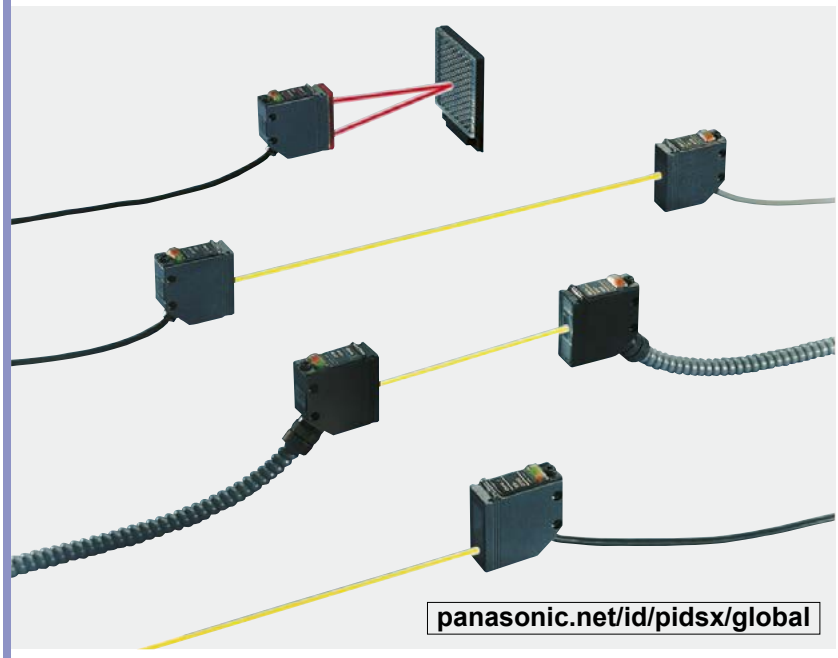
Robust Photoelectric Sensor Amplifier Built-in
RX SERIES

Related Information
■ General terms and conditions..... F-3
■ Selection guide ..... P.231~
■ Glossary of terms..... P.1549~
■ General precautions..... P.1552~



panasonic.net/id/pidsx/global

CE (Excluding **RX2** and **RX4**)

Self-diagnosis | Test input | Interference prevention

Sturdy photoelectric sensor made of die-cast zinc alloy

Robust

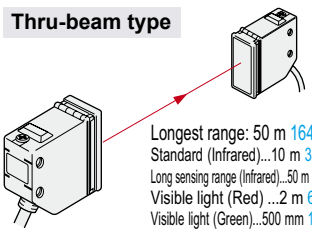
The enclosure is robust as it is made of die-cast zinc alloy.

VARIETIES

Standard type — RX

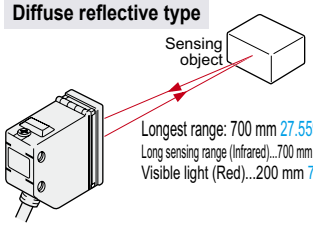
Wide variety

Thru-beam type



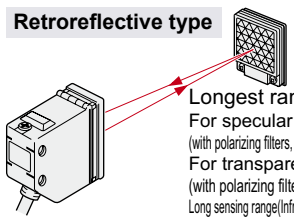
Longest range: 50 m 164.042 ft
Standard (Infrared)...10 m 32.808 ft
Long sensing range (Infrared)...50 m 164.042 ft
Visible light (Red) ...2 m 6.562 ft
Visible light (Green)...500 mm 19.685 in

Diffuse reflective type



Longest range: 700 mm 27.559 in
Long sensing range (Infrared)...700 mm 27.559 in
Visible light (Red)...200 mm 7.874 in

Retroreflective type



Longest range: 5 m 16.404 ft
For specular object sensing
(with polarizing filters, red) ...0.1 to 3 m 0.328 to 9.843 ft
For transparent object sensing
(with polarizing filters, red) ... 500 mm 19.685 in
Long sensing range(Infrared) ... 0.1 to 5 m 0.328 to 16.404 ft

DC 2-wire type — RX2

Wiring reduced by 1/3

Wiring can be completed by using only two, instead of three wires.

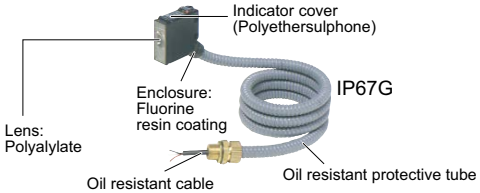
Power supply cost: reduced to 1/30 or less

Current consumption: 1 mA or less
An additional power supply for the sensors is not required.

Heavy duty type — RX4

Durable against oil

This sensor can be used in a harsh environment.



MAINTENANCE

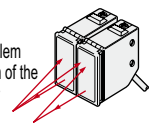
Test input (emission halt input)

Convenient for operation check before start-up.
(Excluding **RX2** types)

FUNCTIONS

Automatic interference prevention function — Retroreflective / diffuse reflective types

Two sensors can be mounted side by side because of the automatic interference prevention function. (Excluding **RX2** types)



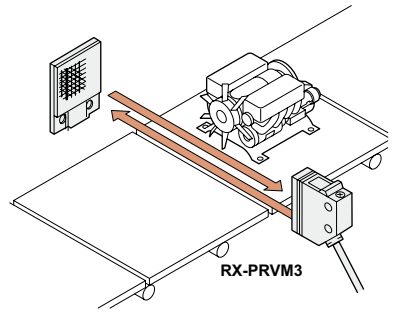
FIBER SENSORS
LASER SENSORS
PHOTOELECTRIC SENSORS
MICRO PHOTOELECTRIC SENSORS
AREA SENSORS
SAFETY LIGHT CURTAINS / SAFETY COMPONENTS
PRESSURE / FLOW SENSORS
INDUCTIVE PROXIMITY SENSORS
PARTICULAR USE SENSORS
SENSOR OPTIONS
SIMPLE WIRE-SAVING UNITS
WIRE-SAVING SYSTEMS
MEASUREMENT SENSORS
STATIC CONTROL DEVICES
LASER MARKERS
PLC
HUMAN MACHINE INTERFACES
ENERGY MANAGEMENT SOLUTIONS
FA COMPONENTS
MACHINE VISION SYSTEMS
UV CURING SYSTEMS

Selection Guide
Amplifier Built-in
Power Supply Built-in
Amplifier-separated

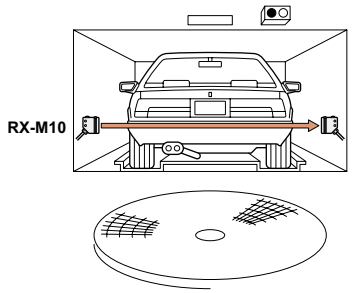
EX-Z
CX-400
CY-100
EX-10
EX-20
EX-30
EX-40
CX-440
EQ-30
EQ-500
MQ-W
RX-LS200
RX
RT-610

APPLICATIONS

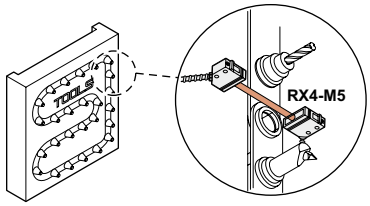
Detecting passage of engines



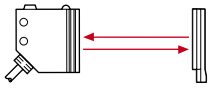
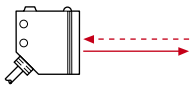
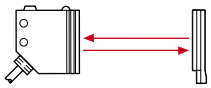
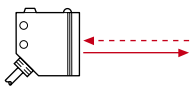
Confirming car position at parking garage



