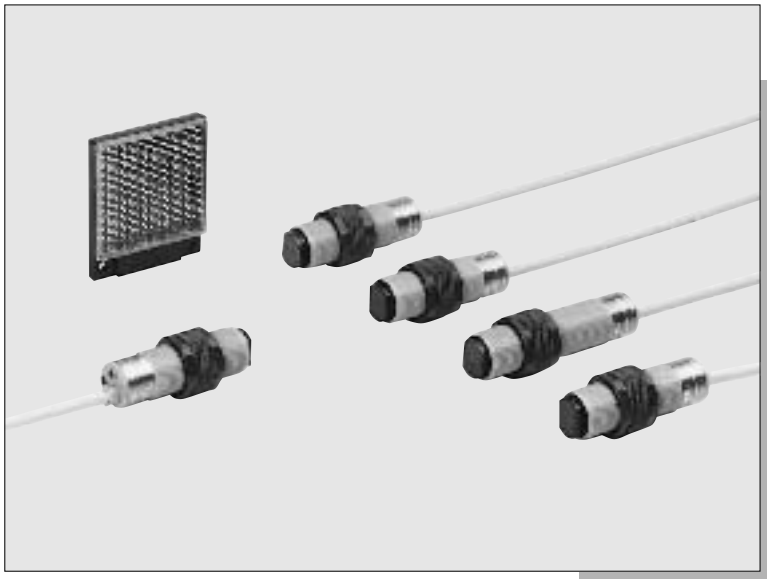
CY SERIES

Amplifier Built-in Cylindrical Photoelectric Sensor

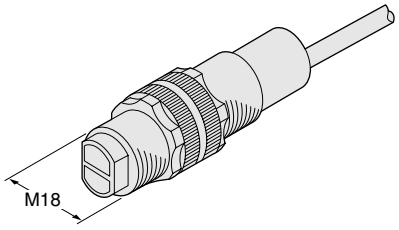


Cylindrical Type Easily Mountable with M18 Thread

CE Marked
Conforming to EMC Directive (AC supply type conforms to Low Voltage Directive, too.)

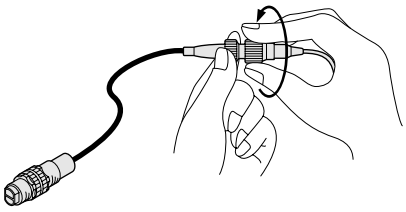
M18 Thread

This sensor has an M18 thread size for convenient mounting.



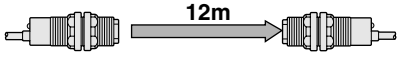
Easy to Replace

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

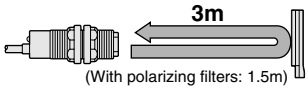


Long Sensing Range

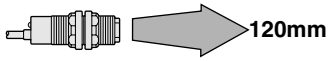
Thru-beam type



Retroreflective type



Diffuse reflective type



Wide Product Range

Supply voltage
① AC supply type (24 to 240V AC)
② DC supply type (10 to 30V 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.

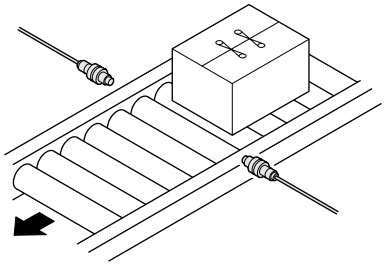


Slit mask (For thru-beam type sensors only)
It is convenient for detecting small objects or enhancing the sensing accuracy.

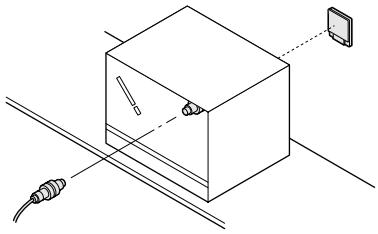


APPLICATIONS

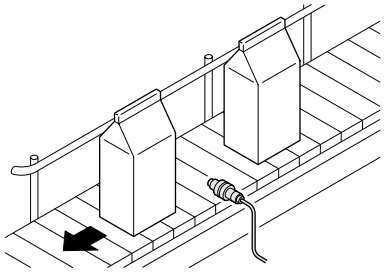
Sensing cardboard boxes



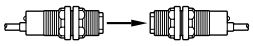
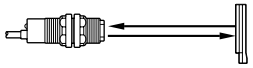
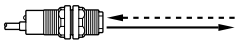
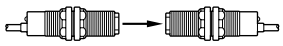
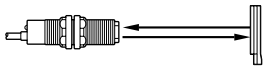
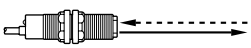
Sensing specular objects



