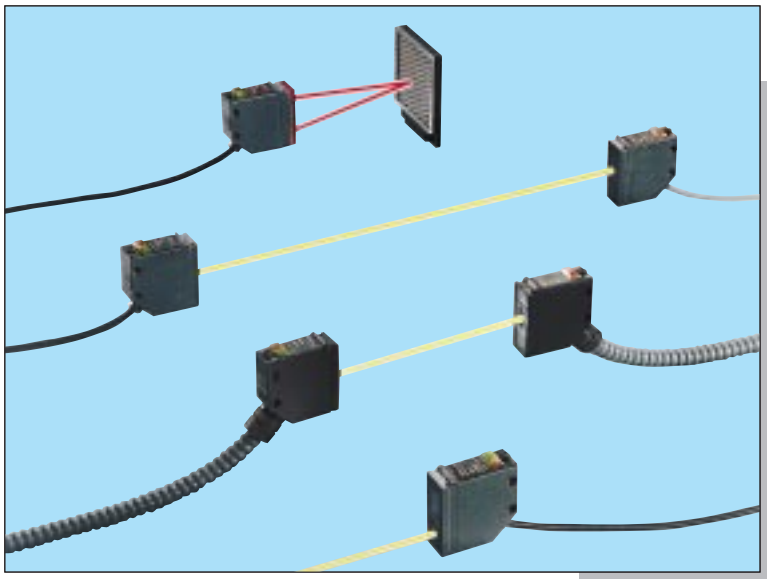
RX SERIES

Amplifier Built-in Robust Photoelectric Sensor

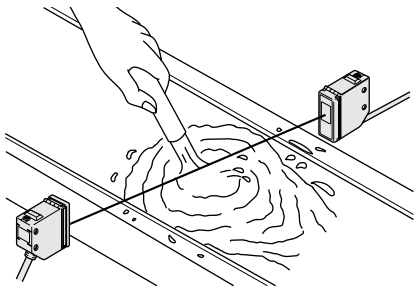


Advanced Sensor Technology

CE Marked
Conforming to EMC Directive
(Excluding RX2, RX3 and RX4)

Waterproof

The sensor can be hosed down because of its IP67 construction. The equipment on which the sensor is mounted can be washed without any problem.



Note: However, take care that if it is exposed to water splashes during operation, it may detect a water drop itself.

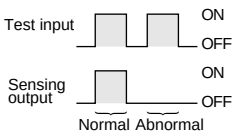
Robust

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

Test Input

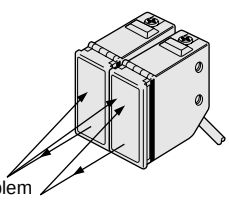
Convenient for operation check before start-up. (Excluding the **RX2** models)

The sensor operation is checked by interrupting the emission repeatedly and confirming that the output changes accordingly.



Automatic Interference Prevention Function (Retroreflective and Diffuse Reflective Type Sensors Only)

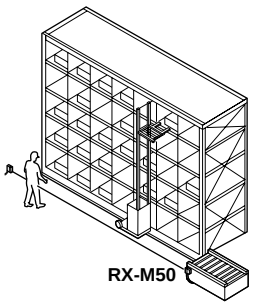
Two sensors can be mounted side by side because of the automatic interference prevention function. (Excluding the **RX2** models)



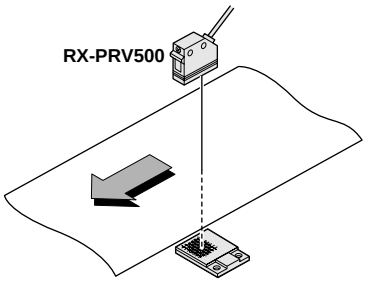
There is no problem
even if the beam of the adjoining sensor is incident.

APPLICATIONS

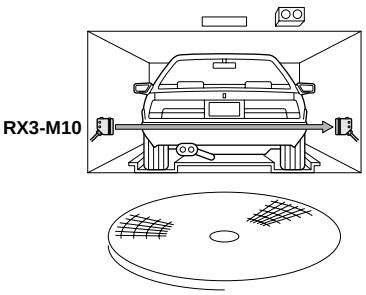
Detecting person entering stacker crane path



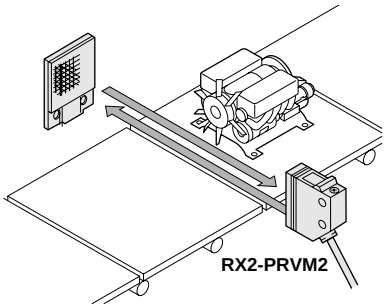
Sensing transparent sheet



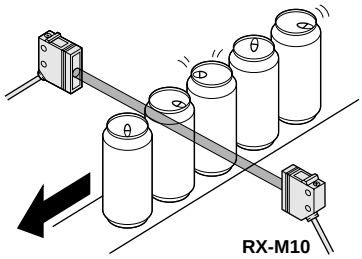
Confirming car position at parking garage



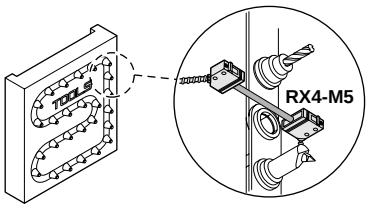
Detecting engines



Counting cans



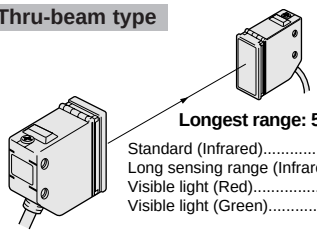
Sensing machine tools



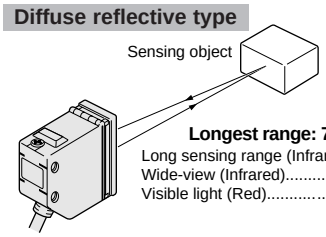
RX... Standard Type

- **Wide variety**

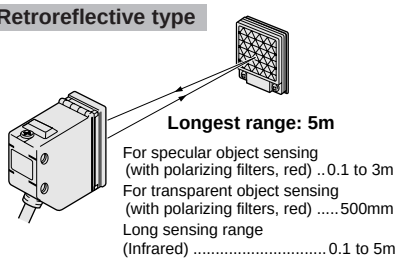
Thru-beam type



Diffuse reflective type

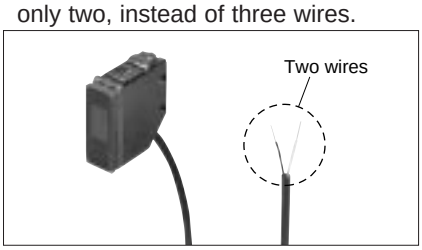


Retroreflective type



RX2... DC 2-wire Type

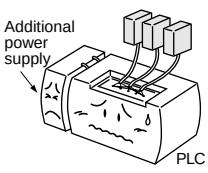
- **Wiring reduced by 1/3**
  Wiring can be completed by using only two, instead of three wires.



- **Power supply cost: reduced to 1/30 or less**
  Current consumption: 1mA or less
  An additional power supply for the sensors is not required.

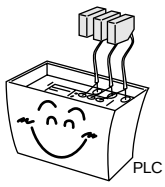
3-wire type

Wiring is time-consuming for the 3-wire sensors and an additional power supply is required.



2-wire type

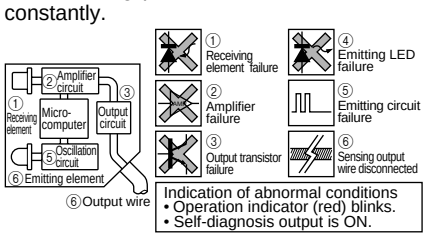
Wiring is simple with only two wires.



RX3... Intelligent Type

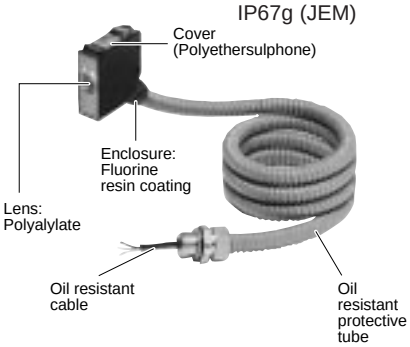
- **Self-diagnosis function for internal circuit**
  In addition to the beam intensity check, the built-in microcomputer self-diagnoses the internal circuit and detects a circuit failure, should it occur.

The following parts ① to ⑥ are monitored constantly.



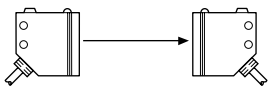
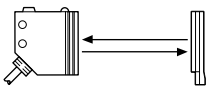
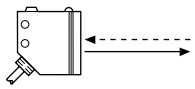
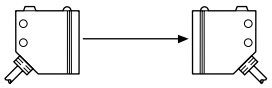
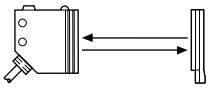
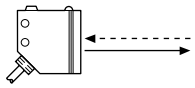
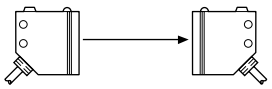
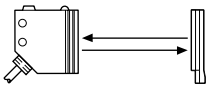
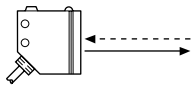
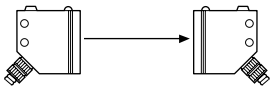
RX4... Heavy Duty Type

- **Durable against oil**
  IP67g (JEM) protection has been achieved by fluorine resin coating on the enclosure and by using oil resistant protective tube. This sensor can be used in a harsh environment.