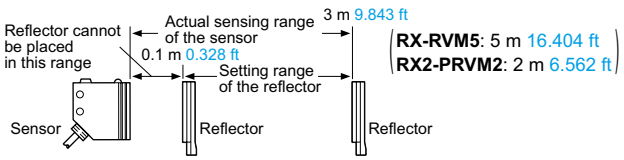
Sensing machine tools



ORDER GUIDE

Type				Appearance	Sensing range	Model No. (Note 2)	Output
RX (Standard type)	Thru-beam	Infrared			10 m 32.808 ft	**RX-M10**	NPN open-collector transistor
			Long sensing range		50 m 164.042 ft	**RX-M50**	
		For mark sensing	Red		2 m 6.562 ft	**RX-M2R**	
			Green		500 mm 19.685 in	**RX-500G**	
	Retroreflective	Red (with polarizing filters)			0.1 to 3 m 0.328 to 9.843 ft (Note 1)	**RX-PRVM3**	
		Infrared (long sensing range)			0.1 to 5 m 0.328 to 16.404 ft (Note 1)	**RX-RVM5**	
	Diffuse reflective	Infrared			700 mm 27.559 in	**RX-D700**	
		Red			200 mm 7.874 in	**RX-D200R**	
RX2 (DC 2-wire type)	Thru-beam	Infrared			5 m 16.404 ft	**RX2-M5**	Non contact DC 2-wire type
	Retroreflective	Red (with polarizing filters)			0.1 to 2 m 0.328 to 6.562 ft (Note 1)	**RX2-PRVM2**	
	Diffuse reflective	Infrared			300 mm 11.811 in	**RX2-D300**	
RX4 (Heavy duty type)	Thru-beam	Infrared	2 m 6.562 ft cable length		5 m 16.404 ft	**RX4-M5**	NPN open-collector transistor
			3 m 9.843 ft cable length			**RX4-M5-C3**	
			5 m 16.404 ft cable length			**RX4-M5-C5**	

Notes: 1) The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector. Further, the sensing range of **RX-PRVM3**, **RX-RVM5** and **RX2-PRVM2** is the possible setting range for the reflector. The sensor can detect an object less than 0.1 m 0.328 ft away.



2) The model No. with "**P**" shown on the label affixed to the thru-beam type sensor is the emitter, "**D**" shown on the label is the receiver.

ORDER GUIDE

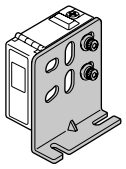
5 m 16.404 ft cable length type

5m 16.404 ft cable length type (standard: 2m 6.562 ft) is also available for **RX** and **RX2** types. (excluding **RX-500G**)
When ordering this type, suffix "**-C5**" to the model No.
(e.g.) 5 m 16.404 ft cable length type of **RX-M10** is "**RX-M10-C5**".

Accessories

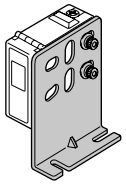
- **MS-RX-1** (Sensor mounting bracket)
- **MS-RX-2** (Sensor mounting bracket)
- **PT-RX4-1** (Oil resistant protective tube 1 m 3.281 ft long)
- **PT-RX4-2** (Oil resistant protective tube 2 m 6.562 ft long)
- **PT-RX4-4** (Oil resistant protective tube 4 m 13.123 ft long)
- **RF-230** (Reflector)

• MS-RX-1



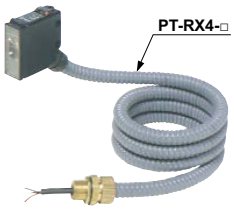
Two M4 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached

• MS-RX-2



Two M4 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached

• PT-RX4-□



• RF-230

OPTIONS

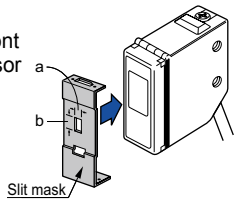
Designation	Model No.	Description		
Slit mask (For **RX-M10** and **RX2-M5** only)	**OS-RX-05×5** (Slit size 0.5 × 5 mm 0.020 × 0.197 in) **OS-RX-5×05** (Slit size 5 × 0.5 mm 0.197 × 0.020 in)	Slit on emitter	• Sensing range: 2.7 m 8.858 ft [**RX-M10**] 1.4 m 4.593 ft [**RX2-M5**] • Min. sensing object: ø8 mm ø0.315 in	
		Slit on receiver	• Sensing range: 1.9 m 6.234 ft [**RX-M10**] 1 m 3.281 ft [**RX2-M5**] • Min. sensing object: ø6 mm ø0.236 in	
		Slit on both sides	• Sensing range: 0.4 m 1.312 ft [**RX-M10**] 0.2 m 0.656 ft [**RX2-M5**] • Min. sensing object: 0.5 × 5 mm 0.020 × 0.197 in	
	OS-RX-1×5 (Slit size 1 × 5 mm 0.039 × 0.197 in) **OS-RX-5×1** (Slit size 5 × 1 mm 0.197 × 0.039 in)	Slit on emitter	• Sensing range: 3.8 m 12.467 ft [**RX-M10**] 1.9 m 6.234 ft [**RX2-M5**] • Min. sensing object: ø8 mm ø0.315 in	
		Slit on receiver	• Sensing range: 2.8 m 9.186 ft [**RX-M10**] 1.4 m 4.593 ft [**RX2-M5**] • Min. sensing object: ø6 mm ø0.236 in	
		Slit on both sides	• Sensing range: 0.8 m 2.625 ft [**RX-M10**] 0.4 m 1.312 ft [**RX2-M5**] • Min. sensing object: 1 × 5 mm 0.039 × 0.197 in	
	OS-RX-3×5 (Slit size 3 × 5 mm 0.118 × 0.197 in) **OS-RX-5×3** (Slit size 5 × 3 mm 0.197 × 0.118 in)	Slit on emitter	• Sensing range: 7 m 22.966 ft [**RX-M10**] 3.5 m 11.483 ft [**RX2-M5**] • Min. sensing object: ø8 mm ø0.315 in	
		Slit on receiver	• Sensing range: 4.9 m 16.076 ft [**RX-M10**] 2.5 m 8.202 ft [**RX2-M5**] • Min. sensing object: ø6 mm ø0.236 in	
		Slit on both sides	• Sensing range: 2.6 m 8.530 ft [**RX-M10**] 1.3 m 4.265 ft [**RX2-M5**] • Min. sensing object: 3 × 5 mm 0.118 × 0.197 in	
Reflector (For retroreflective type sensor only) (Note 1)	**RF-210**	• Sensing range: 0.2 to 1.5 m 0.656 to 4.921 ft [**RX-RVM5**] 0.4 to 1 m 1.312 to 3.281 ft [**RX-PRVM3**] • Min. sensing object: ø30 mm ø1.181 in		
	RF-220	• Sensing range: 0.1 to 3.8 m 0.328 to 12.467 ft [**RX-RVM5**] 0.1 to 2 m 0.328 to 6.562 ft [**RX-PRVM3**] 0.1 to 1.3 m 0.328 to 4.265 ft [**RX2-PRVM2**] • Min. sensing object: ø35 mm ø1.378 in		
Reflector mounting bracket (Note 1)	**MS-RF21-1**	Protective mounting bracket for **RF-210** It protects the reflector from damage and maintains alignment.		
	MS-RF22	For **RF-220**		
	MS-RF23	For **RF-230**		
Reflective tape (For **RX-RVM5** only)	**RF-T110**	This tape can be used in place of the reflector by cutting it to a suitable size. • Size: 100 × 100 mm 3.937 × 3.937 in • Sensing range: 3 m 9.843 ft (at 50 × 50 mm 1.969 × 1.969 in) (There may be a slight variation depending on the product.)		
Protective tube	**PT-RX500**	Length	500 mm 19.685 in	Cable is protected from external forces. It does not rust as it is made of stainless steel.
	PT-RX1000		1,000 mm 39.370 in	
Sensor checker (Note 2)	**CHX-SC2**	It is useful for beam alignment of thru-beam type sensors. The optimum receiver position is given by indicators, as well as an audio signal.		

Notes: 1) Refer to **CX-400** series pages (p.269 and p.272) for dimensions of the reflector or the reflector mounting bracket.
2) Refer to p.959~ for the sensor checker.

Slit mask

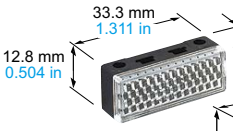
• **OS-RX-□**
Fitted on the front face of the sensor with one-touch.

