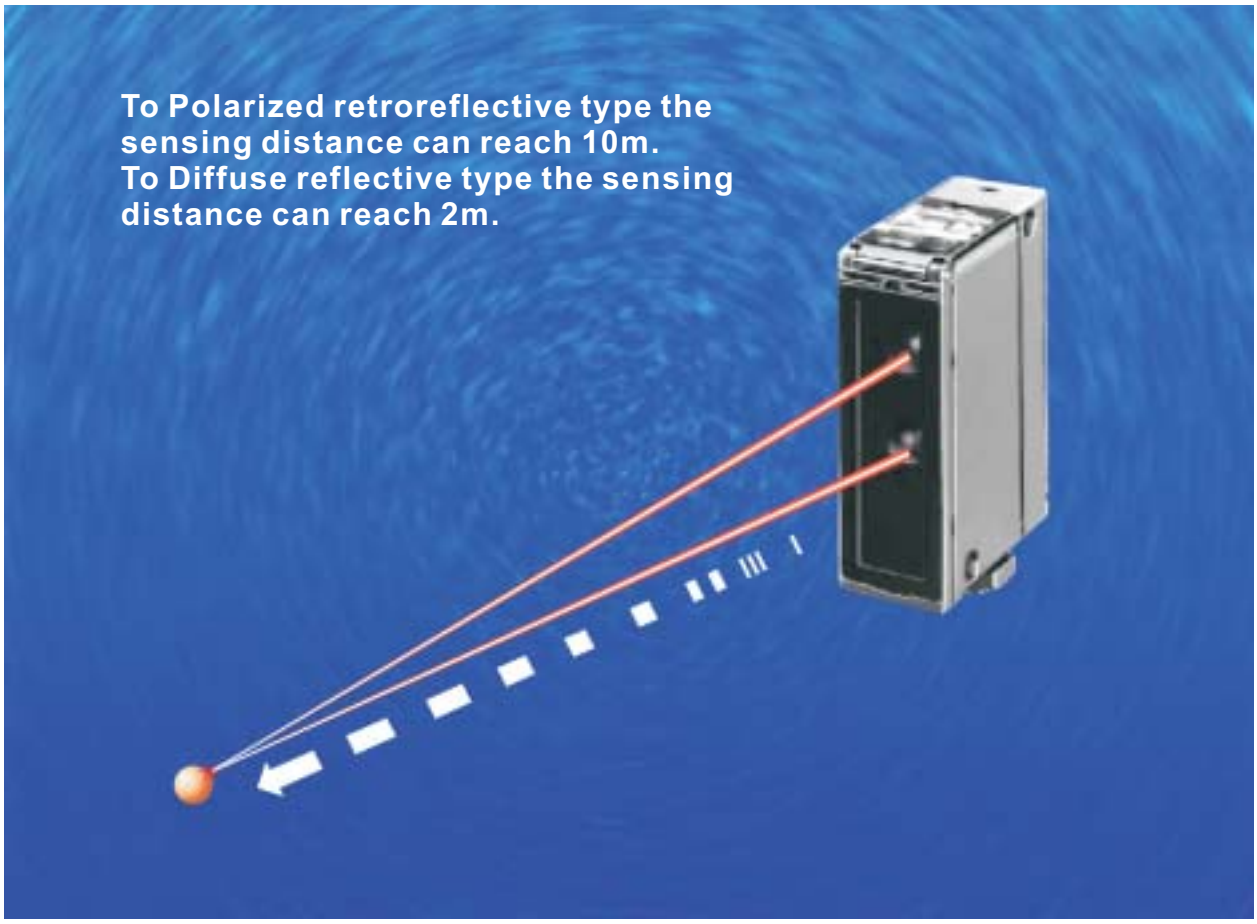
RP85 SERIES

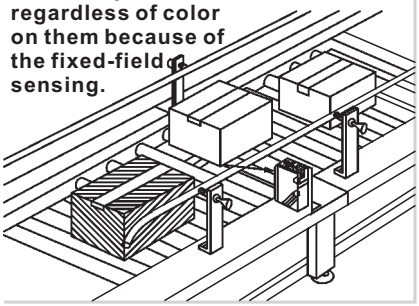


RP85 SERIES

Application

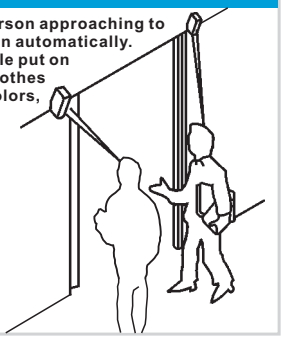
Detecting cardboard boxes passing by

It securely detects cardboard boxes regardless of color on them because of the fixed-field sensing.