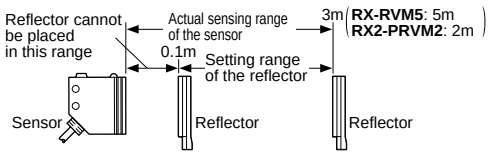


RX

ORDER GUIDE

Type				Appearance	Sensing range	Model No.
RX (Standard type)	Thru-beam	Infrared	Long sensing range		10m	**RX-M10**
					50m	**RX-M50**
		For mark sensing	Red		2m	**RX-M2R**
			Green		500mm	**RX-500G**
	Retroreflective	Red (with polarizing filters)			0.1 to 3m (Note)	**RX-PRVM3**
			For transparent object sensing		500mm (Note)	**RX-PRV500**
		Infrared (long sensing range)			0.1 to 5m (Note)	**RX-RVM5**
	Diffuse reflective	Infrared			700mm	**RX-D700**
			Wide-view		300mm	**RX-D300**
		Red			200mm	**RX-D200R**
RX2 (DC 2-wire type)	Thru-beam	Infrared			5m	**RX2-M5**
	Retroreflective	Red (with polarizing filters)			0.1 to 2m (Note)	**RX2-PRVM2**
	Diffuse reflective	Infrared			300mm	**RX2-D300**
RX3 (Intelligent type)	Thru-beam	Infrared			10m	**RX3-M10**
	Retroreflective	Red (with polarizing filters)			0.1 to 3m (Note)	**RX3-PRVM3**
			For transparent object sensing		500mm (Note)	**RX3-PRV500**
	Diffuse reflective	Infrared			700mm	**RX3-D700**
RX4 (Heavy duty type)	Thru-beam	Infrared	2m cable length		5m	**RX4-M5**
			3m cable length			**RX4-M5-C3**
			5m cable length			**RX4-M5-C5**

Note: The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector. Further, the sensing range of **RX-PRVM3**, **RX-RVM5**, **RX2-PRVM2** and **RX3-PRVM3** is the possible setting range for the reflector. The sensor can detect an object less than 0.1m away.



5m cable length type

5m cable length models are available (Standard: 2m). When ordering this type, add suffix '**-C5**' to the model No. (Excluding **RX-4**□)
(e.g.) 5m cable length type of **RX-M10** is '**RX-M10-C5**'.

SUNX
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OPTIONS

Designation	Model No.	Description		
Slit mask (For **RX-M10**, **RX2-M5** and **RX3-M10** only)	**OS-RX-05 × 5** (Slit size 0.5 × 5mm) **OS-RX-5 × 05** (Slit size 5 × 0.5mm)	Slit on emitter	• Sensing range: 2.7m [**RX-M10** and **RX3-M10**] 1.4m [**RX2-M5**] • Min. sensing object: ϕ8mm	
		Slit on receiver	• Sensing range: 1.9m [**RX-M10** and **RX3-M10**] 1m [**RX2-M5**] • Min. sensing object: ϕ6mm	
		Slit on both sides	• Sensing range: 0.4m [**RX-M10** and **RX3-M10**] 0.2m [**RX2-M5**] • Min. sensing object: 0.5 × 5mm	
	OS-RX-1 × 5 (Slit size 1 × 5mm) **OS-RX-5 × 1** (Slit size 5 × 1mm)	Slit on emitter	• Sensing range: 3.8m [**RX-M10** and **RX3-M10**] 1.9m [**RX2-M5**] • Min. sensing object: ϕ8mm	
		Slit on receiver	• Sensing range: 2.8m [**RX-M10** and **RX3-M10**] 1.4m [**RX2-M5**] • Min. sensing object: ϕ6mm	
		Slit on both sides	• Sensing range: 0.8m [**RX-M10** and **RX3-M10**] 0.4m [**RX2-M5**] • Min. sensing object: 1 × 5mm	
	OS-RX-3 × 5 (Slit size 3 × 5mm) **OS-RX-5 × 3** (Slit size 5 × 3mm)	Slit on emitter	• Sensing range: 7m [**RX-M10** and **RX3-M10**] 3.5m [**RX2-M5**] • Min. sensing object: ϕ8mm	
		Slit on receiver	• Sensing range: 4.9m [**RX-M10** and **RX3-M10**] 2.5m [**RX2-M5**] • Min. sensing object: ϕ6mm	
		Slit on both sides	• Sensing range: 2.6m [**RX-M10** and **RX3-M10**] 1.3m [**RX2-M5**] • Min. sensing object: 3 × 5mm	
Reflector (For retro-reflective type sensor only)	**RF-210**	• Sensing range: 0.2 to 1.5m [**RX-RVM5**] 0.4 to 1m [**RX-PRVM3** and **RX3-PRVM3**] • Min. sensing object: ϕ30mm		
	RF-220	• Sensing range: 0.1 to 3.8m [**RX-RVM5**] 0.1 to 2m [**RX-PRVM3** and **RX3-PRVM3**] 0.1 to 1.3m [**RX2-PRVM2**] 250mm [**RX-PRV500** and **RX3-PRV500**] • Min. sensing object: ϕ35mm		
Reflector mounting bracket	**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 × 100mm • Sensing range: 3m (at 50 × 50mm) (There may be a slight variation depending on the product.)		
Protective tube	**PT-RX500**	Length	500mm	Cable is protected from external forces. It does not rust as it is made of stainless steel.
	PT-RX1000		1,000mm	
Sensor checker (Note)	**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.		

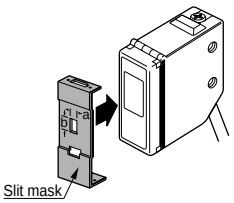
Note: Refer to P.378～ for details of the sensor checker **CHX-SC2**.

Slit mask

Fitted on the front face of the sensor with one-touch.

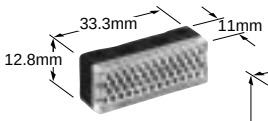
★ Slit size

OS-RX-1 × 5
a b

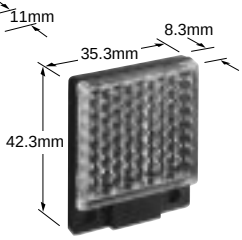


Reflector

• **RF-210**

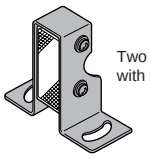


• **RF-220**



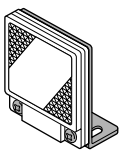
Reflector mounting bracket

• **MS-RF21-1**



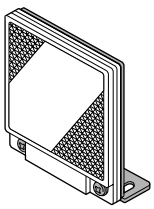
Two M3 (length 12mm) screws with washers are attached.

• **MS-RF22**



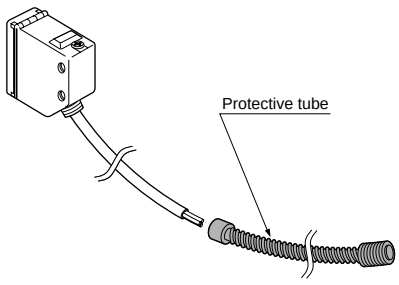
Two M3 (length 8mm) screws with washers are attached.

• **MS-RF23**

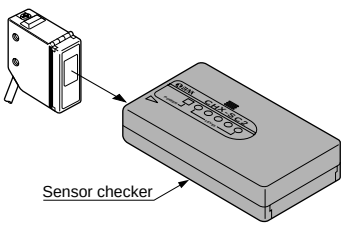


Two M4 (length 10mm) screws with washers are attached.

Protective tube



Sensor checker



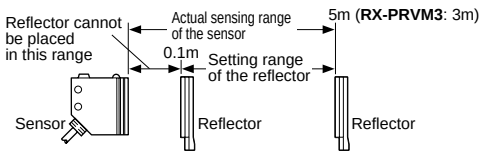
RX

SPECIFICATIONS

Standard type

Item \ Model No.	RX-M10	RX-M50	RX-M2R	RX-500G	RX-PRVM3	RX-PRV500	RX-RVM5	RX-D700	RX-D300	RX-D200R
Type	Thru-beam				Retroreflective			Diffuse reflective		
	Infrared		Red	Green	Red (with polarizing filters)		Infrared (Long sensing range)	Infrared		Red
		Long sensing range				For transparent object sensing			Wide-view	
Sensing range	10m	50m	2m	500mm	0.1 to 3m (Note 1)	500mm (Note 1)	0.1 to 5m (Note 1)	700mm (Note 2)	300mm (Note 2)	200mm (Note 2)
Sensing object	ϕ10mm or more opaque object (Note 3)				ϕ50mm or more opaque, translucent or specular object (Note 1)	ϕ50mm or more opaque, translucent or transparent object (Note 1)	ϕ50mm or more opaque or translucent object (Note 1)	Opaque, translucent or transparent object		
Hysteresis	—				—			15% or less of operation distance		
Repeatability (perpendicular to sensing axis)	0.5mm or less				1mm or less	0.2mm or less	1mm or less	0.5mm or less		
Supply voltage	12 to 24V DC ± 10% Ripple P-P 10% or less									
Current consumption	Emitter: 20mA or less (**RX-M50**: 25mA or less), Receiver: 25mA or less				40mA or less					
Sensing output	NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between sensing output and 0V) • Residual voltage: 1.5V or less (at 100mA sink current) 0.4V or less (at 16mA 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: 50mA • Applied voltage: 30V DC or less (between self-diagnosis output and 0V) • Residual voltage: 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)									
Output operation	ON under unstable sensing condition									
Short-circuit protection	—									
Response time	1ms or less									
Test input	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 closely.)					
Environmental resistance: Pollution degree	3 (Industrial environment)									
Environmental resistance: Protection	IP67 (IEC)									
Environmental resistance: Ambient temperature	− 25 to + 60°C (No dew condensation or icing allowed), Storage: − 30 to + 70°C									
Environmental resistance: Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH									
Environmental resistance: Ambient illuminance	Sunlight: 11,000ℓx at the light-receiving face, Incandescent light: 3,500ℓx at the light-receiving face									
Environmental resistance: EMC	Emission: EN50081-2, Immunity: EN50082-2									
Environmental resistance: Voltage withstandability	1,000V AC for one min. between all supply terminals connected together and enclosure									
Environmental resistance: Insulation resistance	20MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure									
Environmental resistance: Vibration resistance	10 to 500Hz frequency, 1.5mm amplitude (10G max.) in X, Y and Z directions for two hours each									
Environmental resistance: Shock resistance	500m/s² acceleration (50G approx.) in X, Y and Z directions for three times each									
Emitting element	Infrared LED (modulated)		Red LED (modulated)	Green LED (modulated)	Red LED (modulated)		Infrared LED (modulated)			Red LED (modulated)
Material	Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (retroreflective type: Acrylic)									
Cable	Emitter: 0.15mm² 3-core oil, heat and cold resistant cabtyre cable, 2m long Receiver: 0.15mm² 4-core oil, heat and cold resistant cabtyre cable, 2m long				0.15mm² 5-core oil, heat and cold resistant cabtyre cable, 2m long					
Cable extension	Extension up to total 100m is possible with 0.3mm², or more, cable (thru-beam type: both emitter and receiver).									
Weight	Emitter: 70g approx. (**RX-M50**: 75g approx.) Receiver: 70g approx. (**RX-M50**: 75g approx.)				75g approx.					
Accessories	**MS-RX-1** (Sensor mounting bracket): 2 sets Adjusting screwdriver: 1 No.				**MS-RX-1** (Sensor mounting bracket): 1 set **RF-230** (Reflector): 1 No. Adjusting screwdriver: 1 No.			**MS-RX-1** (Sensor mounting bracket): 1 set Adjusting screwdriver: 1 No.		