*Slit size
OS-RX-1×5
a b

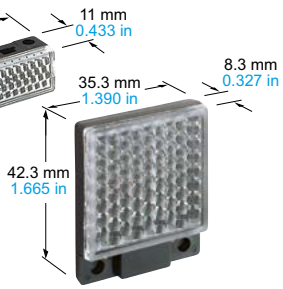


Reflector

• **RF-210**

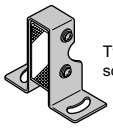


• **RF-220**



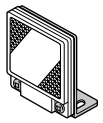
Reflector mounting bracket

• **MS-RF21-1**



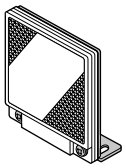
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-RF22**



Two M3 (length 8 mm 0.315 in) screws with washers are attached.

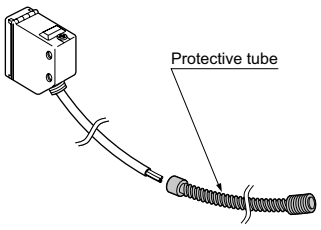
• **MS-RF23**



Two M4 (length 10 mm 0.394 in) screws with washers are attached.

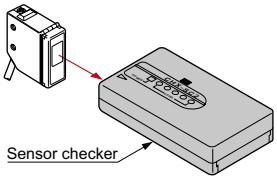
Protective tube

• **PT-RX500**
• **PT-RX1000**



Sensor checker

• **CHX-SC2**



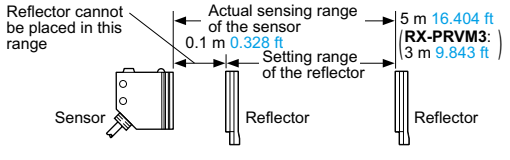
SPECIFICATIONS

Standard type

Item \ Type	Thru-beam				Retroreflective		Diffuse reflective	
	Infrared	Infrared (Long sensing range)	Red	Green	Red (with polarizing filters)	Infrared (Long sensing range)	Infrared	Red
Model No.	RX-M10	RX-M50	RX-M2R	RX-500G	RX-PRVM3	RX-RVM5	RX-D700	RX-D200R
CE marking directive compliance	EMC Directive, RoHS Directive							
Sensing range	10 m 32.808 ft	50 m 164.042 ft	2 m 6.562 ft	500 mm 19.685 in	0.1 to 3 m 0.328 to 9.843 ft (Note 2)	0.1 to 5 m 0.328 to 16.404 ft (Note 2)	700 mm 27.559 in (Note 3)	200 mm 7.874 in (Note 3)
Sensing object	ø10 mm 0.394 in or more opaque object (Note 4)				ø50 mm ø1.969 in or more opaque, translucent or specular object (Note 2, 5)	ø50 mm ø1.969 in or more opaque, or translucent object (Note 2, 5)	Opaque, translucent or transparent object (Note 5)	
Hysteresis	—				—		15 % or less of operation distance (Note 3)	
Repeatability (perpendicular to sensing axis)	0.5 mm 0.020 in or less				1 mm 0.039 in or less		0.5 mm 0.020 in or less	
Supply voltage	12 to 24 V DC ±10 % Ripple P-P 10 % or less							
Current consumption	Emitter: 20 mA or less (**RX-M50**: 25 mA or less), Receiver: 25 mA or less				40 mA or less			
Sensing output	NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between sensing output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current) 1 V or less (at 16 mA sink current)							
Utilization category	DC-12 or DC-13							
Output operation	Switchable either Light-ON or Dark-ON							
Short-circuit protection	Incorporated							
Self-diagnosis output	NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between self-diagnosis output and 0 V) • Residual voltage: 1.5 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)							
Output operation	ON under unstable sensing condition							
Short-circuit protection	—							
Response time	1 ms or less							
Test input (emission halt) function	Incorporated							
Operation indicator	Red LED (lights up when the sensing output is ON)							
Stability indicator	Green LED (lights up under stable light received condition or stable dark condition)							
Emitting indicator	Red LED (lights up during beam emission)				—			
Sensitivity adjuster	Continuously variable adjuster							
Automatic interference prevention function	—				Incorporated (Two units of sensors can be mounted close together.)			
Environmental resistance: Pollution degree	3 (Industrial environment)							
Environmental resistance: Protection	IP67 (IEC)							
Environmental resistance: Ambient temperature	–25 to +60 °C –13 to +140 °F (No dew condensation or icing allowed), Storage: –30 to +70 °C –22 to +158 °F							
Environmental resistance: Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH							
Environmental resistance: Ambient illuminance	Incandescent light: 3,500 ℓx or less at the light-receiving face							
Environmental resistance: Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure							
Environmental resistance: Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure							
Environmental resistance: Vibration resistance	10 to 500 Hz frequency, 1.5 mm 0.059 in double amplitude (10 G max.) in X, Y and Z directions for two hours each							
Environmental resistance: Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions three times each							
Emitting element (modulated)	Infrared LED		Red LED	Green LED	Red LED	Infrared LED		Red LED
Peak emission wavelength	880 nm 0.035 mil		660 nm 0.026 mil	570 nm 0.022 mil	680 nm 0.027 mil	880 nm 0.035 mil		680 nm 0.027 mil
Material	Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (Retroreflective type: Acrylic)							
Cable	Emitter: 0.15 mm² 3-core oil, heat and cold resistant cabtyre cable, 2 m 6.562 ft long Receiver: 0.15 mm² 4-core oil, heat and cold resistant cabtyre cable, 2 m 6.562 ft long				0.15 mm² 5-core oil, heat and cold resistant cabtyre cable, 2 m 6.562 ft long			
Cable extension	Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable (thru-beam type: both emitter and receiver).							
Net weight	Emitter: 70 g approx. (**RX-M50**: 75 g approx.) Receiver: 70 g approx. (**RX-M50**: 75 g approx.)				75 g approx.			
Accessories	**MS-RX-1** (Sensor mounting bracket): 1 set for emitter and receiver Adjusting screwdriver: 1 pc.				**MS-RX-1** (Sensor mounting bracket): 1 set **RF-230** (Reflector): 1 pc. Adjusting screwdriver: 1 pc.		**MS-RX-1** (Sensor mounting bracket): 1 set Adjusting screwdriver: 1 pc.	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) The sensing range and the sensing object for the retroreflective type sensor are specified for the **RF-230** reflector. Further, the sensing range of **RX-PRVM3** and **RX-RVM5** is the possible setting range for the reflector. The sensor can detect an object less than 0.1 m 0.328 ft away.



3) The sensing range and the hysteresis of the diffuse reflective type sensor are specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.

4) If slit masks (optional) are fitted on **RX-M10**, an object of 0.5 × 5 mm 0.020 × 0.197 in can be detected.

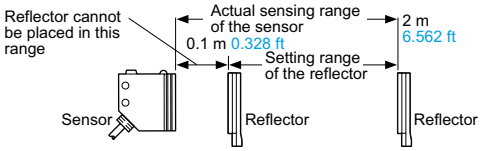
5) Make sure to confirm detection with an actual sensor before use.

