CYSERIES

Cylindrical Photoelectric Sensor Amplifier Built-in









Cylindrical type easily mountable with M18 thread





M18 thread

This sensor has an M18 thread size for convenient mounting.

Easy to replace

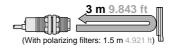
A pigtailed type sensor with connector (CY-□-J), which is easy to replace, is also available.

Long sensing range

Thru-beam type

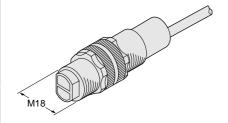


Retroreflective type



Diffuse reflective type





Wide product range

Supply voltage

- 1 AC supply type (24 to 240 V AC) 2 DC supply type (10 to 30 V DC)
- Output
- ① NPN open-collector transistor
- 2 PNP open-collector transistor
- ③ AC non-contact (thyristor) output

Connection

- 1 Cable type
- ② Pigtailed type

A total of 32 models are available.

Environment resistant

Its IP67 construction can be hosed down with water. In addition, it has strong resistance against vibration since it is filled up with resin.

The connector also has IP67 protection.



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

Convenient options

Side-view attachment (For thru-beam type sensors only) The beam is bent at a right angle with the side-view attachment.



Slit mask (For thru-beam type sensors only) It is convenient for detecting small objects or enhancing the sensing accuracy.

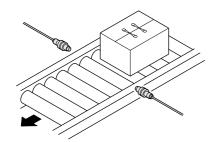


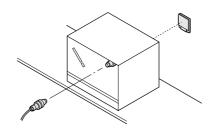
APPLICATIONS

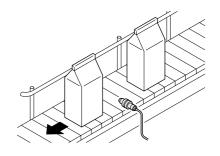
Sensing cardboard boxes

Sensing specular objects

Sensing milk packs







ORDER GUIDE

	Туре	Appearance	Sensing range	Model No.	Supply voltage	Output	Output operation
	neam		12 m 39.370 ft	CY-21		NPN open-collector transistor	Selectable either Light- ON or Dark- ON by the control input
	Thru-beam			CY-21-PN	- 10 to 30 V DC	PNP open-collector transistor	
			3 m 9.843 ft (Note)	CY-27		NPN open-collector transistor	
DC supply type	Retroreflective larizing			CY-27-PN		PNP open-collector transistor	
OC supp			1.5 m 4.921 ft (Note)	CY-29		NPN open-collector transistor	
	Retrore With polarizing filters			CY-29-PN		PNP open-collector transistor	
			120 mm 4.724 in	CY-22		NPN open-collector transistor	
	Diffuse reflective			CY-22-PN		PNP open-collector transistor	
	Thru-beam		12 m 39.370 ft	CY-11A	24 to 240 V AC ± 10 %	AC non-contact (thyristor) output	Light-ON
	Thru-			CY-11B			Dark-ON
_			3 m 9.843 ft (Note)	CY-17A			Light-ON
AC supply type	Retroreflective With polarizing filters			CY-17B			Dark-ON
AC supp			1.5 m 4.921 ft (Note)	CY-19A			Light-ON
				CY-19B			Dark-ON
	se		□ 120 mm	CY-12A			Light-ON
	Diffuse reflective		4.724 in	CY-12B			Dark-ON

NOTE: Reflector is not supplied with the retroreflective type sensor. Please select the suitable reflector or reflective tape from the options.

Note: The sensing range of the retroreflective type sensor is specified for the RF-230 reflector (optional).



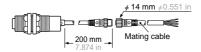
ORDER GUIDE

Pigtailed type

Pigtailed type is also available.

· Table of Model Nos.