Notes: 1) The sensing range and the setting 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 0.1m away.
2) The sensing range of the diffuse reflective type sensor is specified for white non-glossy paper (200 × 200mm) as the object.
3) If slit masks (optional) are fitted on **RX-M10**, an object of 0.5 × 5mm can be detected.

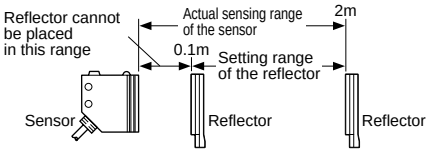


SPECIFICATIONS

DC 2-wire type

Item \ Type	Thru-beam	Retroreflective (with polarizing filters)	Diffuse reflective
Model No.	**RX2-M5**	**RX2-PRVM2**	**RX2-D300**
Sensing range	5m	0.1 to 2m (Note 1)	300mm (Note 2)
Sensing object	ϕ10mm or more opaque object (Note 3)	ϕ50mm or more opaque, translucent or specular object (Note 1)	Opaque, translucent or transparent object
Hysteresis	———	———	15% or less of operation distance
Repeatability (perpendicular to sensing axis)	0.5mm or less	1mm or less	0.5mm or less
Supply voltage	12 to 24V DC ± 10% Ripple P-P 10% or less		
Current consumption	Emitter: 8mA or less, Receiver: 0.8mA or less (Note 4)	1mA or less (Note 4)	
Sensing output	Non contact DC 2-wire type • Load current: 5 to 100mA • Residual voltage: 4V or less (Note 5)		
Output operation	Switchable either Light-ON or Dark-ON		
Short-circuit protection	Incorporated		
Response time	3ms 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)		
Environmental resistance: Ambient temperature	− 20 to + 60°C (No dew condensation or icing allowed), Storage: − 30 to + 70°C		
Environmental resistance: Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH		
Environmental resistance: Ambient illuminance	Sunlight: 11,000 ℓx at the light-receiving face, Incandescent light: 3,500 ℓx at the light-receiving face		
Environmental resistance: Noise immunity	Power line: 240Vp, 10ms cycle, and 0.5 μs pulse width; Radiation: 300Vp, 10ms cycle, and 0.5 μs pulse width (with noise simulator)		
Environmental resistance: Voltage withstandability	1,000V AC for one min. between all supply terminals connected together and enclosure		
Environmental resistance: Insulation resistance	20MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure		
Environmental resistance: Vibration resistance	10 to 500Hz frequency, 1.5mm amplitude (10G max.) in X, Y and Z directions for two hours each		
Environmental resistance: Shock resistance	500m/s^2 acceleration (50G approx.) in X, Y and Z directions for three times each		
Emitting element	Infrared LED (modulated)	Red LED (modulated)	Infrared LED (modulated)
Material	Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (**RX2-PRVM2**: Acrylic)		
Cable	0.15mm^2 2-core oil, heat and cold resistant cabtyre cable, 2m long		
Cable extension	——— (Note 5)		
Weight	Emitter: 70g approx., Receiver: 70g approx.	75g approx.	70g approx.
Accessories	**MS-RX-1** (Sensor mounting bracket): 2 sets Adjusting screwdriver: 1 No.	**MS-RX-1** (Sensor mounting bracket): 1 set **RF-230** (Reflector): 1 No. Adjusting screwdriver: 1 No.	**MS-RX-1** (Sensor mounting bracket): 1 set Adjusting screwdriver: 1 No.

Notes: 1) 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 0.1m away.



2) The sensing range of **RX2-D300** is specified for white non-glossy paper (200 × 200mm) as the object.
3) If slit masks (optional) are fitted, an object of 0.5 × 5mm can be detected.
4) It is the leakage current when the output is in the OFF state.
5) When cable is extended, the residual voltage will be increased.

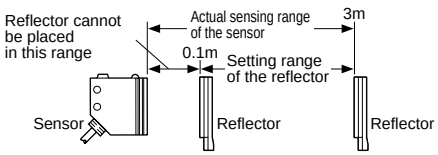
RX

SPECIFICATIONS

Intelligent type

Item \ Type	Model No.	Thru-beam	Retroreflective (with polarizing filters)		Diffuse reflective
				For transparent object sensing	
		RX3-M10	**RX3-PRVM3**	**RX3-PRV500**	**RX3-D700**
Sensing range		10m	0.1 to 3m (Note 1)	500mm (Note 1)	700mm (Note 2)
Sensing object		ϕ10mm or more opaque object (Note 3)	ϕ50mm or more opaque, translucent or specular object (Note 1)	ϕ50mm or more opaque, translucent or transparent object (Note 1)	Opaque, translucent or transparent object
Hysteresis		———			15% or less of operation distance
Repeatability (perpendicular to sensing axis)		0.5mm or less	1mm or less	0.2mm or less	0.5mm or less
Supply voltage		12 to 24V DC ± 10% Ripple P-P 10% or less			
Current consumption		Emitter: 20mA or less Receiver: 45mA or less	50mA or less		
Sensing output		NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between sensing output and 0V) • Residual voltage: 1.5V or less (at 100mA sink current) 0.4V or less (at 16mA 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: 50mA • Applied voltage: 30V DC or less (between self-diagnosis output and 0V) • Residual voltage: 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)			
	Output operation	ON under unstable sensing or the sensor circuit failure conditions (Note 4)			
	Short-circuit protection	———			
Response time		3ms or less			
Test input		Incorporated			
Operation indicator		Red LED (lights up when the sensing output is ON, blinks when the sensor circuit has failed) (Note 4)			
Stability indicator		Green LED (lights up when the sensing output wire is disconnected, lights up under stable light received condition or stable dark condition, and blinks under unstable sensing condition) (Note 4)			
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 closely.)		
Self-diagnosis function		Self-diagnosis of incident light intensity and internal circuit failure			
Environmental resistance	Protection	IP67 (IEC)			
	Ambient temperature	− 25 to + 60°C (No dew condensation or icing allowed), Storage: − 30 to + 70°C			
	Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH			
	Ambient illuminance	Sunlight: 11,000ℓx at the light-receiving face, Incandescent light: 3,500ℓx at the light-receiving face			
	Noise immunity	Power line: 240Vp, 10ms cycle, and 0.5μs pulse width; Radiation: 300Vp, 10ms cycle, and 0.5μs pulse width (with noise simulator)			
	Voltage withstandability	1,000V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance	20MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance	10 to 500Hz frequency, 1.5mm amplitude (10G max.) in X, Y and Z directions for two hours each			
	Shock resistance	500m/s² acceleration (50G approx.) in X, Y and Z directions for three times each			
Emitting element		Infrared LED (modulated)	Red LED (modulated)		Infrared LED (modulated)
Material		Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (retroreflective type: Acrylic)			
Cable		0.15mm² 5-core (thru-beam type: 4-core) oil, heat and cold resistant cabtyre cable, 2m long			
Cable extension		Extension up to total 100m is possible with 0.3mm², or more, cable (thru-beam type: both emitter and receiver).			
Weight		Emitter: 70g approx., Receiver: 70g approx.	75g approx.		
Accessories		**MS-RX-1** (Sensor mounting bracket): 2 sets Adjusting screwdriver: 1 No.	**MS-RX-1** (Sensor mounting bracket): 1 set **RF-230** (Reflector): 1 No. Adjusting screwdriver: 1 No.		**MS-RX-1** (Sensor mounting bracket): 1 set Adjusting screwdriver: 1 No.

Notes: 1) The sensing range and the sensing object for the retroreflective type sensor 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 0.1m away.



2) The sensing range of **RX3-D700** is specified for white non-glossy paper (200 × 200mm) as the object.
3) If slit masks (optional) are fitted, an object of 0.5 × 5mm can be detected.
4) Refer to P.261 for details.