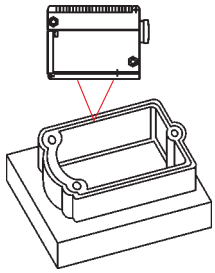


Detecting people in front of automatic door

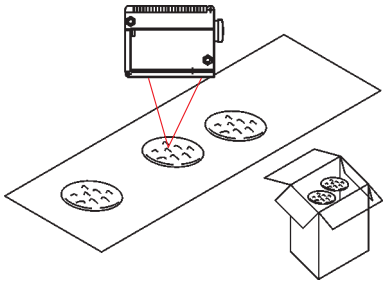
They detect person approaching to the door to open automatically. Although people put on own-desired clothes with various colors, they perfectly detect people.



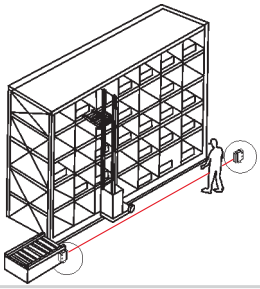
Detecting Gasket on Die-casting



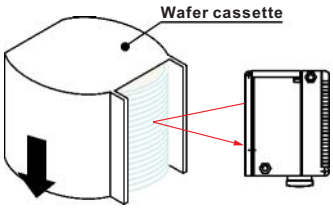
Sensing of thin-baked rice crackers



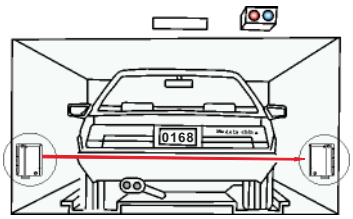
Detecting person entering stacker crane path



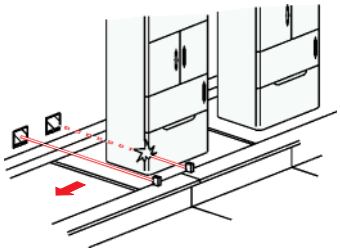
Wafer counting in cassette



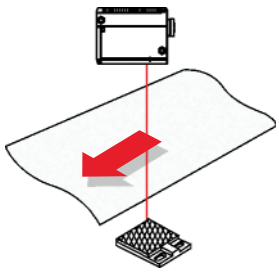
Detecting car entering dangerous place



Detection of specular goods

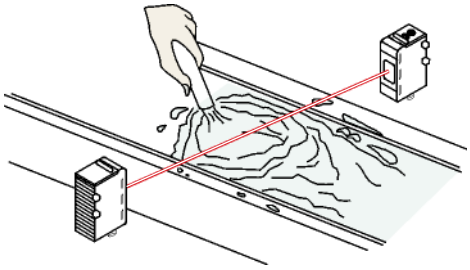


Sensing transparent sheet



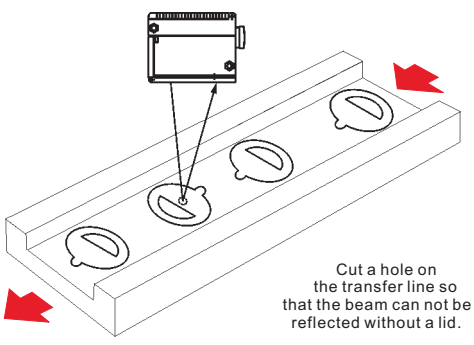
Waterproof

Achieves IP 67. The sensor can be put on machinery washed with water. The mounting bracket (option) is not corrosive as it is made of stainless steel material.



Note: However, a water drop on the sensing face may cause the sensor generate the output.

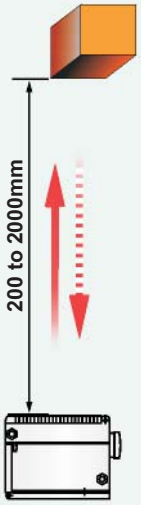
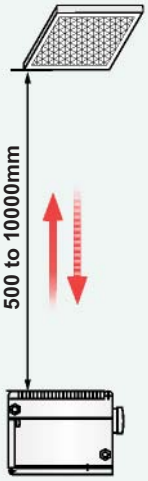
Detecting lids of cups



Cut a hole on the transfer line so that the beam can not be reflected without a lid.

RP85 SERIES

Order guide

Sensing mode	Appearance	Supply voltage	OUTPUT MODE	Part Number
 **Diffuse mode** sensing distance 200 to 2000mm Infrared red LED		12 to 240V DC/ 24 to 240V AC		
			SPDT Relay	RP85-D2000R-CX9T4L
			SPDT Relay with Timing	RP85-D2000R-CX9T4L-T
 **Retro-reflective mode** sensing distance 500 to 10000mm Red LED		12 to 240V DC/ 24 to 240V AC		
			SPDT Relay	RP85-L10000R-CX6T4L
			SPDT Relay with Timing	RP85-L10000R-CX6T4L-T