Туре			Standard	Pigtailed type (Note)			
	NPN output	Thru-beam	CY-21	CY-21-J			
		Retroreflective	CY-27	CY-27-J			
фе		With polarizing filters	CY-29	CY-29-J			
DC supply type		Diffuse reflective	CY-22	CY-22-J			
dns	PNP output	Thru-beam	CY-21-PN	CY-21-PN-J			
8		Retroreflective	CY-27-PN	CY-27-PN-J			
		With polarizing filters	CY-29-PN	CY-29-PN-J			
		Diffuse reflective	CY-22-PN	CY-22-PN-J			
	Light-ON	Thru-beam	CY-11A	CY-11A-J			
		Retroreflective	CY-17A	CY-17A-J			
фе		Light	Light	Light	With polarizing filters	CY-19A	CY-19A-J
AC supply type		Diffuse reflective	CY-12A	CY-12A-J			
ldns	Dark-ON	Thru-beam	CY-11B	CY-11B-J			
AC		Retroreflective	CY-17B	CY-17B-J			
		Dark	With polarizing filters	CY-19B	CY-19B-J		
		Diffuse reflective	CY-12B	CY-12B-J			



Note: Please order the suitable mating cable separately.

Mating cable

Туре	Model No.	Description		
	CN-22-C2	Length: 2 m 6.562 ft	For the emitter of the thru-beam type sensor	
For DC supply	CN-22-C5	Length: 5 m 16.404 ft	(2-core) (Note 2)	
(Note 1)	CN-24-C2	Length: 2 m 6.562 ft	For the receiver of the thru-beam type senso retroreflective type and diffuse reflective type	
	CN-24-C5	Length: 5 m 16.404 ft	sensors (4-core) (Note 2)	
	CN-32-C2	Length: 2 m 6.562 ft	For the emitter of the thru-beam type sensor	
For AC supply	CN-32-C5	Length: 5 m 16.404 ft	(2-core)	
type (Note 1)	CN-33-C2	Length: 2 m 6.562 ft	For the receiver of the thru-beam type sensor, retroreflective type and diffuse reflective type	
	CN-33-C5	Length: 5 m 16.404 ft	sensors (3-core)	

Notes: 1) The DC supply type mating cable and the AC supply type mating cable have different connector structure and so are not interchangeable.

2) To use the test input (emission halt input) use the 4-core CN-24-C□.

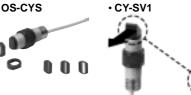
OPTIONS

Designation	Model No.	Description				
	os-cys	Slit size 11.6 × 0.5 mm 0.457 × 0.020 in	Slit on emitter	• Sensing range: 3 m 9.843 ft • Min. sensing object:		
			Slit on receiver	• Sensing range: 2.5 m 8.202 ft • Min. sensing object: ϕ 8 mm ϕ 0.315 in		
			Slit on both sides	• Sensing range: 0.8 m 2.625 ft • Min. sensing object: 10 × 0.7 mm 0.394 × 0.028 in		
		Slit size 11.6 × 1.5 mm 0.457 × 0.059 in	Slit on emitter	• Sensing range: 5 m 16.404 ft • Min. sensing object:		
Slit mask /For thru-beam \			Slit on receiver	• Sensing range: 4.5 m 14.764 ft • Min. sensing object:		
(type sensor only)			Slit on both sides	• Sensing range: 2 m 6.562 ft • Min. sensing object: 10 \times 2 mm 0.394 \times 0.079 in		
		Slit size 11.6 × 3 mm 0.457 × 0.118 in	Slit on emitter	Sensing range: 7.5 m 24.606 ft Min. sensing object:		
			Slit on receiver	Sensing range: 7 m 22.966 ft Min. sensing object:		
			Slit on both sides	• Sensing range: 4.5 m 14.764 ft • Min. sensing object: 10 \times 3 mm 0.394 \times 0.118 in		
Side-view attachment (For thru-beam type sensor only)	CY-SV1	The beam is bent at a right angle by the attachments. • Sensing range (with attachment on both sides): 8 m 26.247 ft				
Reflector	RF-230	• Sensing range: 3 m 9.843 ft [CY-27 & CY-17], 1.5 m 4.921 ft [CY-29 & CY-19]				
(For retroreflective)	RF-220	Sensing range: 2	2 m 6.562 ft [CY	-27□ & CY-17□], 1.2 m 3.937 ft [CY-29□ & CY-19□]		
(type sensor only /	RF-210	• Sensing range: 1 m 3.281 ft [CY-27] & CY-17], 0.7 m 2.297 ft [CY-29] & CY-19]				
Reflector	MS-RF21-1	Protective mounting bracket for RF-210 It protects the reflector from damage and maintains alignment.				
mounting bracket	MS-RF22	For RF-220				
	MS-RF23	For RF-230				
Reflective tape /For retroreflective\	RF-12	• Sensing range: 0.7 m 2.297 ft [CY-27 & CY-17], 0.4 m 1.312 ft [CY-29 & CY-19]				
type sensor only	RF-11	Sensing range:	0.5 m 1.640 ft [0	CY-27□ & CY-17□]		
Sensor checker (Note) CHX-SC2 It is useful for beam alignment of thru-the optimum receiver position is given		thru-beam type sensors. given by indicators, as well as an audio signal.				