SPECIFICATIONS

Heavy duty type

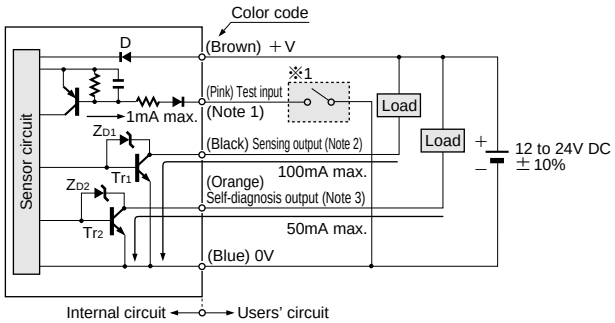
Item \ Type	Thru-beam		
	Cable length 2m	Cable length 3m	Cable length 5m
Model No.	**RX4-M5**	**RX4-M5-C3**	**RX4-M5-C5**
Sensing range	5m		
Sensing object	ϕ10mm or more opaque object		
Repeatability (perpendicular to sensing axis)	0.5mm or less		
Supply voltage	12 to 24V DC ± 10% Ripple P-P 10% or less		
Current consumption	Emitter: 20mA or less, Receiver: 25mA or less		
Sensing output	NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between sensing output and 0V) • Residual voltage: 1.5V or less (at 100mA sink current) 0.4V or less (at 16mA 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: 50mA • Applied voltage: 30V DC or less (between self-diagnosis output and 0V) • Residual voltage: 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)		
Output operation	ON under unstable sensing condition		
Short-circuit protection	———		
Response time	1ms or less		
Test input	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 (JEM)		
Environmental resistance: Ambient temperature	− 25 to + 60°C (No dew condensation or icing allowed), Storage: − 30 to + 70°C		
Environmental resistance: Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH		
Environmental resistance: Ambient illuminance	Sunlight: 11,000 ℓx at the light-receiving face, Incandescent light: 3,500 ℓx at the light-receiving face		
Environmental resistance: Noise immunity	Power line: 240Vp, 10ms cycle, and 0.5 μs pulse width; Radiation: 300Vp, 10ms cycle, and 0.5 μs pulse width (with noise simulator)		
Environmental resistance: Voltage withstandability	1,000V AC for one min. between all supply terminals connected together and enclosure		
Environmental resistance: Insulation resistance	20MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure		
Environmental resistance: Vibration resistance	10 to 500Hz frequency, 1.5mm amplitude (10G max.) in X, Y and Z directions for two hours each		
Environmental resistance: Shock resistance	500m/s^2 acceleration (50G approx.) in X, Y and Z directions for three times each		
Emitting element	Infrared LED (modulated)		
Material	Enclosure: Die-cast zinc alloy (Fluorine resin coating), Indicator cover: Polyethersulphone, Lens: Polyalylate, Protective tube sheath: Oil resistant PVC		
Cable	0.15mm^2 4-core (emitter: 3-core) oil, heat and cold resistant cabtyre cable		
Protective tube length	1m	2m	4m
Cable extension	Extension up to total 100m is possible for both emitter and receiver with 0.3mm^2, or more, cable.		
Weight	Emitter: 175g approx., Receiver: 175g approx.	Emitter: 265g approx., Receiver: 265g approx.	Emitter: 495g approx., Receiver: 495g approx.
Accessories	**MS-RX-2** (Sensor mounting bracket): 2 sets, Adjusting screwdriver: 1 No.		

RX

I/O CIRCUIT AND WIRING DIAGRAMS

RX-□ RX3-□ RX4-□

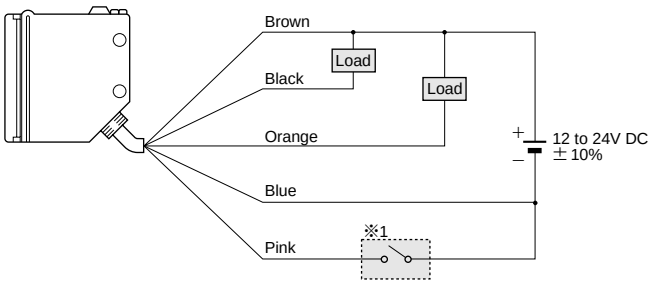
I/O circuit diagram



Notes: 1) The receiver of the thru-beam type sensor does not incorporate the test input.
2) The emitter of the thru-beam type sensor does not incorporate the sensing output.
3) The emitter of the thru-beam type sensors **RX** and **RX4** does not incorporate the self-diagnosis output.

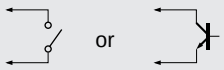
Symbols ... D: Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr_1, Tr_2 : NPN output transistor

Wiring diagram



※1

Non-voltage contact or NPN open-collector transistor

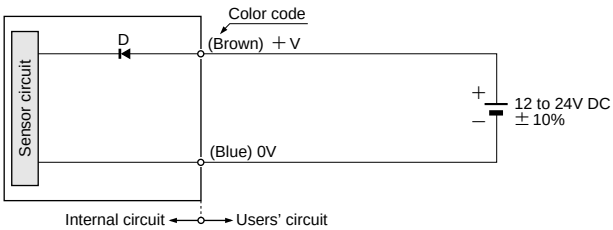


[Supply voltage −2.5V] or more (4.5V or more for the **RX3** model): emission
[Supply voltage −3.3V] or less (2.5V or less for the **RX3** model): emission stopped

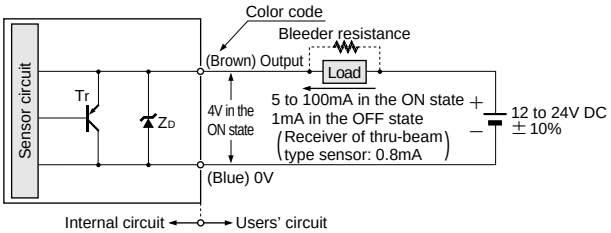
RX2-□

I/O circuit diagram

Emitter of thru-beam type sensor



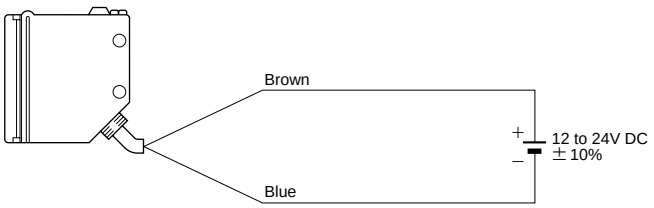
Receiver of thru-beam type sensor, retroreflective and diffuse reflective type sensors



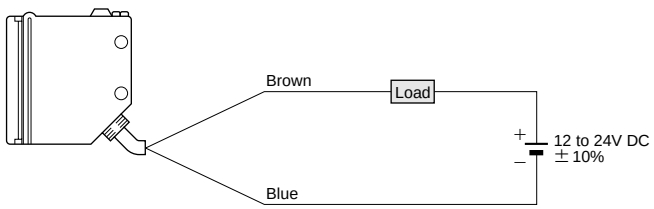
Symbols ... D: Reverse supply polarity protection diode
Z_D: Surge absorption zener diode
Tr: PNP output transistor

Wiring diagrams

Emitter of thru-beam type sensor



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



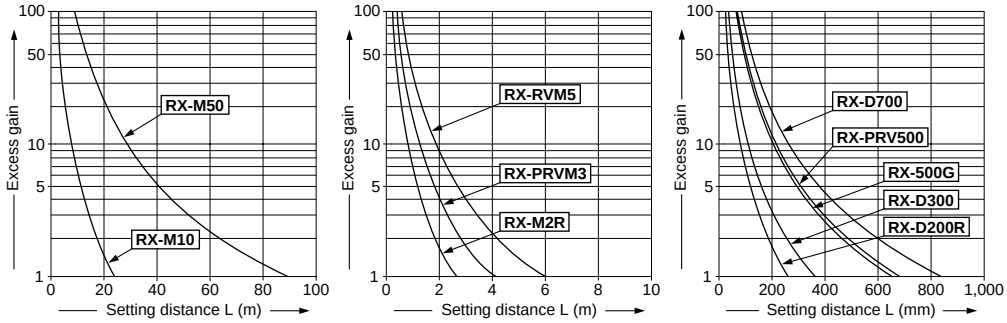
Conditions for the load

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

SENSING CHARACTERISTICS (TYPICAL)

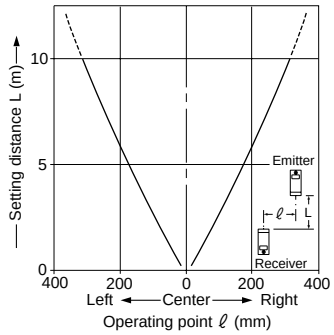
RX-□ All models

Correlation between setting distance and excess gain

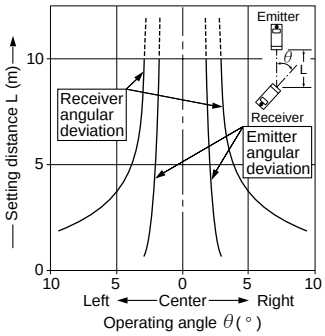


RX-M10 RX3-M10 Thru-beam type

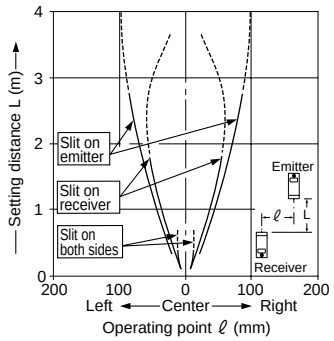
Parallel deviation



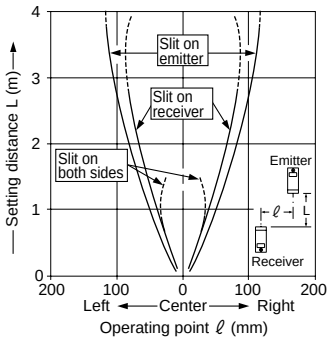
Angular deviation



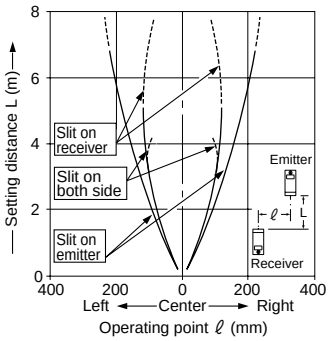
Parallel deviation with slit masks (0.5 X 5mm)



Parallel deviation with slit masks (1 X 5mm)

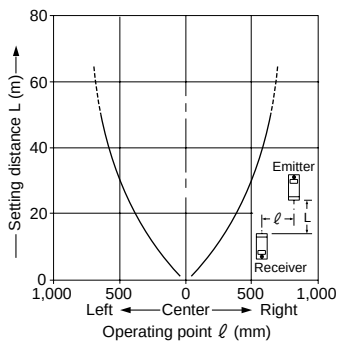


Parallel deviation with slit masks (3 X 5mm)