SPECIFICATIONS

DC 2-wire type

Item \ Type	Model No.	Thru-beam	Retroreflective (with polarizing filters)	Diffuse reflective
		RX2-M5	**RX2-PRVM2**	**RX2-D300**
Sensing range		5 m 16.404 ft	0.1 to 2 m 0.328 to 6.562 ft (Note 2)	300 mm 11.811 in (Note 3)
Sensing object		ø10 mm ø0.394 in or more opaque object (Note 4)	ø50 mm ø1.969 in or more opaque, translucent or specular object (Note 2, 5)	Opaque, translucent or transparent object (Note 5)
Hysteresis		———	———	15 % or less of operation distance (Note 3)
Repeatability (perpendicular to sensing axis)		0.5 mm 0.020 in or less	1 mm 0.039 in or less	0.5 mm 0.020 in or less
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less		
Current consumption		Emitter: 8 mA or less, Receiver: 0.8 mA or less (Note 6)	1 mA or less (Note 6)	
Sensing output		Non contact DC 2-wire type • Load current: 5 to 100 mA • Residual voltage: 4 V or less (Note 7)		
	Output operation	Switchable either Light-ON or Dark-ON		
	Short-circuit protection	Incorporated		
Response time		3 ms or less		
Operation indicator		Red LED (lights up when the output is ON)		
Stability indicator		Green LED (Light-ON mode: lights up under stable light received condition / Dark-ON mode: lights up under stable dark condition)		
Emitting indicator		Red LED (lights up during beam emission)	———	
Sensitivity adjuster		Continuously variable adjuster		
Environmental resistance	Protection	IP67 (IEC)		
	Ambient temperature	–20 to +60 °C –4 to +140 °F (No dew condensation or icing allowed), Storage: –30 to +70 °C –22 to +158 °F		
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH		
	Ambient illuminance	Incandescent light: 3,500 ℓx or less at the light-receiving face		
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure		
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure		
	Vibration resistance	10 to 500 Hz frequency, 1.5 mm 0.059 in double amplitude (10 G max.) in X, Y and Z directions for two hours each		
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions three times each		
Emitting element		Infrared LED (modulated)	Red LED (modulated)	Infrared LED (modulated)
	Peak emission wavelength	880 nm 0.035 mil	680 nm 0.027 mil	890 nm 0.035 mil
Material		Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (**RX2-PRVM2**: Acrylic)		
Cable		0.15 mm² 2-core oil, heat and cold resistant cabtyre cable, 2 m 6.562 ft long		
Cable extension		——— (Note 7)		
Net weight		Emitter: 70 g approx., Receiver: 70 g approx.	75 g approx.	70 g approx.
Accessories		**MS-RX-1** (Sensor mounting bracket): 1 set for emitter and receiver Adjusting screwdriver: 1 pc.	**MS-RX-1** (Sensor mounting bracket): 1 set **RF-230** (Reflector): 1 pc. Adjusting screwdriver: 1 pc.	**MS-RX-1** (Sensor mounting bracket): 1 set Adjusting screwdriver: 1 pc.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) The sensing range and the sensing object for **RX2-PRVM2** are specified for the **RF-230** reflector. Further, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 0.1 m 0.328 ft away.



3) The sensing range and the hysteresis of **RX2-D300** are specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.
4) If slit masks (optional) are fitted, an object of 0.5 × 5 mm 0.020 × 0.197 in can be detected.
5) Make sure to confirm detection with an actual sensor before use.
6) It is the leakage current when the output is in the OFF state.
7) When extending the cable, the residual voltage will be increased depending on the type of cable used. Verify the residual voltage when extending the cable.

SPECIFICATIONS

Heavy duty type

Item \ Type		Thru-beam		
		Cable length 2 m 6.562 ft	Cable length 3 m 9.843 ft	Cable length 5 m 16.404 ft
Model No.		**RX4-M5**	**RX4-M5-C3**	**RX4-M5-C5**
Sensing range		5 m 16.404 ft		
Sensing object		ø10 mm ø0.394 in or more opaque object		
Repeatability (perpendicular to sensing axis)		0.5 mm 0.020 in or less		
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less		
Current consumption		Emitter: 20 mA or less, Receiver: 25 mA or less		
Sensing output		NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between sensing output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current) 1 V or less (at 16 mA sink current)		
	Output operation	Switchable either Light-ON or Dark-ON		
	Short-circuit protection	Incorporated		
Self-diagnosis output		NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between self-diagnosis output and 0 V) • Residual voltage: 1.5 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)		
	Output operation	ON under unstable sensing condition		
	Short-circuit protection	—		
Response time		1 ms or less		
Test input (emission halt) function		Incorporated		
Operation indicator		Red LED (lights up when the sensing output is ON)		
Stability indicator		Green LED (lights up under stable light received condition or stable dark condition)		
Emitting indicator		Red LED (lights up during beam emission)		
Sensitivity adjuster		Continuously variable adjuster		
Environmental resistance	Protection	IP67 (IEC), IP67G		
	Ambient temperature	–25 to +60 °C –13 to +140 °F (No dew condensation or icing allowed), Storage: –30 to +70 °C –22 to +158 °F		
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH		
	Ambient illuminance	Incandescent light: 3,500 ℓx or less at the light-receiving face		
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure		
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure		
	Vibration resistance	10 to 500 Hz frequency, 1.5 mm 0.059 in double amplitude (10 G max.) in X, Y and Z directions for two hours each		
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions three times each		
Emitting element		Infrared LED (Peak emission wavelength: 880 nm 0.035 mil, modulated)		
Material		Enclosure: Die-cast zinc alloy (Fluorine resin coating), Indicator cover: Polyethersulphone, Lens: Polyalylate, Protective tube sheath: Oil resistant PVC		
Cable		0.15 mm² 4-core (emitter: 3-core) oil, heat and cold resistant cabtyre cable		
Protective tube length		1 m 3.281 ft	2 m 6.562 ft	4 m 13.123 ft
Cable extension		Extension up to total 100 m 328.084 ft is possible for both emitter and receiver with 0.3 mm², or more, cable.		
Net weight		Emitter: 175 g approx., Receiver: 175 g approx.	Emitter: 265 g approx., Receiver: 265 g approx.	Emitter: 495 g approx., Receiver: 495 g approx.
Accessories		**MS-RX-2** (Sensor mounting bracket): 1 set for emitter and receiver, Adjusting screwdriver: 1 pc.		

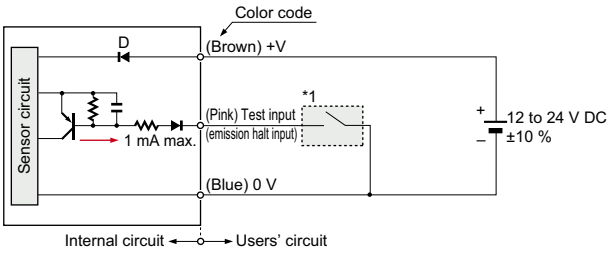
Note: Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

I/O CIRCUIT AND WIRING DIAGRAMS

RX-□ RX4-□

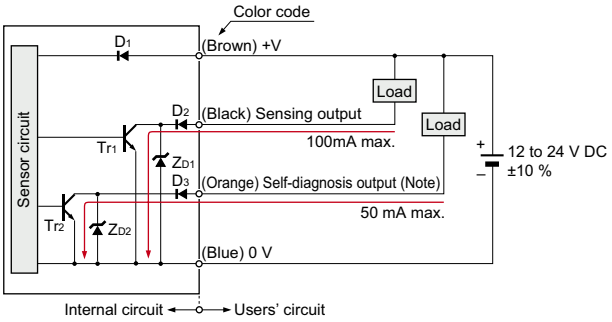
I/O circuit diagrams

Emitter of thru-beam type sensor



Symbol … D: Reverse supply polarity protection diode

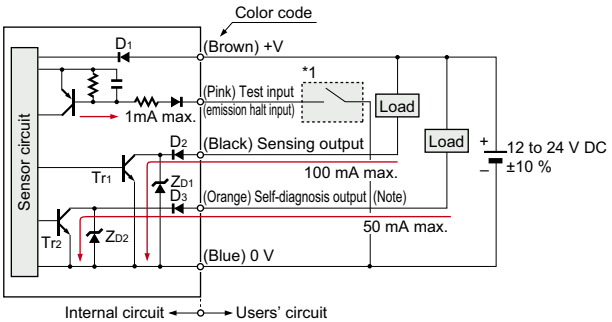
Receiver of thru-beam type sensor



Note: The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

Symbols ... D_1: Reverse supply polarity protection diode
D_2, D_3 : Reverse output polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr_1, Tr_2 : NPN output transistor

Retroreflective and diffuse reflective type sensors

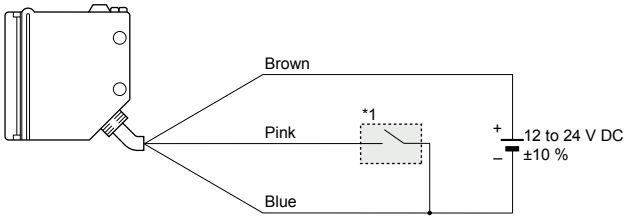


Note: The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

Symbols ... D_1: Reverse supply polarity protection diode
D_2, D_3 : Reverse output polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr_1, Tr_2 : NPN output transistor