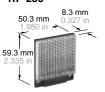
Note: Refer to p.414 \sim for details on the sensor checker CHX-SC2.

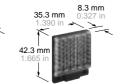
Side-view attachment





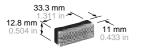
Reflector • RF-230



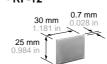


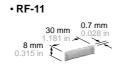
• RF-220

• RF-210



Reflective tape • RF-12





Reflector mounting bracket · MS-RF22

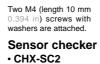
• MS-RF23





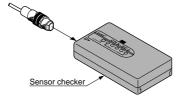
Two M3 (length 8 mm 0.315 in) screws with washers are attached.

• MS-RF21-1





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



SPECIFICATIONS

DC supply type

Supply t			Retrore	eflective			
Туре		Thru-beam	With polarizing filters		Diffuse reflective		
Š	NPN output type	CY-21	CY-27	CY-29	CY-22		
m \ Bodel	PNP output type	CY-21-PN	CY-27-PN	CY-29-PN	CY-22-PN		
sing range		12 m 39.370 ft	3 m 9.843 ft (Note 1)	1.5 m 4.921 ft (Note 1)	120 mm 4.724 in (Note 2)		
sing object			φ50 mm φ1.969 in or more opaque or translucent object (Note 1)	φ50 mm φ1.969 in or more opaque, translucent or specular object (Note 1)	Opaque, translucent or transparent object		
teresis			15 % or less of operation distance				
eatability pendicular t	o sensing axis)		0.3 mm 0.012 in or less				
ply voltage			10 to 30 V DC Rip	ple P-P 10 % or less			
rent consum	ption	Emitter: 20 mA or less Receiver: 25 mA or less		25 mA or less			
Output							
Utilization of	category	DC-12 or DC-13					
Output ope	ration	Selectable either Light-ON or Dark-ON by the control input					
Short-circui	it protection	Incorporated					
ponse time		2 ms or less					
input (emiss	ion halt) function	Incorporated ————					
eration indica	ator	Red LED (lights up when the output is ON)					
Emission indicator		Red LED (lights up during beam emission)					
Pollution degree		3 (Industrial environment)					
Protection		IP67 (IEC)					
Ambient ter	mperature	$-$ 25 to $+$ 55 $^{\circ}$ C $-$ 13 to $+$ 131 $^{\circ}$ F (No dew condensation or icing allowed), Storage: $-$ 30 to			o + 70°C − 22 to + 158 °F		
Ambient hu	ımidity						
Ambient illu	ıminance	Sunlight: 10,000 ℓ x at the light-receiving face, Incandescent light: 3,000 ℓ x at the light-receiving f					
EMC		EN 50081-2, EN 50082-2, EN 60947-5-2					
Voltage with	hstandability	1,000 V AC for one min. between all supply terminals connected together and			d enclosure		
Insulation r	esistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and er					
Vibration re	esistance	10 to 500 Hz frequen	ns for two hours each				
Shock resis	stance	500 m/s ² acceleration (50 G approx.) in X, Y and Z directions for three times each					
Emitting element		Infrared LED (modulated) Red LED (modulated)			Infrared LED (modulated)		
Material		Enclosure: PBT, Lens: Polycarbonate Enclosure: PBT, Front cover: Acrylic					
Cable		0.34 mm ² 4-core (thru-beam type emitter: 3-core) cabtyre cable, 2 m 6.562 ft long					
Cable extension		Extension up to total 100 m 328.084 ft is possible with 0.34 mm ² , or more, cable (thru-beam type: both emitter and receiver).					
Weight		Emitter: 90 g approx. Receiver: 100 g approx.	100 g арргох.				
essories		Nut: 4 pcs.	Nut: 2 pcs.				
	sing range sing object teresis seatability pendicular terply voltage rent consumption of the consumption of	PNP output type sing range sing object teresis seatability pendicular to sensing axis) sply voltage rent consumption Utilization category Output operation Short-circuit protection sponse time input (emission halt) function eration indicator Pollution degree Protection Ambient temperature Ambient humidity Ambient illuminance EMC Voltage withstandability Insulation resistance Vibration resistance Shock resistance tting element erial sile sile extension ght	NPN output type CY-21	Type Thru-beam Thru-beam type entited Thru-beam type entited Thru-beam Thru-beam type entited Thru-beam type entited Thru-beam Thru-beam type entited Thru-beam ty	NPN output type CY-21 CY-27 CY-29-PN CY-29-PN		