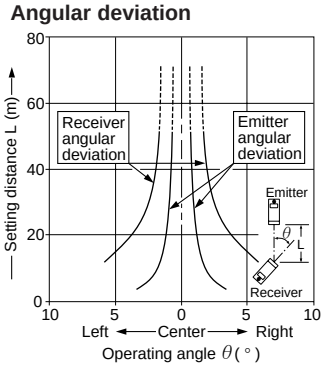


RX-M50 Thru-beam type

Parallel deviation

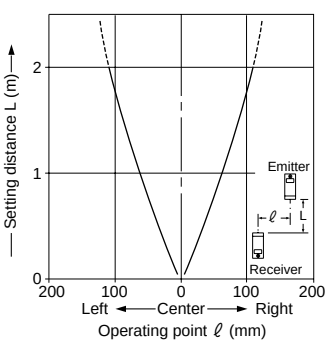


Angular deviation

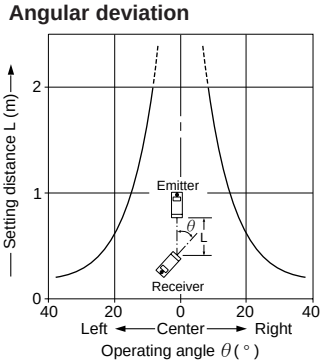


RX-M2R Thru-beam type

Parallel deviation



Angular deviation

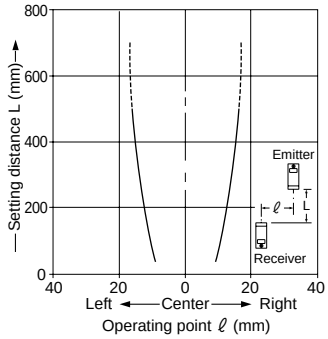


RX

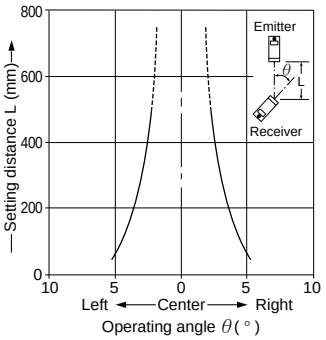
SENSING CHARACTERISTICS (TYPICAL)

RX-500G Thru-beam type

Parallel deviation

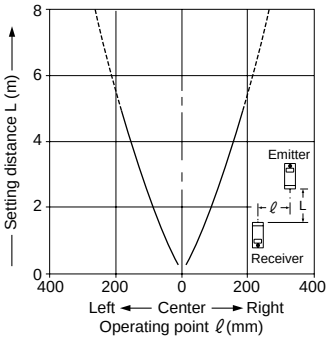


Angular deviation

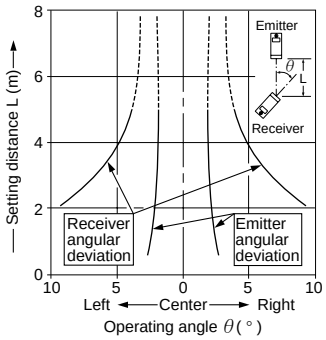


RX4-M5□ Thru-beam type

Parallel deviation

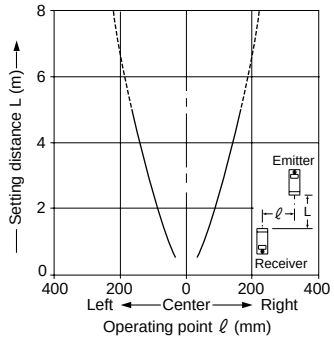


Angular deviation

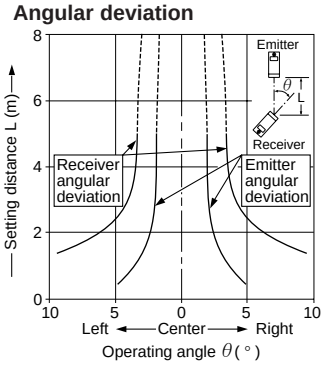


RX2-M5 Thru-beam type

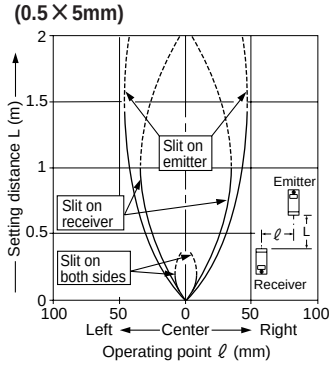
Parallel deviation



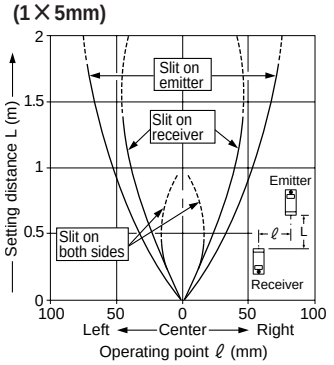
Angular deviation



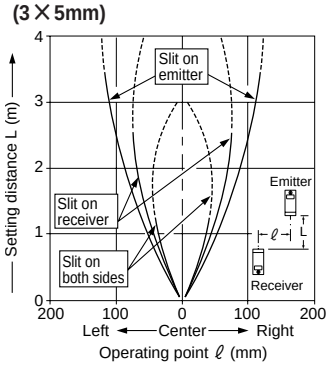
Parallel deviation with slit masks (0.5 × 5mm)



Parallel deviation with slit masks (1 × 5mm)

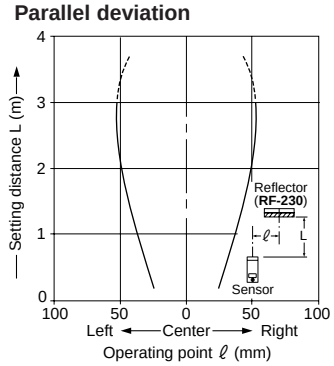


Parallel deviation with slit masks (3 × 5mm)

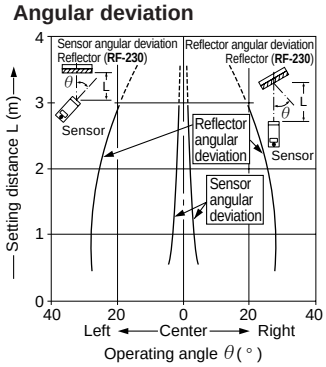


RX-PRVM3 RX3-PRVM3 Retroreflective type

Parallel deviation

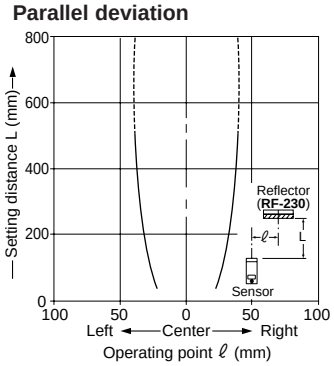


Angular deviation

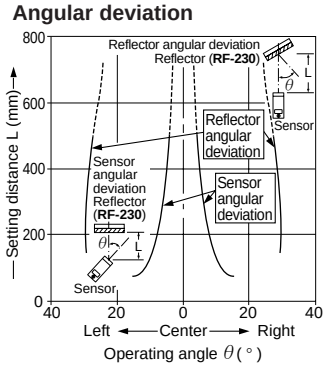


RX-PRV500 RX3-PRV500 Retroreflective type

Parallel deviation



Angular deviation

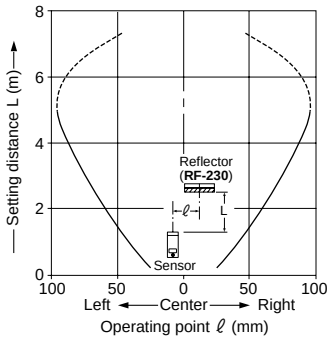


SUNX
AUDIN - 8, avenue de la malle - 51370 Saint Brice Courcelles
Tel : 03.26.04.20.21 - Fax : 03.26.04.28.20 - Web : http: www.audin.fr - Email : info@audin.fr

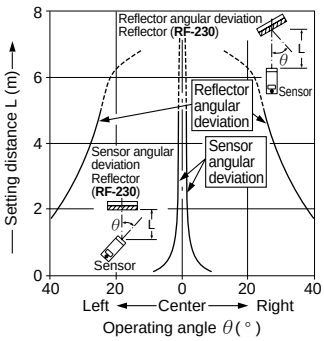
SENSING CHARACTERISTICS (TYPICAL)

RX-RVM5 Retroreflective type

Parallel deviation

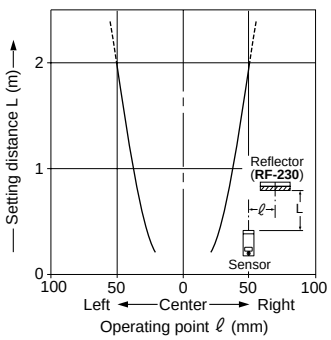


Angular deviation

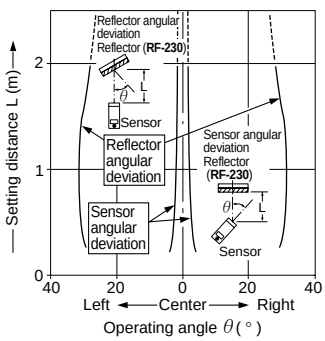


RX2-PRVM2 Retroreflective type

Parallel deviation

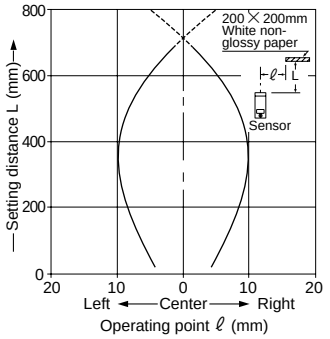


Angular deviation

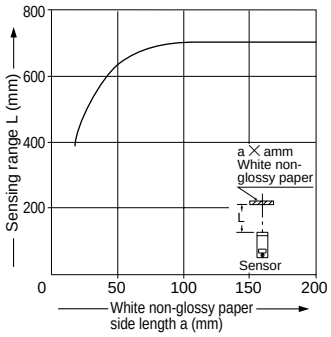


RX-D700 RX3-D700 Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

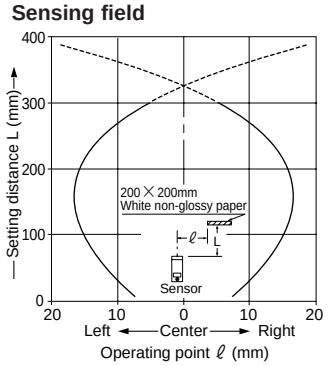


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200×200mm), the sensing range shortens, as shown in the left graph.