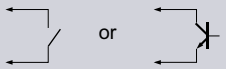
Wiring diagram

Emitter of thru-beam type sensor



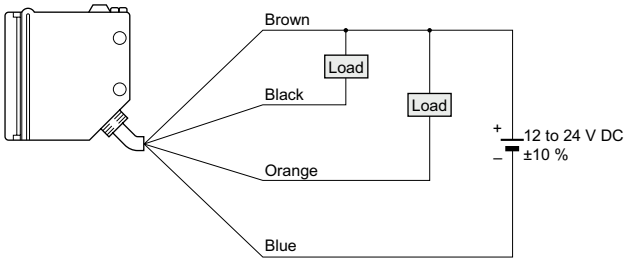
* 1

Non-voltage contact or NPN open-collector transistor

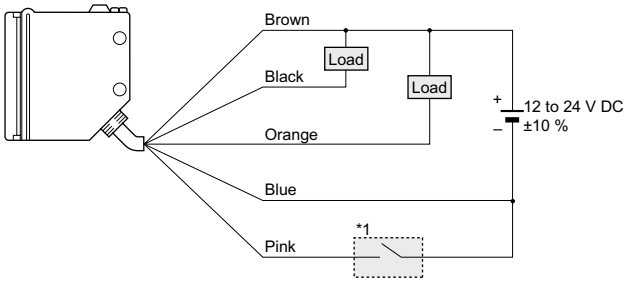


- Test input (emission halt input)
  [Supply voltage – 2.5 V] or more: Emission
  [Supply voltage – 3.3 V] or less: Emission halt

Receiver of thru-beam type sensor

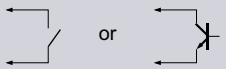


Retroreflective and diffuse reflective type sensors



* 1

Non-voltage contact or NPN open-collector transistor



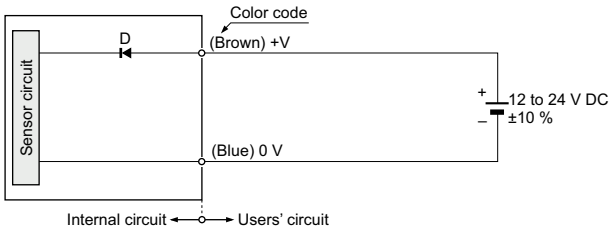
- Test input (emission halt input)
  [Supply voltage – 2.5 V] or more: Emission
  [Supply voltage – 3.3 V] or less: Emission halt

I/O CIRCUIT AND WIRING DIAGRAMS

RX2-□

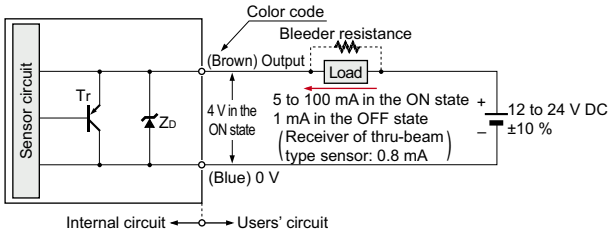
I/O circuit diagrams

Emitter of thru-beam type sensor



Symbol … D: Reverse supply polarity protection diode

Receiver of thru-beam type sensor, retroreflective and diffuse reflective type sensors



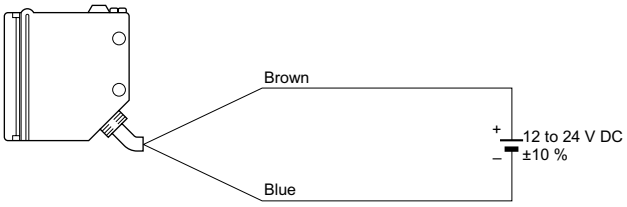
Symbols ... D : Reverse supply polarity protection diode
ZD: Surge absorption zener diode
Tr : PNP output transistor

Conditions for the load

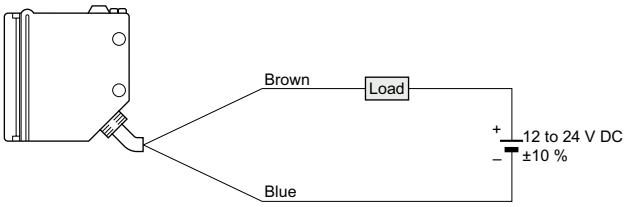
1) The load should not be actuated by the leakage current (1 mA; 0.8 mA for receiver of thru-beam type sensor) in the OFF state.
2) The load should be actuated by (supply voltage – 4 V) in the ON state.
3) The current in the ON state should be between 5 to 100 mA DC.
   [In case the current is less than 5 mA, connect a bleeder resistance in parallel to the load (shown in dotted line above) so that a current of 5 mA, or more, flows.]

Wiring diagrams

Emitter of thru-beam type sensor



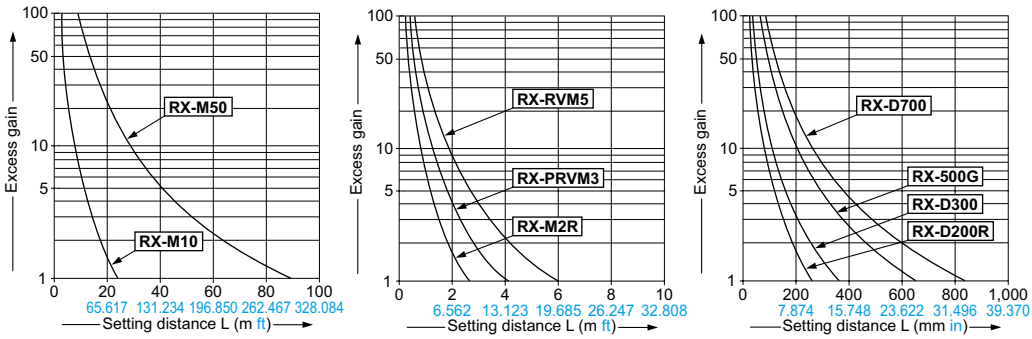
Receiver of thru-beam type sensor, retroreflective and diffuse reflective type sensors



SENSING CHARACTERISTICS (TYPICAL)

RX-□ All models

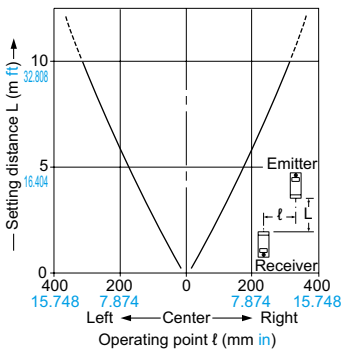
Correlation between setting distance and excess gain



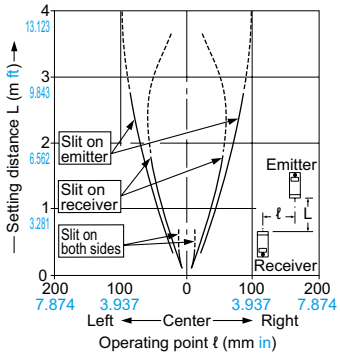
SENSING CHARACTERISTICS (TYPICAL)

RX-M10 — Thru-beam type

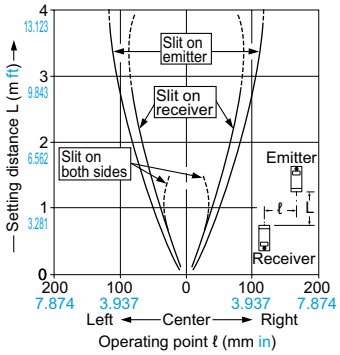
Parallel deviation



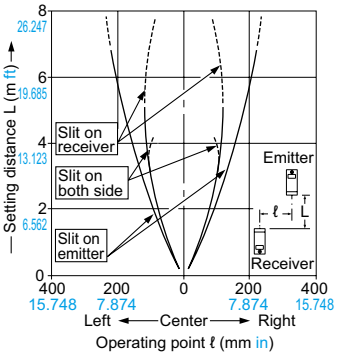
Parallel deviation with slit masks (0.5 × 5 mm 0.020 × 0.197 in)



Parallel deviation with slit masks (1 × 5 mm 0.039 × 0.197 in)