RP85 SERIES

PHOTOELECTRIC SPECIFICATIONS

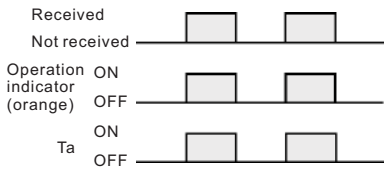
Specifications

Item \ Type	Retroreflective	Diffuse reflective
Model No.	RP85-L10000R-CX6T4L RP85-L10000R-CX6T4L-T	RP85-D2000R-CX9T4L RP85-D2000R-CX9T4L-T
Sensing distance	0.5 to 10m using RE-8160	0.2 to 2m
Setting distance	————	0.5 to 2m
Standard sensing object	Opaque: 80 dia. Min.	Kodak 90% white card 300x300 mm
Hysteresis (typical)	————	10% of setting distance
Directional angle	Sensor: 1° to 5°; Reflector:40° min.	————
Reflectivity characteristics (black/white error)	————	±10% max. (At 1m sensing distance)
Light source (wave length)	Red LED (700 nm)	Infrared LED (860 nm)
Spot size	————	70 dia.max.at 1m sensing distance
Supply voltage	12 to 240V DC ±10% including 10% (p-p)max. Ripple 24 to 240V AC ±10% at 50/60 Hz	
Current consumption	2W max.	
Output	Relay output: SPDT, 3A (cos ϕ=1) max. At 250V AC or 3A max. At 30V DC	Relay output: SPDT, 3A (cos ϕ=1) max. At 250V AC or 3A max. At 30V DC
Operation mode	Light-ON/Dark-ON switch selectable	
Life expectancy (relay output)	Mechanical: 50,000,000 operations min.(Switching frequency: 18,000 operations/h) Electrical: 100,000 operations min.(switching frequency: 1,800 operations/h)	
Circuit protection	Protection from mutual interference	
Response time	30ms max.	
Sensitivity adjustment	One-turn potentiometer	Teaching (in NORMAL or ZONE mode)
Ambient illumination (receiver side)	Incandescent lamp: 30000 lx max. Sunlight: 10000 lx max.	
Ambient temperature	Operating: -25℃ to 55℃(-13 to 131°F) Storage: -30℃ to 70℃ (-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 MΩmin. At 500V DC	
Dielectric strength	2000VAC, 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/s² 3 times each in X, Y, and Z axes	
Degree of protection	IP 67	
Connection method	Terminal block	
Weight (packed state)	Approx. 150g	
Material	Case: PBT (polybutylene terephthalate); Lens: Acrylic (PMMA); Mounting bracket: Stainless steel (SUS 304), order separately	

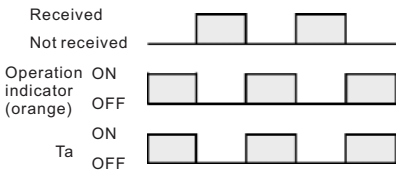
Relay output

Timing chart

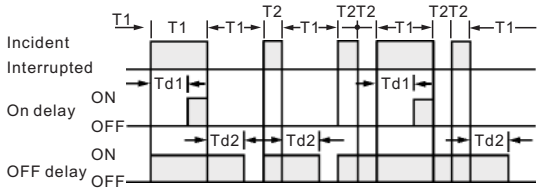
Without timer function--- Light ON



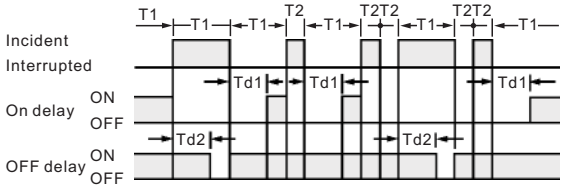
Without timer function--- Dark ON



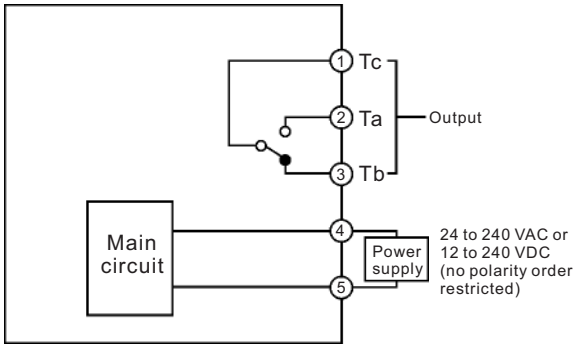
With Timer function---Light ON



With Timer function---Dark ON



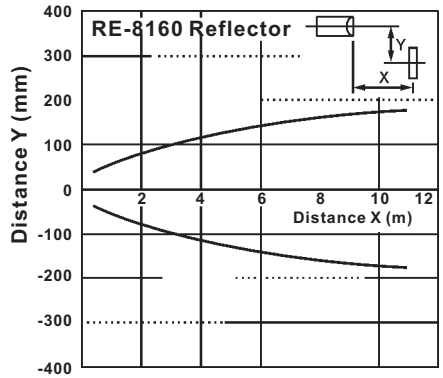
Output circuit



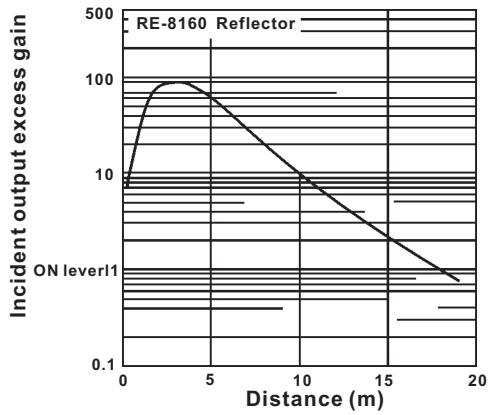
Note: Td1, Td2: Delay time (0 to 5s)
T1: A period longer than the delay time.
T2: A period shorter than the delay time.
For ON-and OFF- delay timers, Td1 and Td2 are independently variable.