NOTE: Reflector is not supplied with the retroreflective type sensor. Please select the suitable reflector or reflective tape from the options.

Notes: 1) The sensing range and the sensing object of the retroreflective type sensor are specified for the RF-230 reflector (optional).

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

SPECIFICATIONS

AC supply type

		Type	Thomas	Retrore	Difference and the actions			
		туре	Thru-beam		With polarizing filters	Diffuse reflective		
	Š	Light-ON	CY-11A	CY-17A	CY-19A	CY-12A		
Item	Model No.	Dark-ON	CY-11B	CY-17B	CY-19B	CY-12B		
Sensing i	range		12 m 39.370 ft	3 m 9.843 ft (Note 1)	1.5 m 4.921 ft (Note 1)	120 mm 4.724 in (Note 2)		
Sensing (object			φ50 mm φ1.969 in or more opaque or translucent object (Note 1)	ϕ 50 mm ϕ 1.969 in or more opaque, translucent or specular object (Note 1)	Opaque, translucent or transparent object		
Hysteres	sis					15 % or less of operation distance		
Repeatal (perpendi		sensing axis)		0.1 mm 0.004 in or less		0.3 mm 0.012 in or less		
Supply vo	oltage/			24 to 240 V	AC ± 10 %			
Power co	onsump	tion	Emitter: 1.5 VA or less Receiver: 2.5 VA or less		2.7 VA or less			
Output			AC non-contact (thyristor) output • Load current: 5 to 200 mA • Applied voltage: 24 to 240 V AC ± 10 % • Residual voltage: 4 V AC or less (at 200 mA load current)					
Respons	se time		20 ms or less					
Operation	on indica	ator	Red LED (lights up when the output is ON), incorporated on the receiver for the thru-beam type sensor					
Power in	ndicator		Red LED (lights up when the power is ON), incorporated on the emitter					
Pollu	ution de	egree	3 (Industrial environment)					
Prote	tection			IP67	(IEC)			
වූ Amb	bient ter	mperature	$-25 \text{ to} + 55 ^{\circ}\text{C} - 13 \text{ to} + 131 ^{\circ}\text{F}$ (No dew condensation or icing allowed), Storage: $-30 \text{ to} + 70 ^{\circ}\text{C} - 22 \text{ to} + 158 ^{\circ}\text{F}$					
Amb	bient hu	midity	35 to 85 % RH, Storage: 35 to 85 % RH					
dmA	bient illu	ıminance	Sunlight: 10,000 ℓ x at the light-receiving face, Incandescent light: 3,000 ℓ x at the light-receiving face					
EMC	С		EN 50081-2, EN 50082-2, EN 60947-5-2					
Volta	age witl	nstandability	1,500 V AC for one min. between all supply terminals connected together and enclosure					
ы Insul	ulation r	esistance	$20~\text{M}\Omega$, or more, with 500 V DC megger between all supply terminals connected together and enclosure					
Vibra	ration re	sistance	10 to 500 Hz frequency, 1.5 mm 0.059 in amplitude (10 G max.) in X, Y and Z directions for two hours each					
Shoo	ck resis	stance	500 m/s ²	nes each				
Emitting (elemen	ıt	Infrared LED (modulated)		Red LED (modulated)	Infrared LED (modulated)		
Material			Enclosure: PBT, Lens: Polycarbonate Enclosure: PBT, F			ont cover: Acrylic		
Cable			0.34 mm² 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2 m 6.562 ft long					
Cable extension			Extension up to total 100 m 328.084 ft is possible with 0.34 mm², or more, cable (thru-beam type: both emitter and receiver).					
Weight			Emitter: 90 g approx. Receiver: 100 g approx.	100 g approx.				
Accessories			Nut: 4 pcs.	Nut: 2 pcs.				