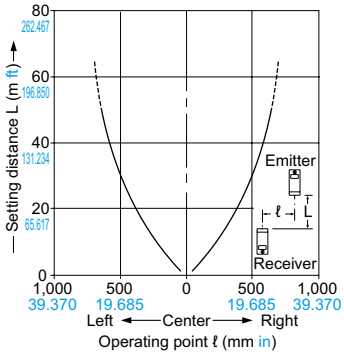


Parallel deviation with slit masks (3 × 5 mm 0.118 × 0.197 in)



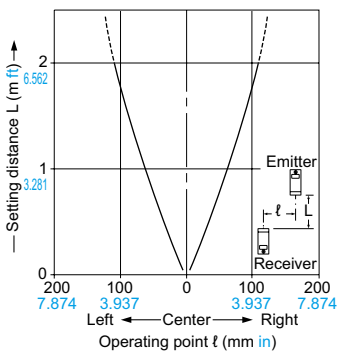
RX-M50 — Thru-beam type

Parallel deviation



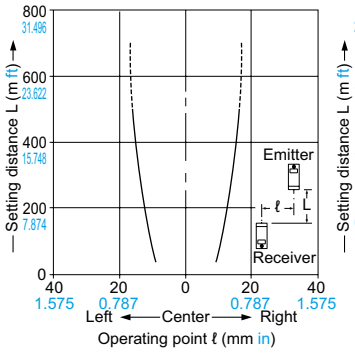
RX-M2R — Thru-beam type

Parallel deviation



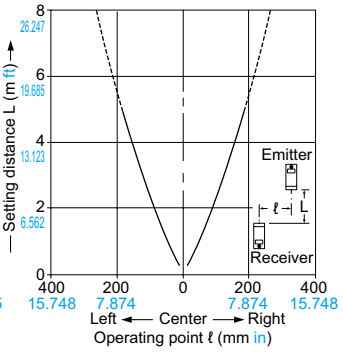
RX-500G — Thru-beam type

Parallel deviation



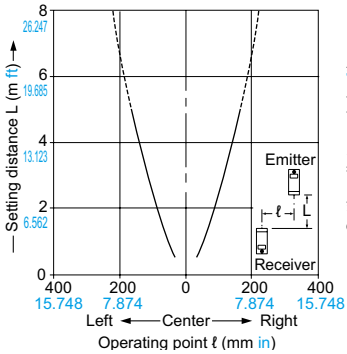
RX4-M5□ — Thru-beam type

Parallel deviation

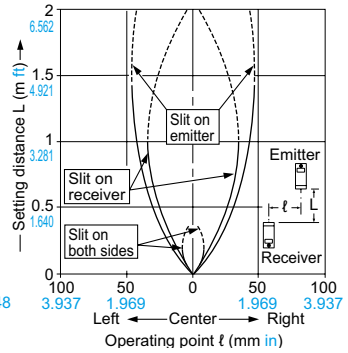


RX2-M5 — Thru-beam type

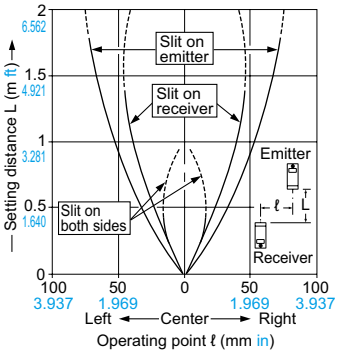
Parallel deviation



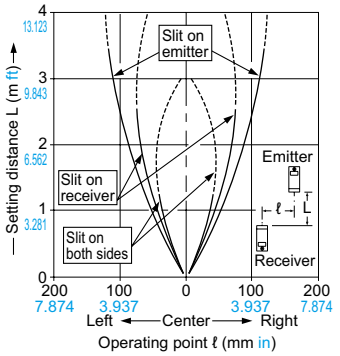
Parallel deviation with slit masks (0.5 × 5 mm 0.020 × 0.197 in)



Parallel deviation with slit masks (1 × 5 mm 0.039 × 0.197 in)

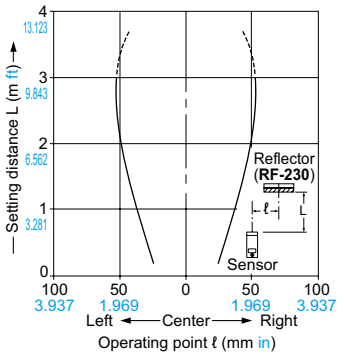


Parallel deviation with slit masks (3 × 5 mm 0.118 × 0.197 in)



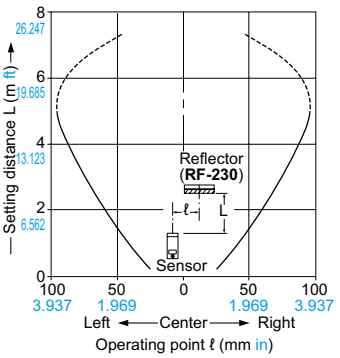
RX-PRVM3 — Retroreflective type

Parallel deviation



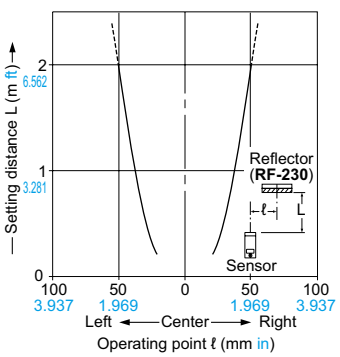
RX-RVM5 — Retroreflective type

Parallel deviation



RX2-PRVM2 — Retroreflective type

Parallel deviation

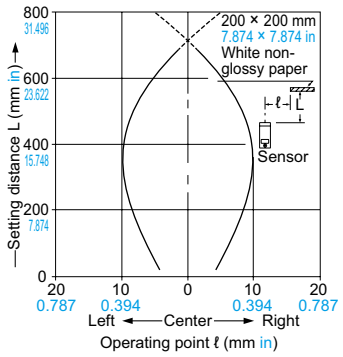


SENSING CHARACTERISTICS (TYPICAL)

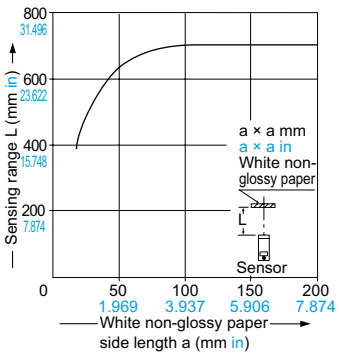
RX-D700

Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range



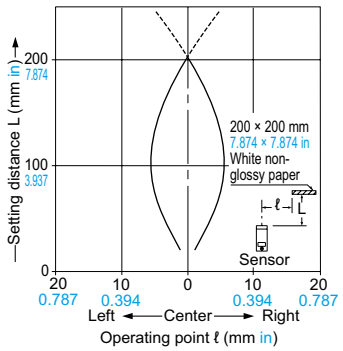
As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 × 200 mm 7.874 × 7.874 in), the sensing range shortens, as shown in the left graph.

(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 700 mm 27.559 in.)

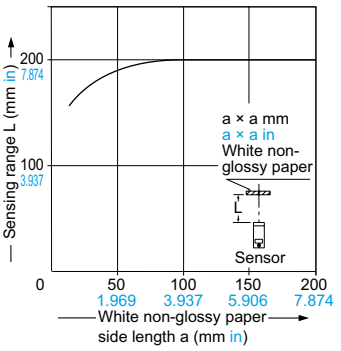
RX-D200R

Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range



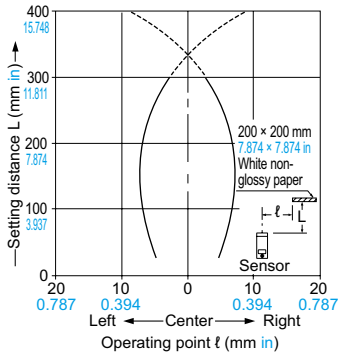
As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 × 200 mm 7.874 × 7.874 in), the sensing range shortens, as shown in the left graph.

(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 200 mm 7.874 in.)

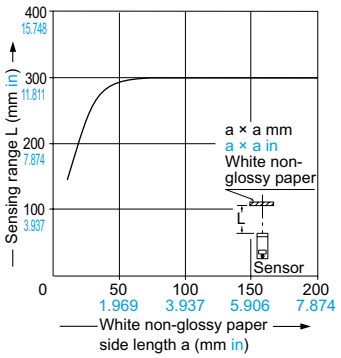
RX2-D300

Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range



As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 × 200 mm 7.874 × 7.874 in), the sensing range shortens, as shown in the left graph.