RETRO REFLECTIVE MODELS

Lateral Movement

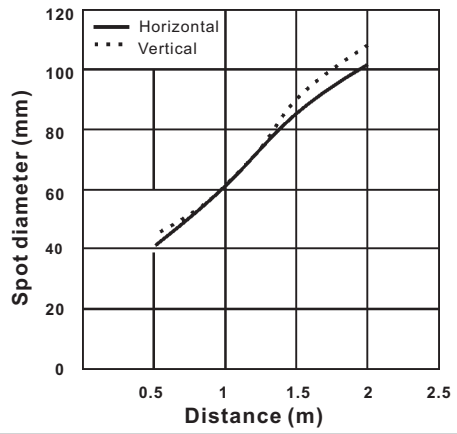


Excess Gain

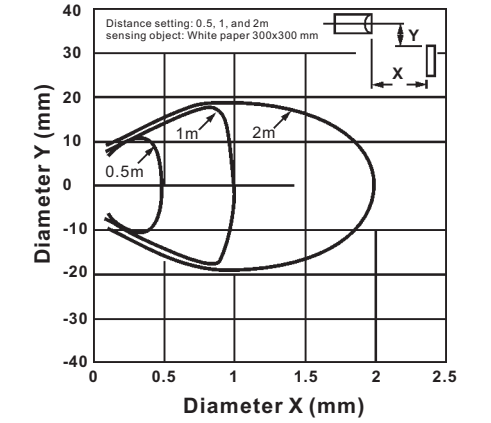


DIFFUSE MODELS

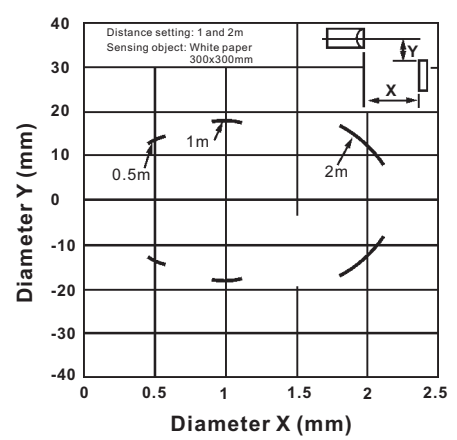
Spot diameter vs. Sensing distance



Sensing Zone in NORMAL Mode

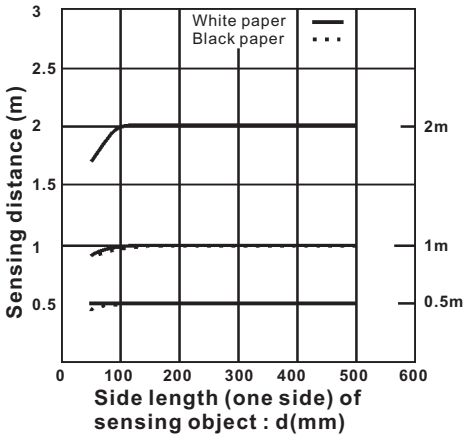


Sensing Zone in ZONE Mode

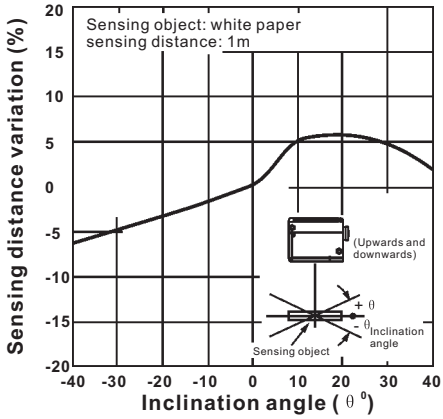


DIFFUSE MODELS

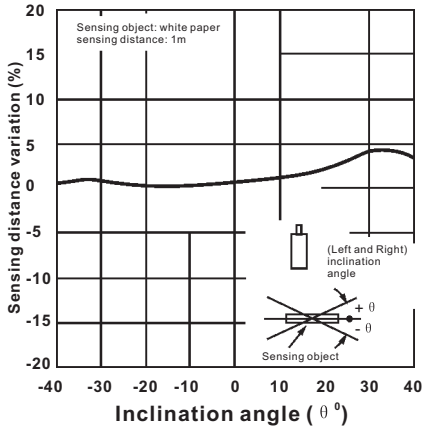
Sensing Object Size vs. Setting Distance