NOTE: Reflector is not supplied with the retroreflective type sensor. Please select the suitable reflector or reflective tape from the options.

Notes: 1) The sensing range and the sensing object of the retroreflective type sensor are specified for the RF-230 reflector (optional).

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

I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

I/O circuit diagram

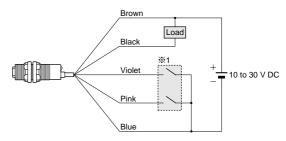
Color code / Connector pin No. of the pigtailed type (Brown / 1) + \ (Black / 4) Output (Note 1) Sensor circuit 100 mA max. (Violet / 2) Test input (emission halt input) (Note 2) 10 to 30 V DC (Pink / 2) Control input (Note 1) (Blue / 3) 0 V Internal circuit ← - o - Users' circuit

Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is

> 2) Test input (emission halt input) is incorporated only on the emitter of the thru-beam type sensor. When the mating cable is connected to the pigtailed type, its color is white.

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

Wiring diagram

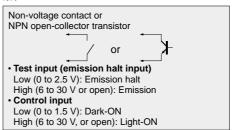


Connector pin position (Pigtailed type)



- 2: Test input (emission halt input) or control input
- 3: 0 V
- 4: Output or not connected

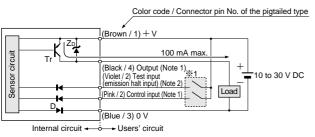
%1



Note: If opening the input cable, make sure to insulate it.

PNP output type

I/O circuit diagram

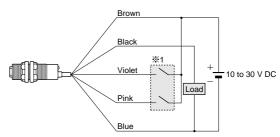


Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is

> 2) Test input (emission halt input) is incorporated only on the emitter of the thru-beam type sensor. When the mating cable is connected to the pigtailed type, its color is white.

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

Wiring diagram

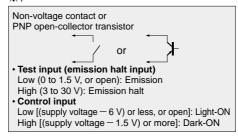


Connector pin position (Pigtailed type)



- 2: Test input (emission halt input) or control input 3: 0 V
- 4: Output or not connected

%1



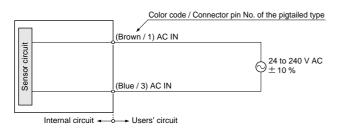
Note: If opening the input cable, make sure to insulate it.

