- 1.Red/black(L2)
- 2.Red/white (L1)
- 3.Not used
- 4.Not used

Sensing Characteristics (Typical)

Retroreflective Mode with Polarizing Filter



Diffuse Mode



Installation

Wiring

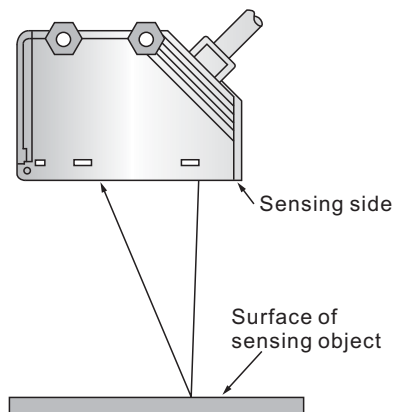
The tensile strength of the cable during operation should not exceed the values shown below.

Part number	Tensile strength
RP68-L010MD-CX6C3U2-PF	50N max.
RP68-L010MD-CX6Q4UE-PS	10N max.

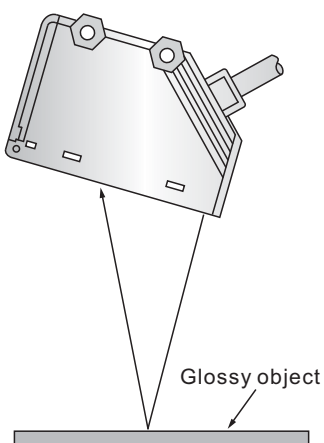
Mounting Diffuse Models

Mounting Directions

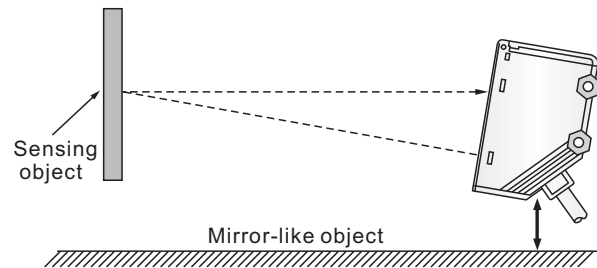
Make sure that the sensing side of the sensor is parallel with the surface of each sensing object. Do not tilt the sensor towards the sensing object.



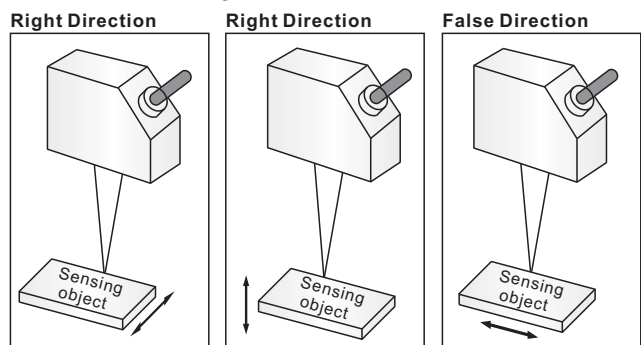
If the sensing object has a glossy surface, tilt the sensor by 5° to 10° as shown below, provided that the sensor is not influenced by any background objects.



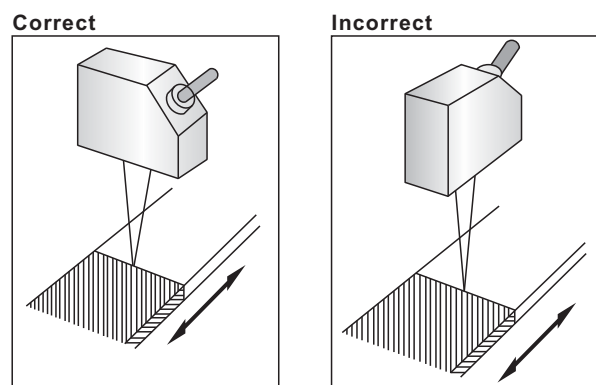
If there is a mirror-like object below the sensor, the sensor may not be in stable operation. Therefore, tilt the sensor or keep the sensor a distance away from the mirror-like object as shown below.