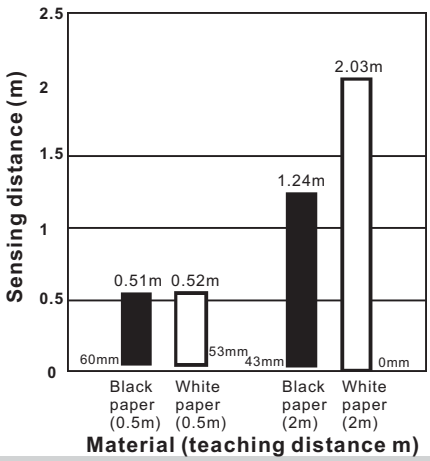
Sensing object Angle characteristics (Up and Down)



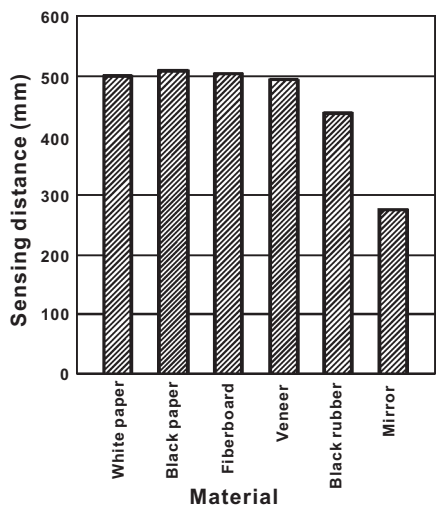
Sensing Object Angle (Left and Right)



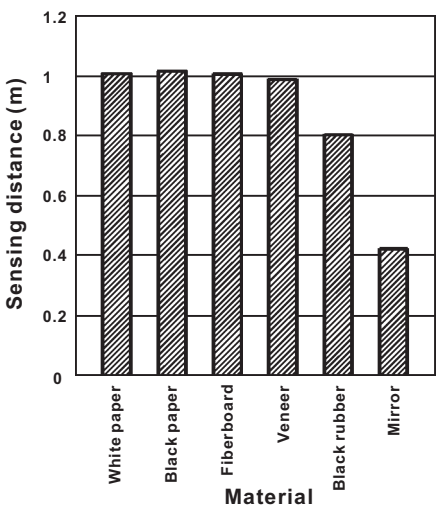
Close-range Characteristics



Sensing Distance vs. Sensing Object Material (at 500-mm Setting Distance)



Sensing Distance vs. Sensing object Material (at 1-m Setting Distance)



Installation

DISTANCE SETTING (TEACHING)

Select the most appropriate teaching method in reference to the following descriptions.

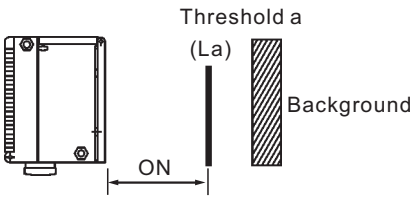
Application	Teaching without sensing objects (i.e.,teaching the background).	Setting a threshold in the middle between the background and sensing object for operation.	Detection of glossy objects in front of the background.	Setting the maximum sensing distance of the sensor.

Teaching	Normal one-point teaching	Normal two-point teaching	Zone teaching	Maximum distance setting (in normal mode)
Setting method	Press the TEACH button with the background object.	Press the TEACH button with the background object and with the sensing object.	Press the TEACH button with the background object (conveyor, etc.)	Press the TEACH button for longer than three seconds.
Set threshold	Threshold (a) is set to a distance in front of the background of 20% of the background distance	Threshold (a) is set approximately in the middle between the background and sensing object.	Thresholds (a and b) are set in the sensing distance on condition that the difference between these thresholds are approximately 10% of the whole sensing distance.	The threshold is set so that the stability indicator will turn ON at approximately 2m if the sensing object is white paper.
Output ON range	The output is ON between the Sensor and La.	The output is ON between the sensor and La.	The output is ON between La and Lb.	The output is ON whenever the sensing object is located between the sensor and at a distance of 2.2m.

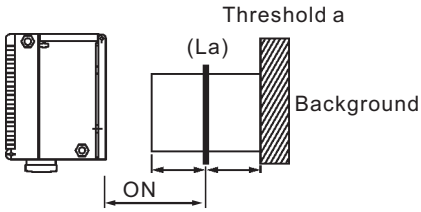
La: Distance equivalent to threshold (a)
Lb: Distance equivalent to threshold (b)

NORMAL MODE

1.Normal one-point teaching



2.Normal two-point teaching



Normal One-point teaching

Procedure		Operation
	1.	Set the more selector to TEACH.
	2.	Set the NORMAL/ZONE mode selector to NORMAL
	3.	Press the TEACH button with no sensing object (i.e.,teach the background). The teaching indicator (red) will turn ON.
	4.	Set the mode selector to RUN. (Set to L-ON or D-ON mode.)

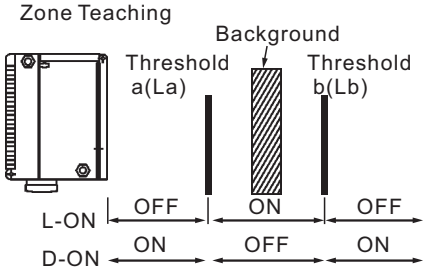
Note: Perform normal one-point teaching with the background.