(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 300 mm 11.811 in.)

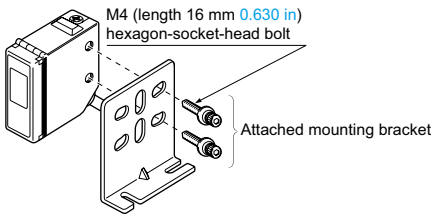
PRECAUTIONS FOR PROPER USE

Refer to p.1552~ for general precautions.

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Mounting

- The tightening torque should be 1.17 N·m or less.



Wiring

- The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

Others

- Do not use during the initial transient time (50 ms) after the power supply is switched on.

PRECAUTIONS FOR PROPER USE

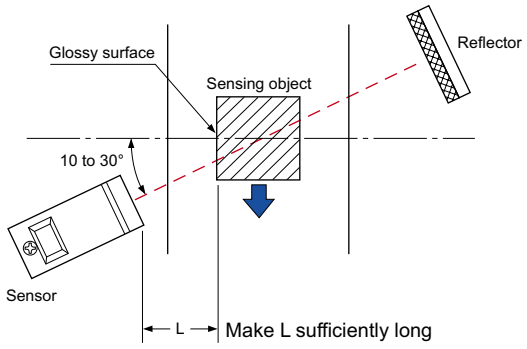
Refer to p.1552~ for general precautions.

RX-RVM5

Glossy object sensing

• Please take care of the following points when detecting materials having a gloss.

①Make L, shown in the diagram, sufficiently long.
②Install at an angle of 10 to 30 degrees to the sensing object.



RX-PRVM3 RX2-PRVM2

Retroreflective type sensor with polarizing filters

• If a shiny object is covered or wrapped with a transparent film such as those described below, the retroreflective type sensor with polarizing filters may not be able to detect it.
In that case, follow the steps given below.

Example of sensing objects

• Can wrapped by clear film
• Aluminum sheet covered by plastic film
• Gold or silver color (specular) label or wrapping paper

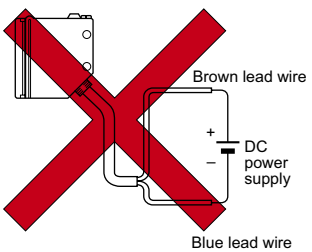
Steps

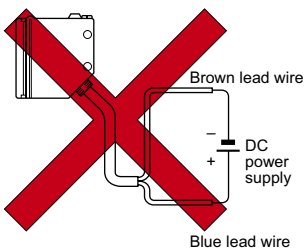
• Tilt the sensor with respect to the sensing object while fitting.
• Reduce the sensitivity.
• Increase the distance between the sensor and the sensing object.

RX2-□

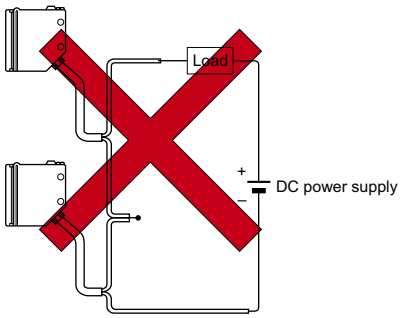
Wiring

• Always connect the sensor to the power supply through a load. If the sensor is connected to the power supply directly, the short-circuit protection makes the sensor inoperable. (The output stays in the OFF state and no indicator lights up.) If this happens, connect the sensor to the power supply through a load.
Further, note that the sensor will be damaged if the power supply is connected in reverse without a load.

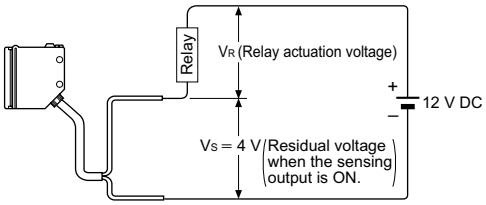




• Do not connect sensors in series (AND circuit).



• The residual voltage of the sensor is 4 V. Before connecting to a relay, be aware of the actuation voltage of the relay. (Not all 12 V relays may be connected as the load.)



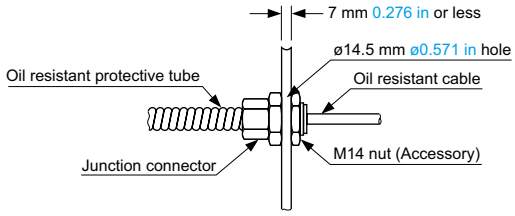
Relay actuation voltage:
$V_R \leq 12 - 4$ V
≤ 8 V

RX4-□

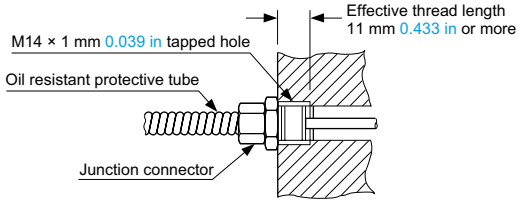
Connection of protective tube connector

• Connect the junction connector securely as shown below. The tightening torque should be 0.98 N·m or less.

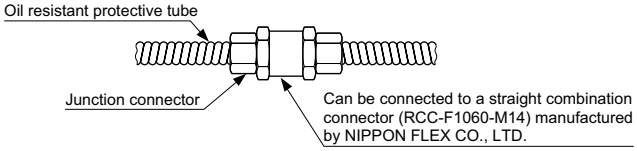
When mounted on a plate



When mounted with a female screw



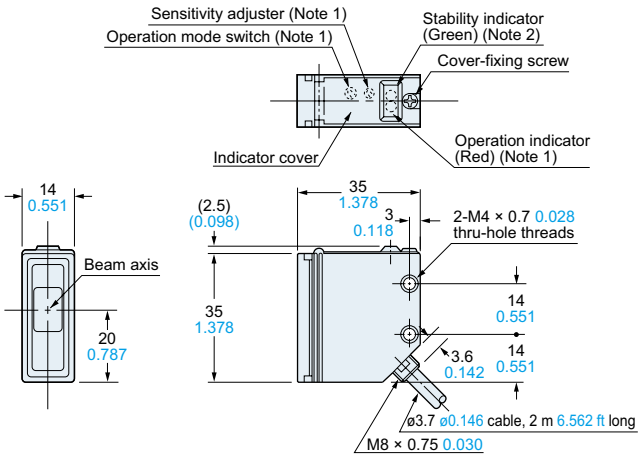
When connected to another protective tube



DIMENSIONS (Unit: mm in)

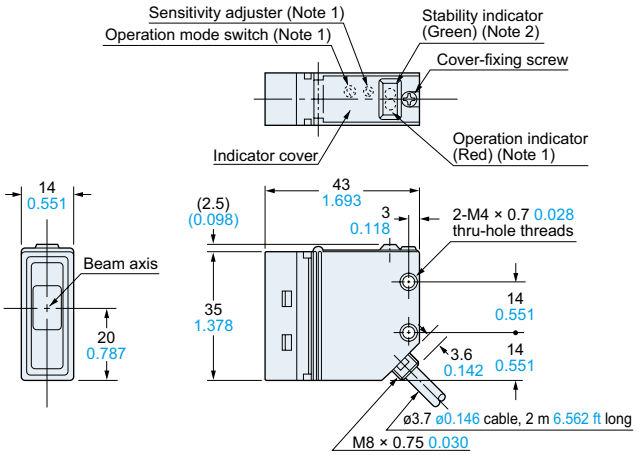
The CAD data can be downloaded from our website.
Refer to **CX-400** series pages (p.269 and p.272) for dimensions of the reflector or the reflector mounting bracket.