I/O CIRCUIT AND WIRING DIAGRAMS

AC non-contact output type

I/O circuit diagrams

Emitter of thru-beam type sensor



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

(Brown / 1) AC IN

(Black / 4) Output

(Blue / 3) AC IN

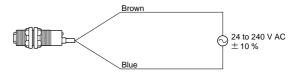
→ Users' circuit

Color code / Connector pin No. of the pigtailed type

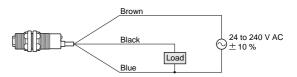
24 to 240 V AC ± 10 %

Wiring diagrams

Emitter of thru-beam type sensor



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



Connector pin position (Pigtailed type)

Emitter of thru-beam type sensor



- 1: AC IN 2: Not connected
- 3: AC IN
- 4: Not connected

Receiver of thru-beam type sensor, retroreflective & diffuse reflective type sensors 1: AC IN



- 2: Not connected
- 3: AC IN
- 4: Output

Retroreflective type

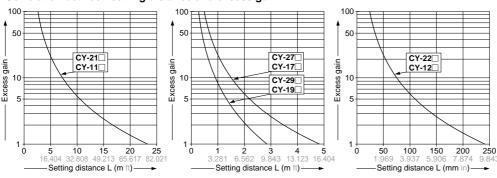
SENSING CHARACTERISTICS (TYPICAL)

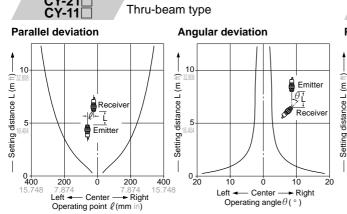
All models

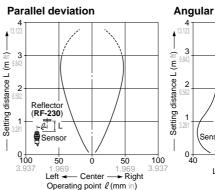
Internal circuit ←-ò

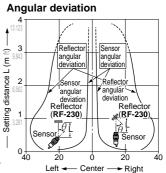
Sensor circuit

Correlation between setting distance and excess gain





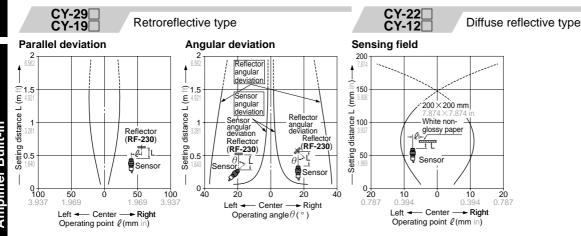




Operating angle θ (°)

CY

SENSING CHARACTERISTICS (TYPICAL)



PRECAUTIONS FOR PROPER USE

Refer to p.1135~ for general precautions.

Ŵ

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 2 N·m or less.



Retroreflective type sensor with polarizing filters (CY-29□ and CY-19□)

 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

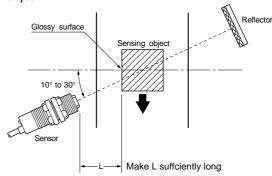
- · Can wrapped by clear film
- Aluminum sheet covered by plastic film
- Gold or silver color (specular) label or wrapping paper

Steps

- Tilt the sensor with respect to the sensing object while fitting.
- Increase the distance between the sensor and the sensing object.

Retroreflective type sensor (CY-27□ and CY-17□)

- 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.

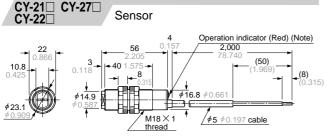


※CY-29 and **CY-19** do not need the above adjustment.

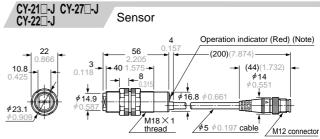
Others

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

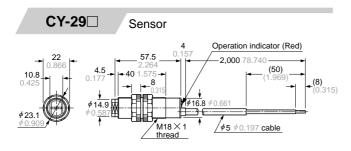
DIMENSIONS (Unit: mm in) The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

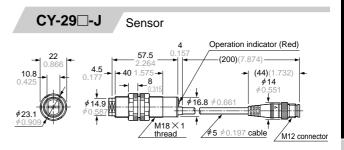


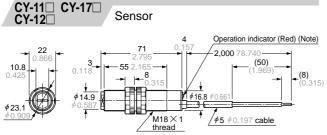
Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.