Normal Two-point teaching

Procedure		Operation
	1.	Set the more selector to TEACH.
	2.	Set the NORMAL/ZONE mode selector to NORMAL
	3.	Press the TEACH button with a sensing object located at the sensing position. The teaching indicator (red) will turn ON.
	4.	Move the sensing object and press the TEACH button with the background. ● If the teaching is successful, the teaching indicator(green) will turn ON. ● If the teaching is not successful, the teaching indicator(red) will start to flash.
	5.	If the teaching is successful, set the mode selector to RUN to complete the teaching operation. Set the Rp68 series to light-or dark-ON mode with the mode selector according to the application. If the teaching is not successful, change the set distance and object sensing position and repeat two-point teaching from step 3.

ZONE MODE

Zone Teaching



Zone teaching

Procedure		Operation
	1.	Set the more selector to TEACH.
	2.	Set the NORMAL/ZONE mode selector to NORMAL
	3.	Press the TEACH button with the background. ● The teaching indicator (red) will turn ON first. Then the teaching indicator (green) will turn ON.
	4.	Set the mode selector to RUN. (Set L-ON or D-ON mode.)

Note: Perform zone teaching with the background.

Maximum distance setting (in normal mode)

Procedure		Operation
	1.	Set the more selector to TEACH.
	2.	Set the NORMAL/ZONE mode selector to NORMAL
	3.	Press the TEACH button for 3s or more. ● The teaching indicator (red) will turn ON. ● The teaching indicator (green) will turn ON in 3s. This means that teaching was successful.
	4.	If the teaching is successful, set the mode selector to RUN to complete the teaching operation. (Set to L-ON or D-ON mode)

Installation

POWER SUPPLY

A power supply with full-wave rectification can be connected to the RP85-L10000R-CX6T4L-T.

WIRING

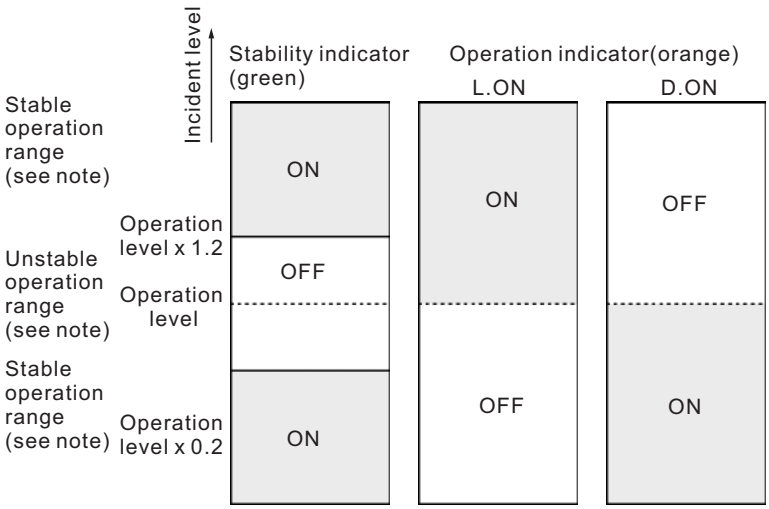
The tensile strength of the cable during operation should not exceed the values shown below.

Part number	Tensile strength
RP85-L10000R-CX6T4L	50 N max.

ADJUSTMENTS

Indicators

The following illustration indicates the operation levels of the **RP85**. Set the **RP85** so that it will work within the stable operation range.



Note: If the operation level is set to the stable operation range, the RP85 series will operation with the highest reliability and without being influenced by temperature change, voltage fluctuation, dust, or setting change. If the operation level can not be set to the stable operation range, pay close attention to environmental changes while operating the RP85 series.

TERMINAL BLOCK MODELS

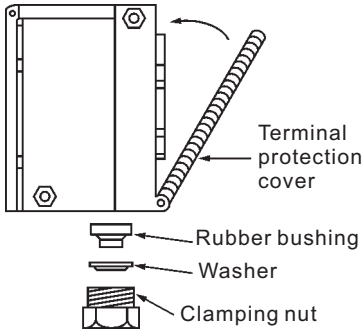
Wiring

The cable with an external diameter of 8mm is recommended.

Be sure to attach the cover with screws securely in order to maintain the water- and dust-resistive properties of the product.

Terminal Cover

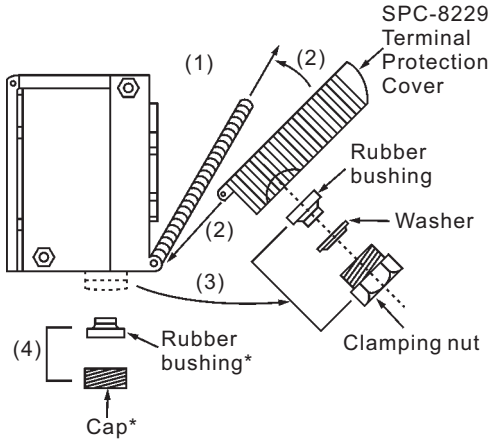
Do not tighten the terminal protection cover with wires pinched between the sensor and the cover in order to maintain the water an dust resistive properties of the product.