RX-M10 RX-M2R RX-500G RX2-M5 Sensor



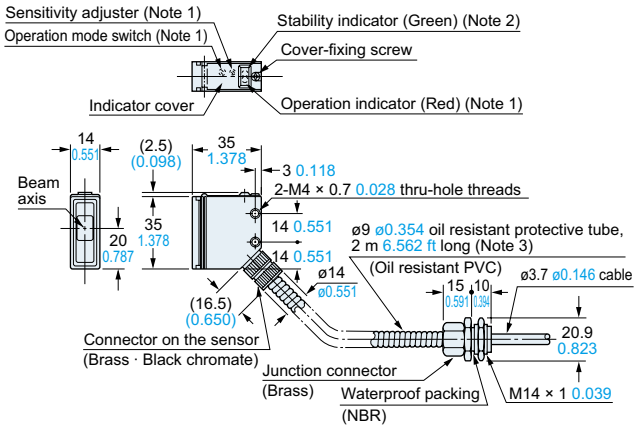
Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter.

RX-M50 Sensor



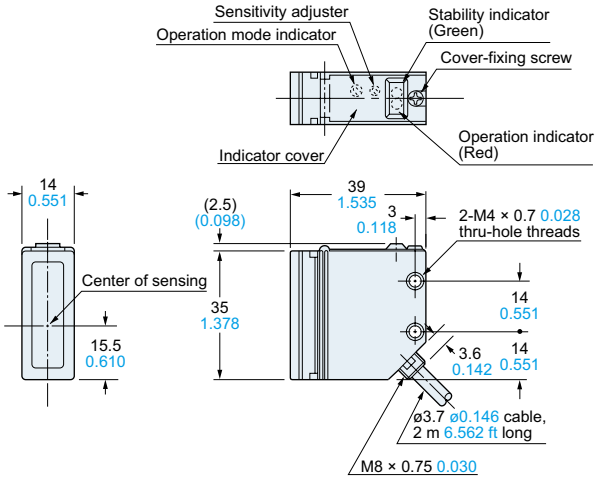
Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter.

RX4-M5□ Sensor

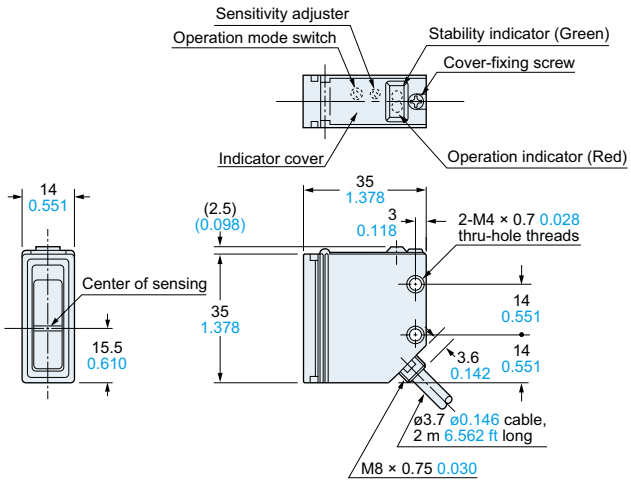


Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter.
3) The given length of the protective tube is for **RX4-M5-C3**.
(**RX4-M5**: 1 m 3.281 ft, **RX4-M5-C5**: 4 m 13.123 ft)

RX-PRVM3 RX-RVM5 RX2-PRVM2 Sensor



RX-D700 RX-D200R RX2-D300 Sensor

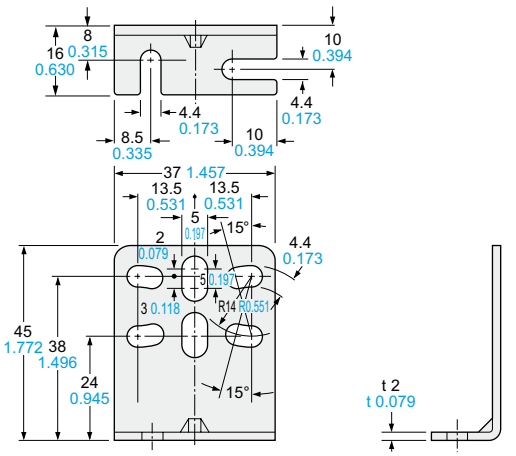


DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.
Refer to **CX-400** series pages (p.269 and p.272) for dimensions of the reflector or the reflector mounting bracket.

MS-RX-1

Sensor mounting bracket (Accessory for **RX-□**, **RX2-□**)

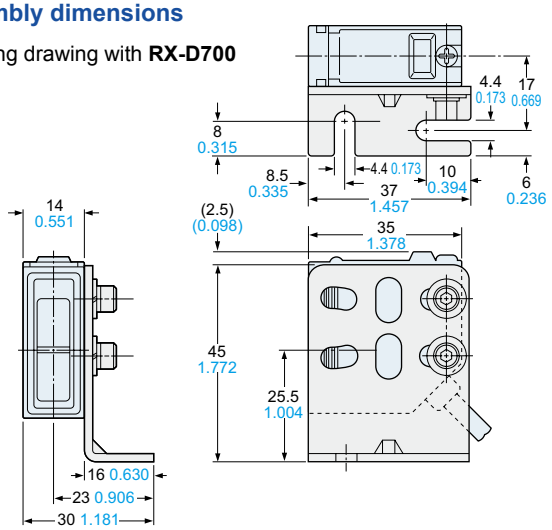


Material: Cold rolled carbon steel (SPCC)

Two M4 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached.

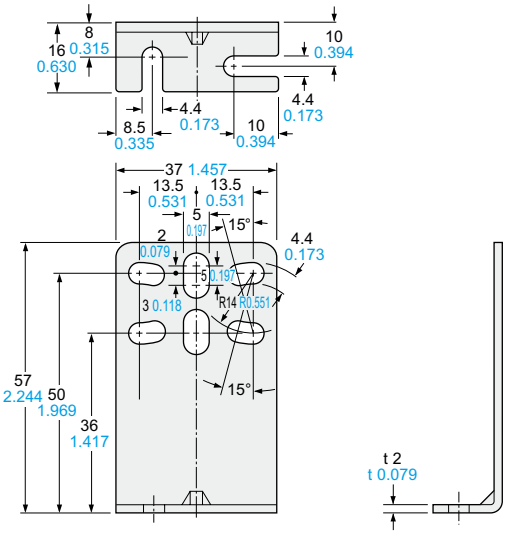
Assembly dimensions

Mounting drawing with **RX-D700**



MS-RX-2

Sensor mounting bracket (Accessory for **RX4-□**)

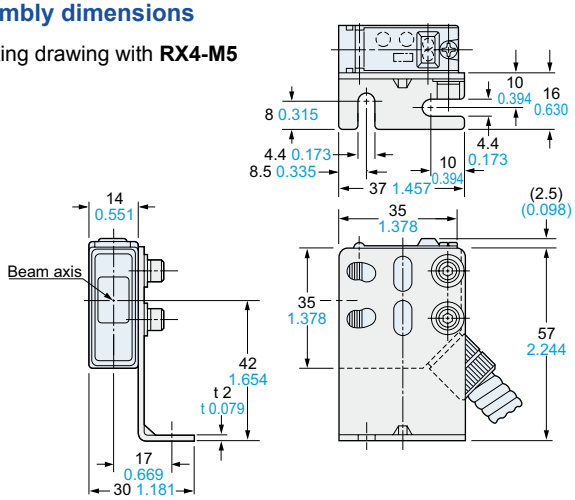


Material: Cold rolled carbon steel (SPCC)

Two M4 (length 16 mm 0.630 in) hexagon-socket-head bolts are attached.

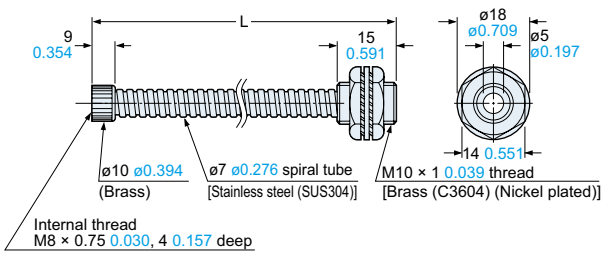
Assembly dimensions

Mounting drawing with **RX4-M5**



PT-RX500 PT-RX1000

Protective tube (Optional)



• Length L

Model No.	Length L
PT-RX500	500^{+10}_{0} $19.685^{+0.394}_{0}$
PT-RX1000	$1{,}000^{+10}_{0}$ $39.370^{+0.394}_{0}$