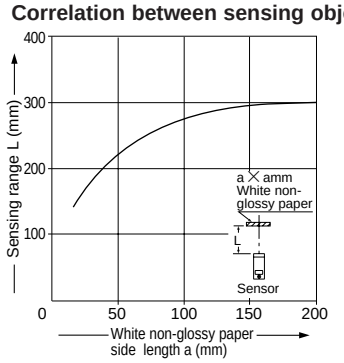
For plotting the left graph, the sensitivity has been set such that a 200×200mm white non-glossy paper is just detectable at a distance of 700mm.

RX-D300 Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

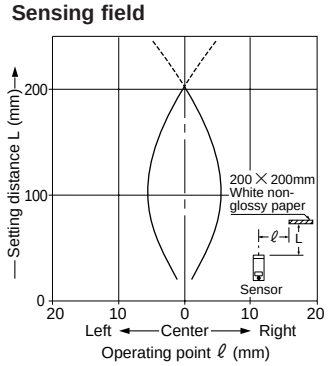


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200×200mm), the sensing range shortens, as shown in the left graph.

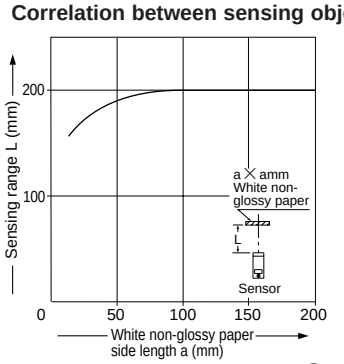
For plotting the left graph, the sensitivity has been set such that a 200×200mm white non-glossy paper is just detectable at a distance of 300mm.

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 200×200mm), the sensing range shortens, as shown in the left graph.

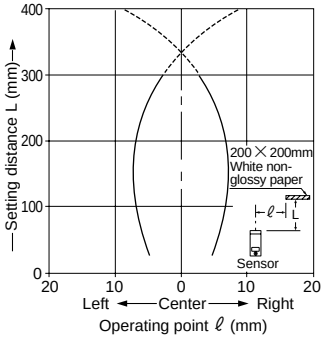
For plotting the left graph, the sensitivity has been set such that a 200×200mm white non-glossy paper is just detectable at a distance of 200mm.

RX

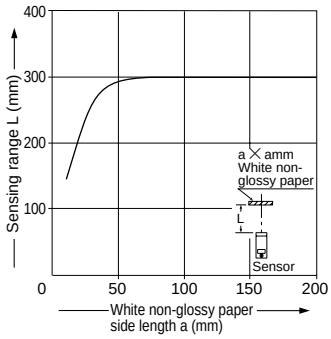
SENSING CHARACTERISTICS (TYPICAL)

RX2-D300 Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range



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

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

PRECAUTIONS FOR PROPER USE

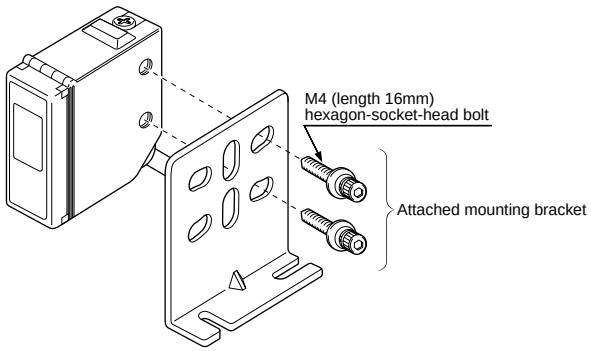
Refer to P.820～ for general precautions.

All models

This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

Mounting

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



Wiring

• The self-diagnosis output is not incorporated with 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 (50ms) after the power supply is switched on.

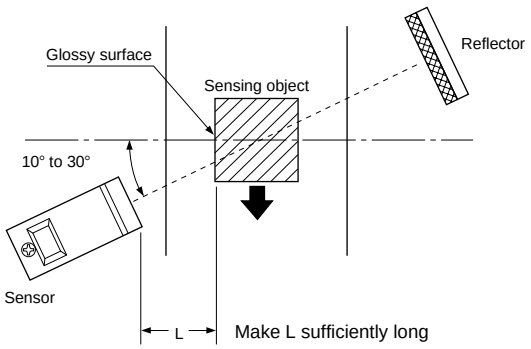
RX-RVM5

Glossy object sensing

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

① Make L, shown in the diagram, sufficiently long.

② Install at an angle of 10 to 30 degrees to the sensing object.



RX□-PRVM3 RX□-PRV500 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 (glossy) 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.

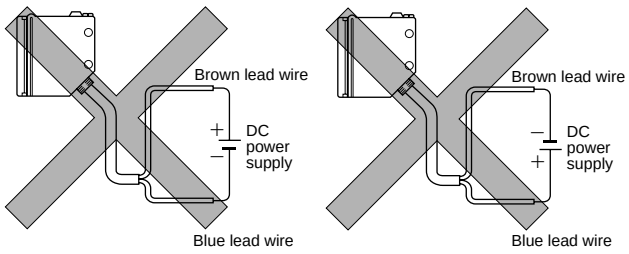
PRECAUTIONS FOR PROPER USE

Refer to P.820～ for general precautions.

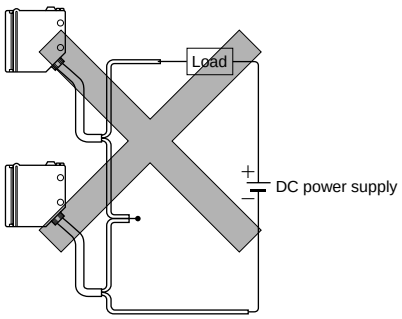
RX2-□

Wiring

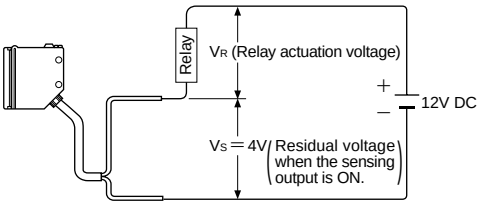
- Always connect the sensor to the power supply through a load. If the sensor is connected to the power supply directly, the short-circuit protection makes the sensor inoperable (The output stays in the OFF state and no indicator lights up). If this happens, connect the sensor to the power supply through 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 4V. Before connecting to a relay, be aware of the actuation voltage of the relay.
  (Not all 12V relays may be connected as the load.)



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

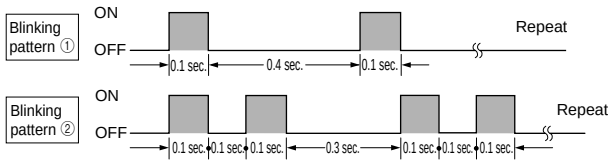
RX3-□

Self-diagnosis output

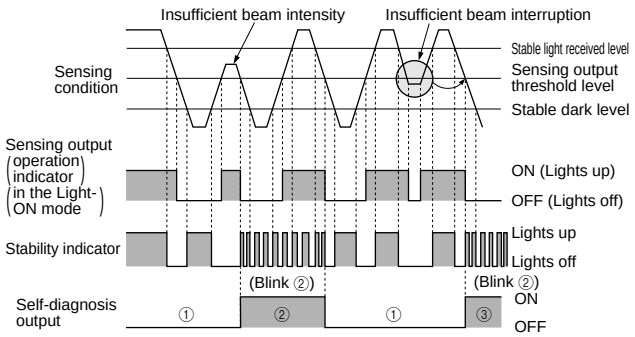
- The self-diagnosis output turns ON when the incident light intensity is reduced due to the lens being soiled with dust or dirt, due to beam misalignment, or if the internal circuit has failed. If the self-diagnosis output and the operation indicator behave as given in the table below, abnormality is indicated and should be rectified.

Symptoms			Failure	Remedy
Self-diagnosis output	Operation indicator (Red LED)	Stability indicator (Green LED)		
ON	Blinking pattern ① (Note 1)	Lights off	Sensing output wire is disconnected during unstable light received condition or unstable dark condition.	Check the sensing output wire (black lead wire) and the placement of the sensor.
			Failure of the sensor circuit. (Failure of the emitting or receiving elements, emitting circuit, amplifier circuit, or output transistor.	If the sensor does not operate after the power is supplied once again, please contact our office.
		Lights up	Sensing output wire is disconnected.	Check the sensing output wire (black lead wire).
	Blinking pattern ② (Note 1)	Lights up/ Lights off	Sensing output is short-circuited and excessive current flows.	Check the sensing output wire (black lead wire) and the load.
	Lights up/ Lights off	Blinking pattern ② (Note 1)	Unstable sensing condition due to soiled lens or beam misalignment. (Note 2)	Check the placement of the sensors and the surface condition of the lenses.

Notes:
1) There are two blinking patterns of the operation indicator and the stability indicator.



2) The time chart for unstable light received condition and unstable dark condition are shown in the following diagram.