CHANGING CABLE EXIT

Procedure

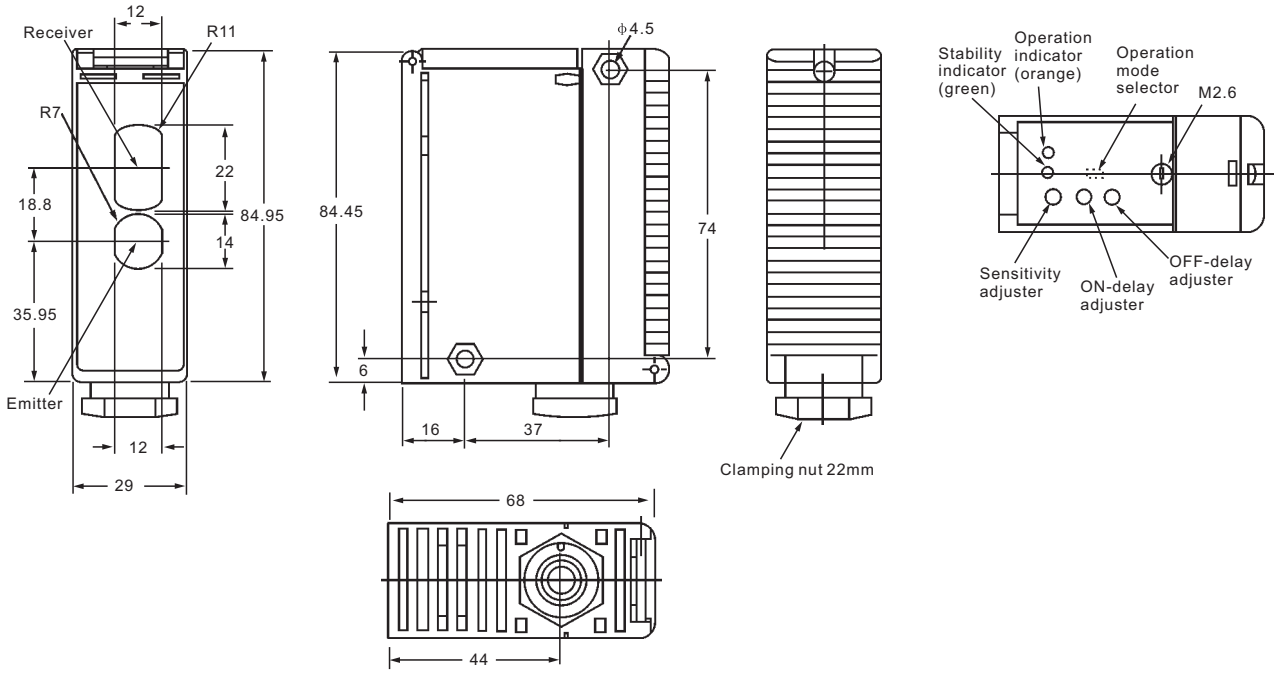
1. Remove the present cover.(Item1 below)
2. Attach the SPC-8229 Terminal Protection Cover for side-pull-out cable.
3. Remove the clamping nut, washer, and rubber bushing of the RP85 series. These are used for the side-pull out cable.
4. Attach the rubber bushing and cap provided with the SPC-8229 to the RP85 series as replacements.



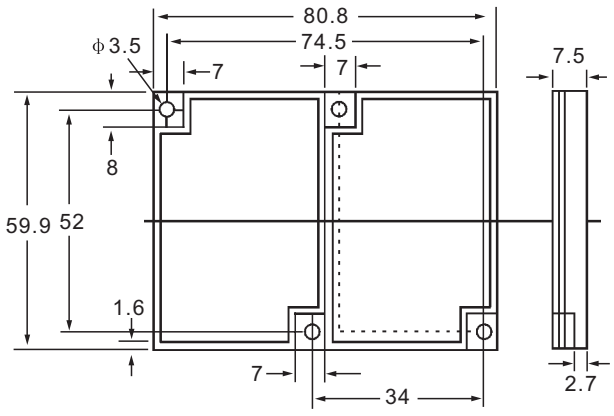
Note: *Provided with the SPC-8229

Dimensions

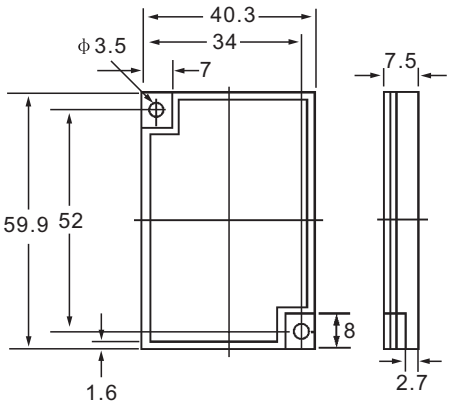
RP85-D2000R-CX9T4L
RP85-D2000R-CX9T4L-T
RP85-L10000R-CX6T4L
RP85-L10000R-CX6T4L-T