Make sure not to install the sensor in the incorrect direction. Refer to the following.



Install the sensor as shown in the following if each sensing object greatly differs in color or material.



Precautions for Proper Use

Precautions

Do not ignore the following items that are essential for securing safety during sensor operation.

- Do not use the sensor in locations with explosive or flammable gas.
- Do not use the sensor in the water or electrically conductive solutions.
- Do not disassemble, repair, or modify the product.
- Make sure that the power supply specifications, such as AC or DC, are correct.
- Do not apply voltage or current exceeding the rated ranges.
- Do not make mistakes in wiring, such as mistakes in polarity.
- Be sure to connect the load correctly.
- Do not short-circuit the load terminals.

Designing

Load relay contact

If sensor is connected to an inductive load with contacts that spark when the load is turned OFF (e.g., a contactor or valve), the normally-closed side may be turned ON before the normally-open side is turned OFF or vice-versa. If both normally-open output and normally-close output are used simultaneously, apply an surge suppressor to the load.

Stabilization on Power-up

The sensor needs 100ms to be ready to operate after it is turned ON. The devices connected to RP wait until the sensor is ready to operate. If the sensor and load are connected to separate power supplies, be sure to turn ON the sensor first.

Power OFF

A single pulse signal may be output from the sensor immediately after it is turned OFF. This will occur more frequently if a timer or counter is connected to the sensor and power is supplied to the timer or counter independently. Be sure to supply power to the timer or counter from the built-in power supply of the sensor.

Power Supply

If a standard switching regulator is used, be sure to ground the FG(frame ground) and G (ground) terminals, otherwise the sensor may malfunction due to the switching noise of the regulator.

Repeated cable bending

Do not bend the sensor cable repeatedly.

High-tension lines

Do not wire power lines or high-tension lines alongside the lines of the sensor in the same conduit, otherwise the sensor may be damaged or may malfunction due to induction. Be sure to wire the lines of the sensor separated from power lines or high-tension lines or laid in an exclusive, shielded conduit.

Wiring

The sensor has a built-in function to protect the sensor from load short-circuiting. If load short-circuit results, the output will be turned OFF. In that case, check the wiring and turn ON the sensor again so that the short-circuit protection circuit will be reset. This function will operate if the output current flow is at least 2.0 times the rated load current. If an inductive load is connected to the sensor, make sure that the inrush current does not exceed 1.2 times the rated load current.

The cable can be extended up to a total length of 100m, on condition that the thickness of the wire is at least 0.3mm.

Mounting

Mounting Conditions

If sensors are mounted face-to-face, make sure that no optical axes cross each other. Otherwise, mutual interference may result.

Be sure to install the sensor carefully so that the directional angle range of the sensor will not be directly exposed to intensive light, such as sunlight, fluorescent light, or incandescent light.

Do not strike the Photoelectric sensor with a hammer or any other tool during the installation of the sensor, or the sensor will lose its water-resistive properties.

Use M4 screws to mount the sensor.

When mounting the case, make sure that the tightening torque applied to each screw not exceed 1.2N · m.

M12 connector

Be sure to connector or disconnect the M12 connector after turning OFF the sensor.

Be sure to hold the connector cover when connecting or disconnecting the M12 connector.

The M12 connector must be only hand-tightened.

If the M12 connector is not connected securely, the proper degree of protection of the sensor may not be maintained or the connector may be disconnected due to vibration.

Water Resistance

Do not use the product in water, in rain, or outdoors.

Tighten the operation cover screws and terminal block cover screws to a torque of 0.3 to 0.5N · m in order to ensure water resistivity.

Maintenance and Inspection

Cleaning

Use only water and mild detergent. Do not use harsh chemicals or solvents.