① The self-diagnosis output transistor stays in the 'OFF' state during stable sensing.
② When the sensing output changes, if the incident light intensity does not reach the stable light received level or the stable dark level, the self-diagnosis output becomes ON.
Further, the self-diagnosis output changes state when the sensing output changes from Light to Dark state. (It is not affected by the operation mode switch.)
③ In case of insufficient beam interruption, there will be a time lag before the self-diagnosis output turns ON.

3) For the emitter of the thru-beam type diagnosis is only for the emitting element and circuit failure, and the failure is indicated by blinking pattern ①.
4) The self-diagnosis output (for sensing output wire disconnection, output transistor failure) may not be generated or changed depending on the fault conditions.
5) When the test input is connected to 0V, the self-diagnosis is inoperable.
6) Turning the sensitivity adjuster to the minimum simulates the internal circuit failure condition. Set it at the proper position.

RX

PRECAUTIONS FOR PROPER USE

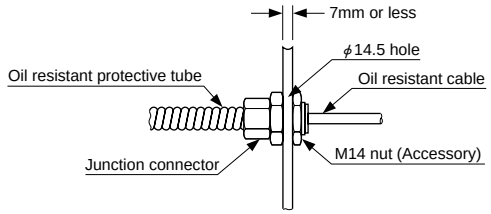
Refer to P.820～ for general precautions.

RX4-□

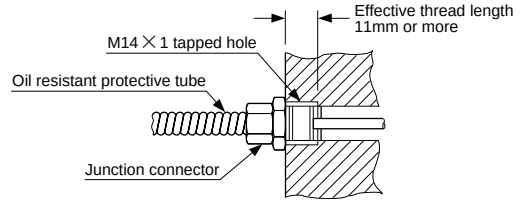
Connection of protective tube connector

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

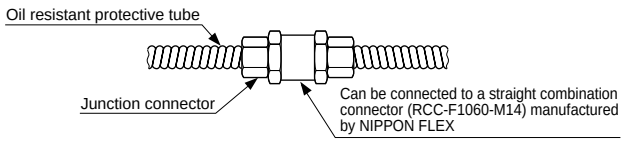
When mounted on a plate



When mounted with a female screw



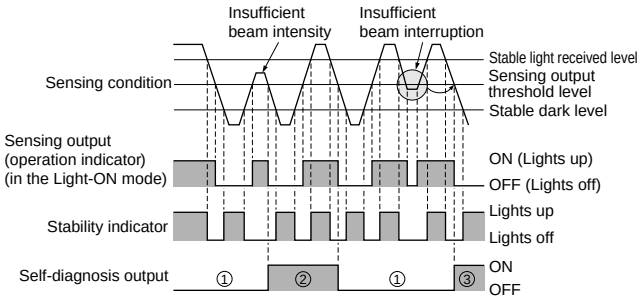
When connected to another protective tube



RX-□ RX4-□

Self-diagnosis function

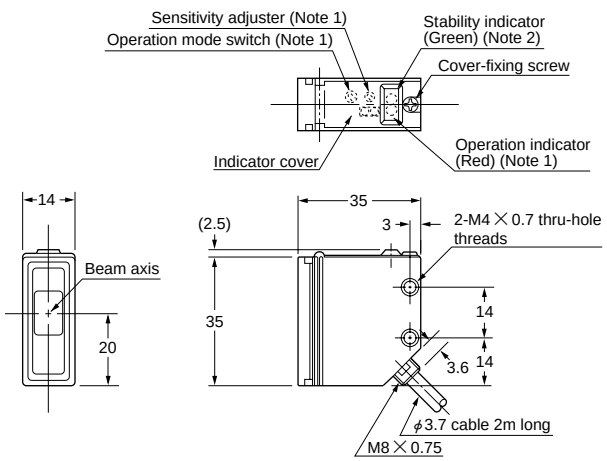
• The sensor diagnoses the incident light intensity, and if it is reduced due to dirt or dust, or beam misalignment an output is generated.



① The self-diagnosis output transistor stays in the 'OFF' state during stable sensing.
② When the sensing output changes, if the incident light intensity does not reach the stable light received level or the stable dark level, the self-diagnosis output becomes ON.
Further, the self-diagnosis output changes state when the sensing output changes from Light to Dark state. (It is not affected by the operation mode switch.)
③ In case of insufficient beam interruption, there will be a time lag before the self-diagnosis output turns ON.

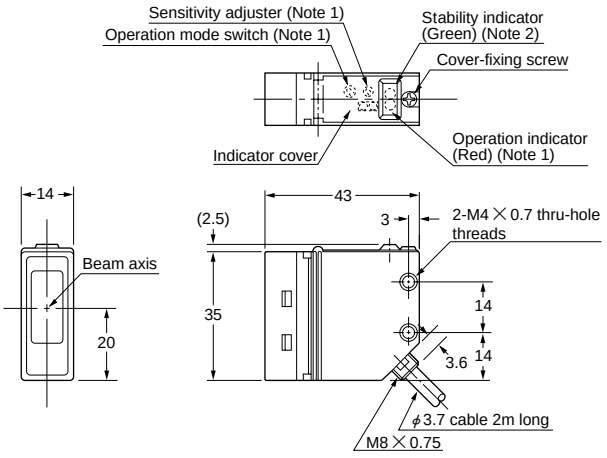
DIMENSIONS (Unit: mm)

RX-M10 RX-M2R RX-500G RX2-M5 RX3-M10 Sensor



Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

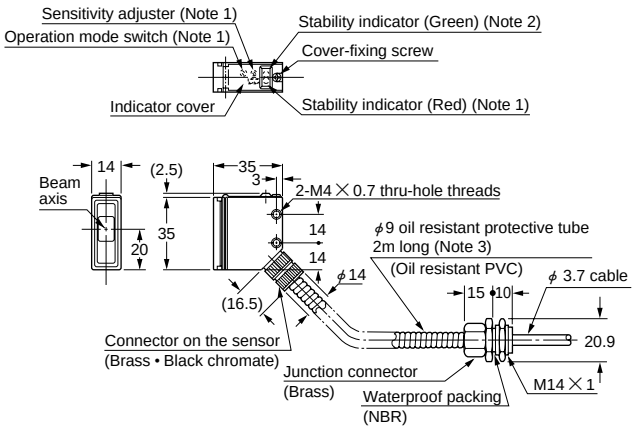
RX-M50 Sensor



Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

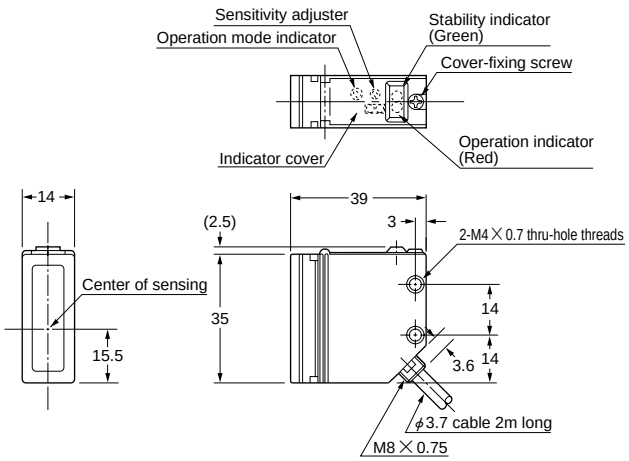
DIMENSIONS (Unit: mm)

RX4-M5□ Sensor

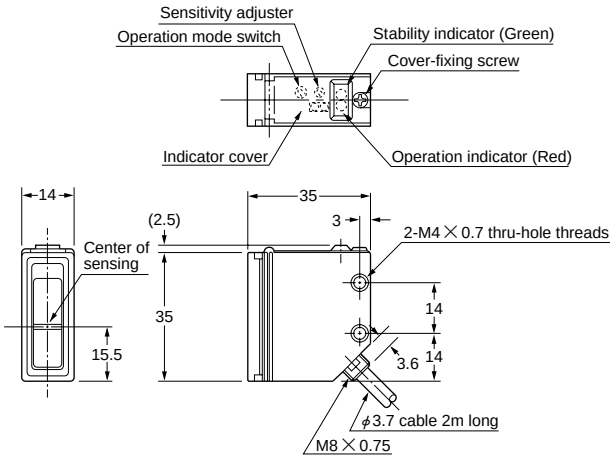


Notes: 1) Not incorporated on the emitter.
2) It is the emitting indicator (red) on the emitter of the thru-beam type sensor.
3) The given length of the protective tube is for **RX4-M5-C3**.
(**RX4-M5**: 1m, **RX4-M5-C5**: 4m)

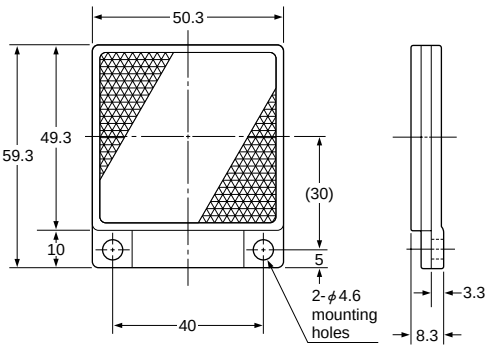
RX-PRVM3 RX-PRV500 RX-RVM5 RX2-PRVM2 RX3-PRVM3 RX3-PRV500 Sensor



RX-D700 RX-D300 RX-D200R RX2-D300 RX3-D700 Sensor

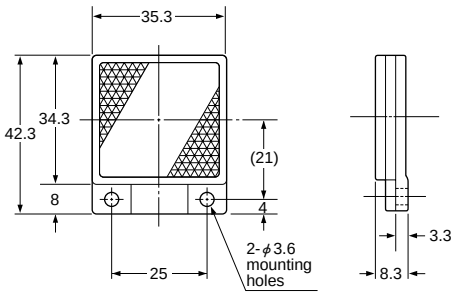


RF-230 Reflector (Accesory for the retroreflective type sensor)



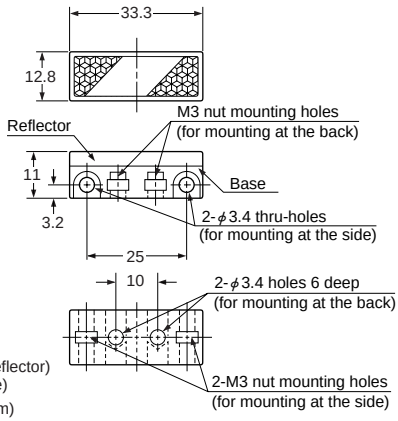
Material: Acrylic (Reflector)
ABS (Base)

RF-220 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

RF-210 Reflector (Optional)



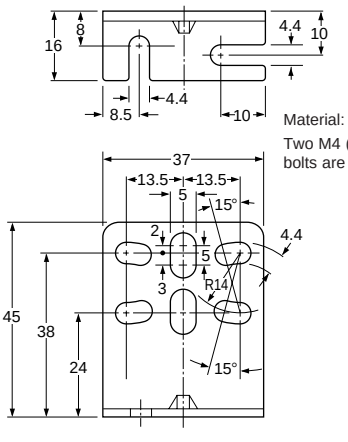
Material: Acrylic (Reflector)
ABS (Base)
Two M3 (length 8mm) screws with washers and two nuts are attached.