RE-8160



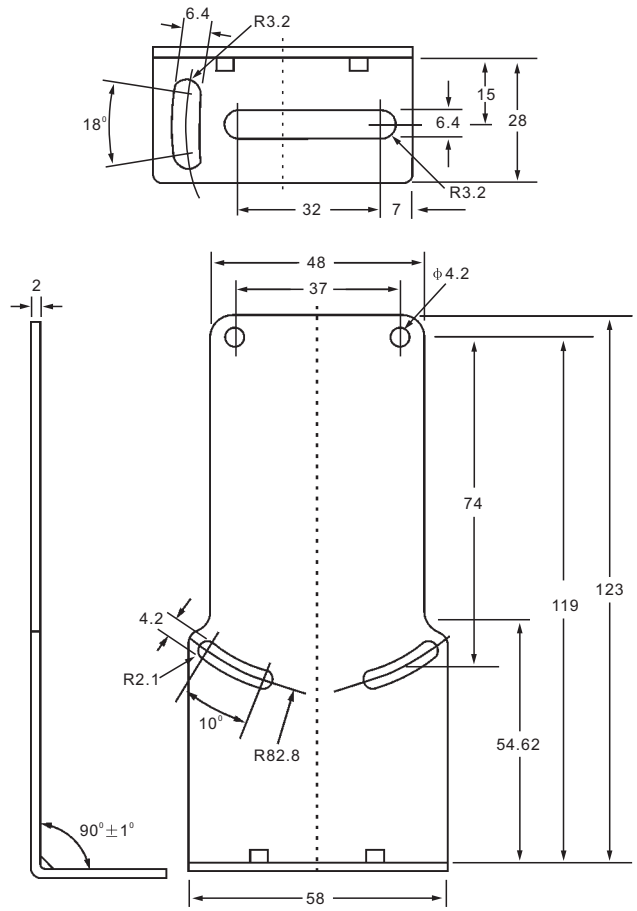
RE-4060



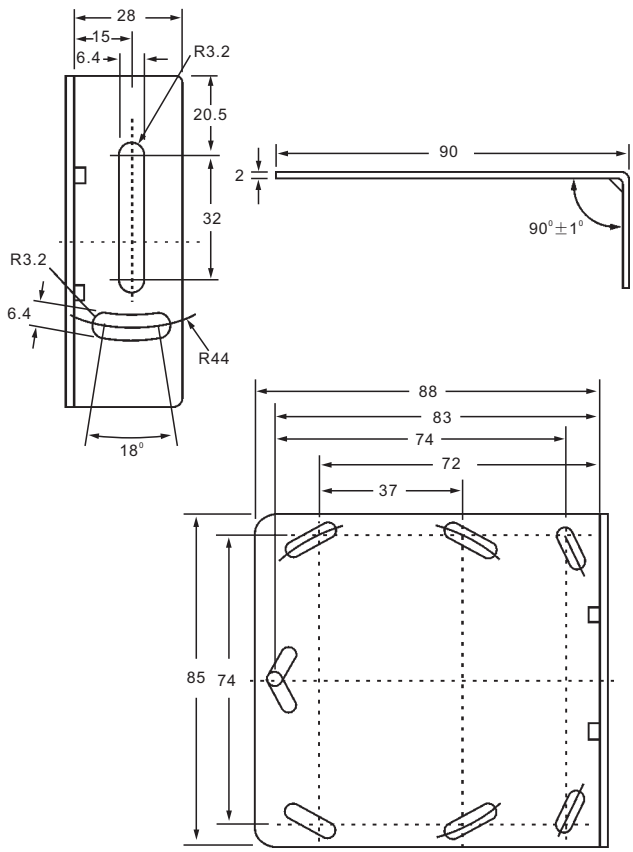
DIMENSIONS (Unit: mm)

Dimensions

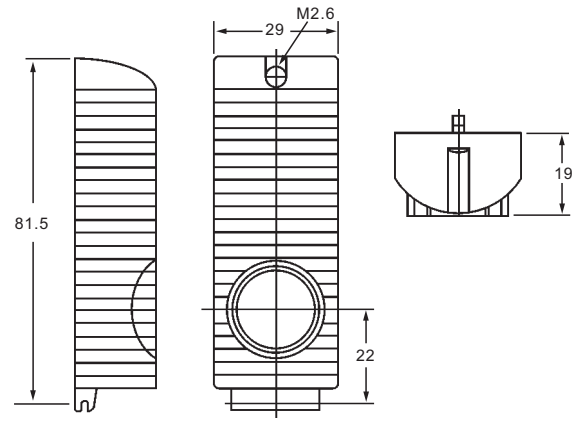
SMB-4828



SMB-8828



SPC-8229



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 RP series 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 repeately.

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 RP series 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 RP series 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 RP series, 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 loose 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 disconnector 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.

OPERATING ENVIRONMENT

Do not install the RP serise 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.