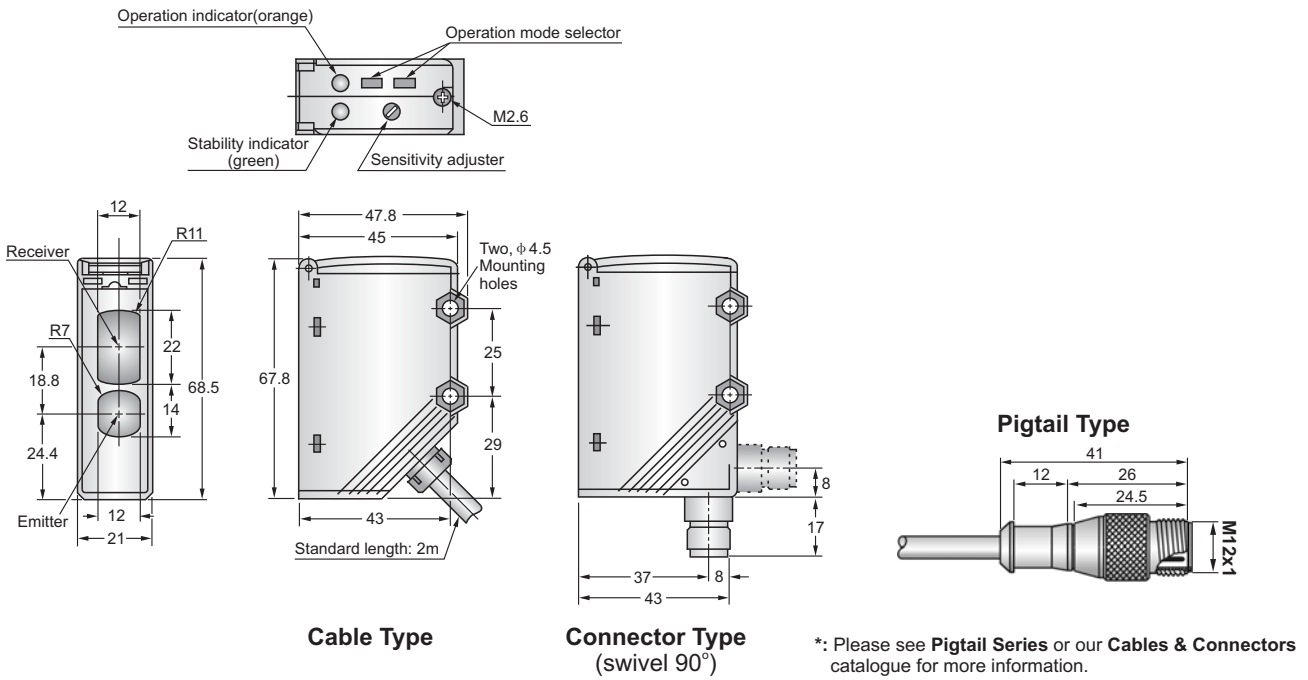
Operation Environment

Do not install the sensor in locations with the following conditions.

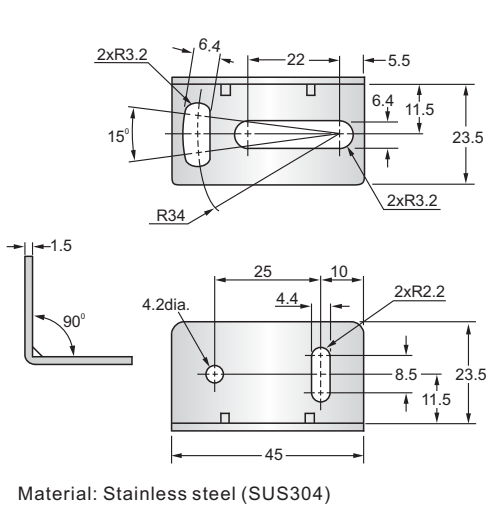
- Excessive dust.
- Corrosive gases.
- Directly exposed to sprays of water, oil, or chemicals.
- Directly exposed to vibration or shock.

Dimensions (Unit: mm)

Sensor Type



MB-4524 (Mounting bracket-optional)



MB-4565 (Mounting bracket-optional)