RX

DIMENSIONS (Unit: mm)

MS-RX-1

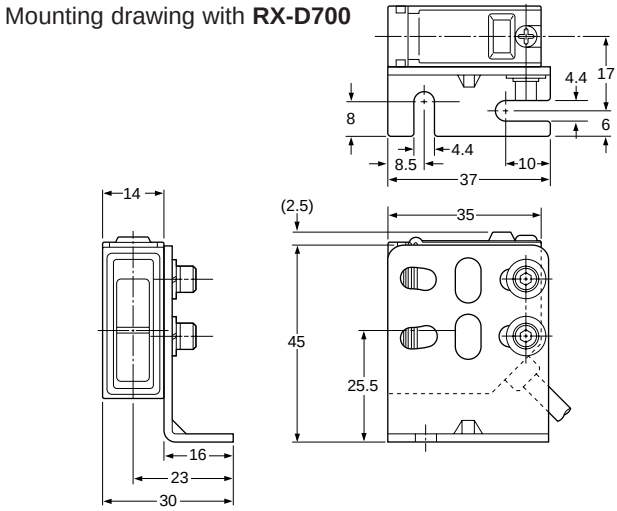
Sensor mounting bracket (Accessory for **RX-□**, **RX2-□**, **RX3-□**)



Material: Cold rolled carbon steel (SPCC)
Two M4 (length 16mm) hexagon-socket-head bolts are attached.

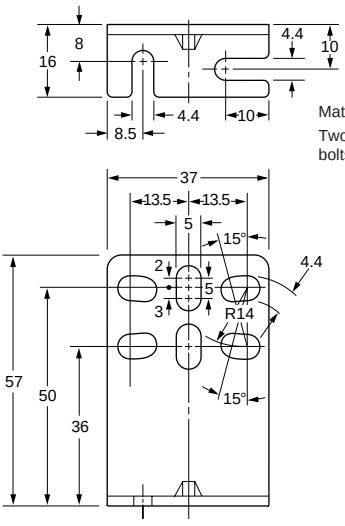
Assembly dimensions

Mounting drawing with **RX-D700**



MS-RX-2

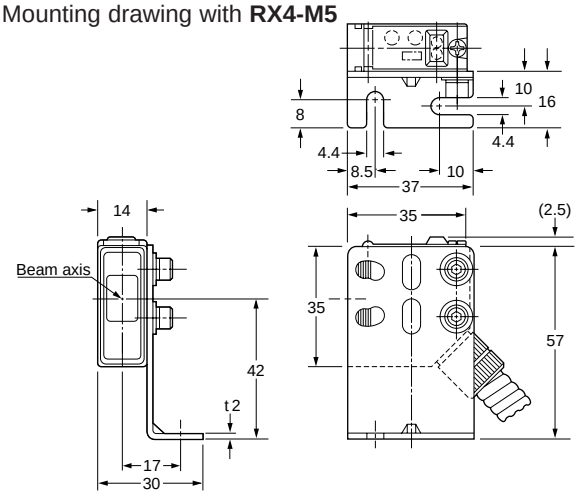
Sensor mounting bracket (Accessory for **RX4-□**)



Material: Cold rolled carbon steel (SPCC)
Two M4 (length 16mm) hexagon-socket-head bolts are attached.

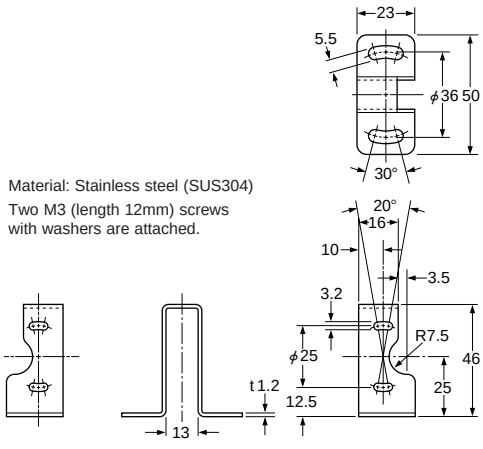
Assembly dimensions

Mounting drawing with **RX4-M5**



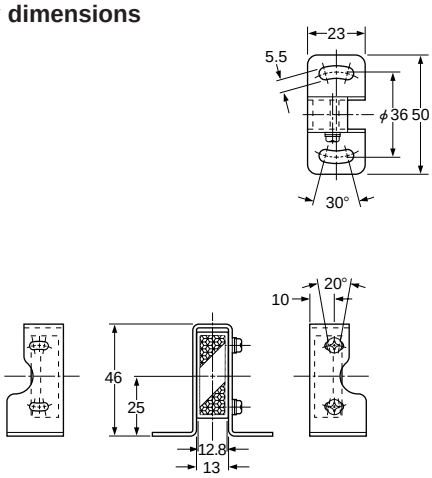
MS-RF21-1

Reflector mounting bracket for **RF-210** (Optional)



Material: Stainless steel (SUS304)
Two M3 (length 12mm) screws with washers are attached.

Assembly dimensions



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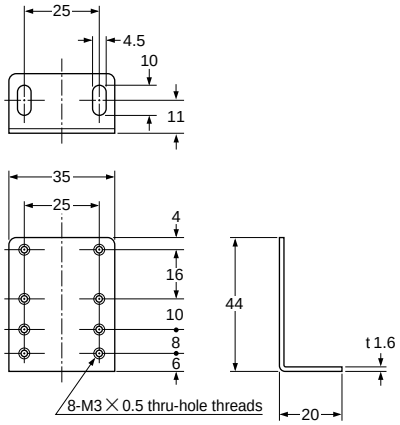
DIMENSIONS (Unit: mm)

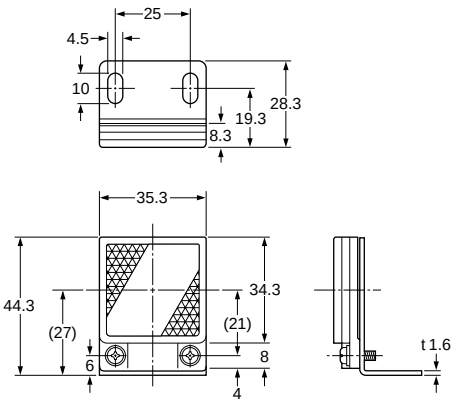
MS-RF22 Reflector mounting bracket for **RF-220** (Optional)



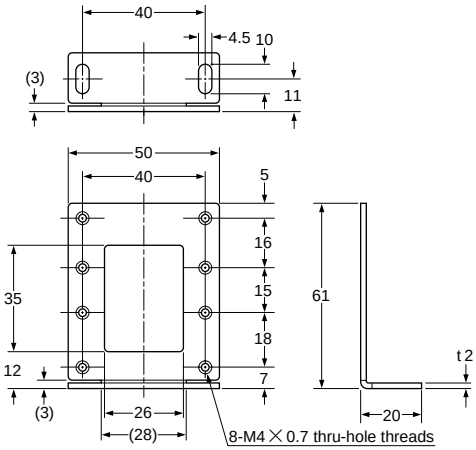
Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Two M3 (Length 8mm) screws with washers are attached.

Assembly dimensions



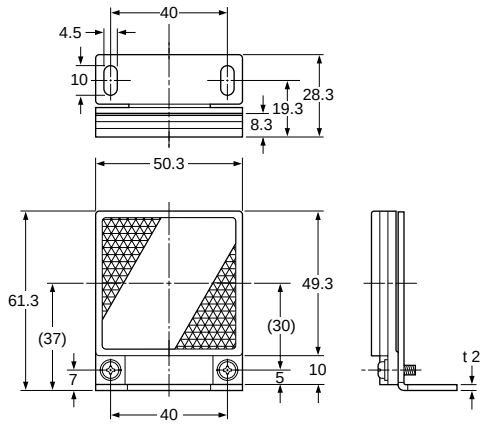
MS-RF23 Reflector mounting bracket for **RF-230** (Optional)



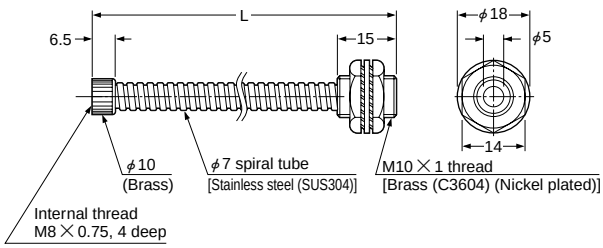
Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Two M4 (Length 10mm) screws with washers are attached.

Assembly dimensions



PT-RX500 PT-RX1000 Protective tube (Optional)



· Length L

Model No.	L (mm)
PT-RX500	500^{+10}_{0}
PT-RX1000	$1{,}000^{+10}_{0}$