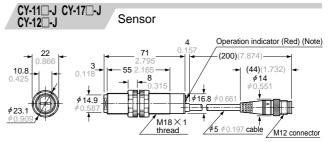
Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.



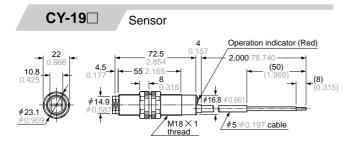


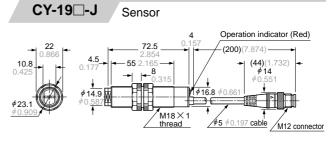


Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.

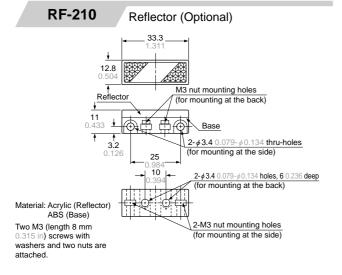


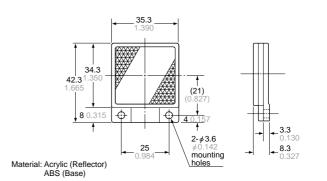
Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.





Reflector (Optional)





RF-220

CY

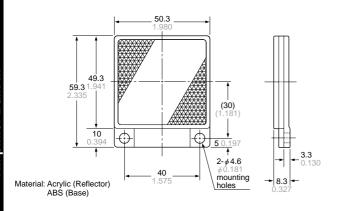
DIMENSIONS (Unit: mm in) The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

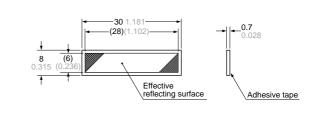
RF-230

Reflector (Optional)

RF-11

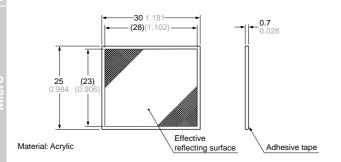
Reflective tape (Optional)





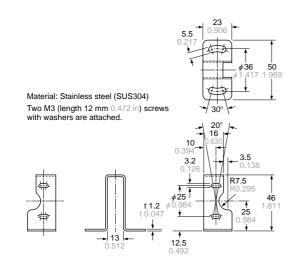
Material: Acrylic

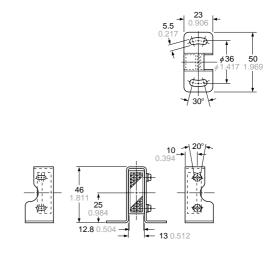
RF-12 Reflective tape (Optional)



MS-RF21-1 Reflector mounting bracket for RF-210 (Optional)

Assembly dimensions

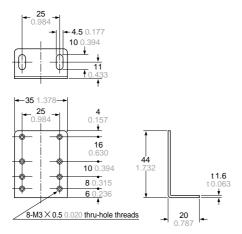




DIMENSIONS (Unit: mm in) The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

MS-RF22

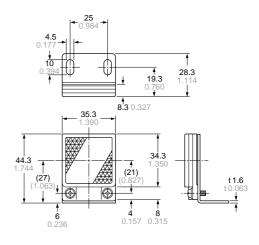
Reflector mounting bracket for RF-220 (Optional)



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

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

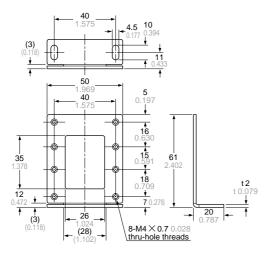
Assembly dimensions



MS-RF23

Reflector mounting bracket for RF-230 (Optional)

Assembly dimensions



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

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