Sensing milk packs



ORDER GUIDE

Type		Appearance	Sensing range	Model No.	Supply voltage	Output	Output operation
DC supply type	Thru-beam		12m	**CY-21**	10 to 30V DC	NPN open-collector transistor	Selectable either Light-ON or Dark-ON by the control input
				CY-21-PN		PNP open-collector transistor	
	Retroreflective With polarizing filters		3m (Note 1)	**CY-27**		NPN open-collector transistor	
				CY-27-PN		PNP open-collector transistor	
			1.5m (Note 1)	**CY-29**		NPN open-collector transistor	
				CY-29-PN		PNP open-collector transistor	
	Diffuse reflective		120mm	**CY-22**		NPN open-collector transistor	
				CY-22-PN		PNP open-collector transistor	
AC supply type	Thru-beam		12m	**CY-11A**	24 to 240V AC ±10%	AC non-contact (thyristor) output	Light-ON
				CY-11B			Dark-ON
	Retroreflective With polarizing filters		3m (Note 1)	**CY-17A**			Light-ON
				CY-17B			Dark-ON
			1.5m (Note 1)	**CY-19A**			Light-ON
				CY-19B			Dark-ON
	Diffuse reflective		120mm	**CY-12A**			Light-ON
				CY-12B			Dark-ON

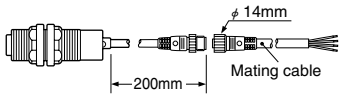
NOTE: Reflector is not supplied with the retroreflective type sensor. Please select the suitable reflector or reflective tape from the options.

Note 1: The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector (optional).

ORDER GUIDE

Pigtailed type

Pigtailed sensors are available. When ordering this type, add suffix '**-J**' to the model No.
Please order the suitable mating cable separately.
(e.g.) The pigtailed type of **CY-22-PN** is '**CY-22-PN-J**'.



• Mating cable

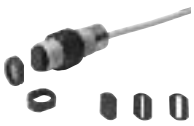
Type	Model No.	Description	
For DC supply type (Note 1)	**CN-22-C2**	Length: 2m	• For the emitter of the thru-beam type sensor (2-core) (Note 2)
	CN-22-C5	Length: 5m	
	CN-24-C2	Length: 2m	• For the receiver of the thru-beam type sensor, retroreflective type and diffuse reflective type sensors (4-core)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

Notes: 1) The DC supply type mating cable and the AC supply type mating cable have different connector stracture and so are not interchangeable.
2) To use the test input, use the 4-core **CN-24-C**□.

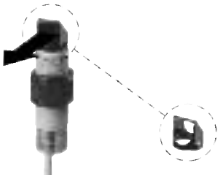
OPTIONS

Designation	Model No.	Description		
Slit mask (For thru-beam type sensor only)	**OS-CYS**	Slit size 11.6 × 0.5mm	Slit on emitter	• Sensing range: 3m • Min. sensing object: ϕ8mm
			Slit on receiver	• Sensing range: 2.5m • Min. sensing object: ϕ8mm
			Slit on both sides	• Sensing range: 0.8m • Min. sensing object: 10 × 0.7mm
		Slit size 11.6 × 1.5mm	Slit on emitter	• Sensing range: 5m • Min. sensing object: ϕ8mm
			Slit on receiver	• Sensing range: 4.5m • Min. sensing object: ϕ8mm
			Slit on both sides	• Sensing range: 2m • Min. sensing object: 10 × 2mm
		Slit size 11.6 × 3mm	Slit on emitter	• Sensing range: 7.5m • Min. sensing object: ϕ8mm
			Slit on receiver	• Sensing range: 7m • Min. sensing object: ϕ8mm
			Slit on both sides	• Sensing range: 4.5m • Min. sensing object: 10 × 3mm
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 slit on both sides): 8m		
Reflector (For retroreflective type sensor only)	**RF-230**	• Sensing range: 3m [**CY-27**□ & **CY-17**□], 1.5m [**CY-29**□ & **CY-19**□]		
	RF-220	• Sensing range: 2m [**CY-27**□ & **CY-17**□], 1.2m [**CY-29**□ & **CY-19**□]		
	RF-210	• Sensing range: 1m [**CY-27**□ & **CY-17**□], 0.7m [**CY-29**□ & **CY-19**□]		
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 retroreflective type sensor only)	**RF-12**	• Sensing range: 0.7m [**CY-27**□ & **CY-17**□], 0.4m [**CY-29**□ & **CY-19**□]		
	RF-11	• Sensing range: 0.5m [**CY-27**□ & **CY-17**□]		
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.		

Slit mask

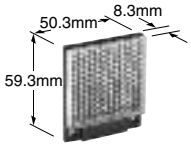


Side-view attachment

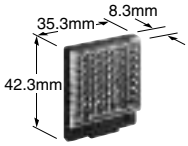


Reflector

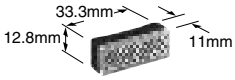
• RF-230



• RF-220

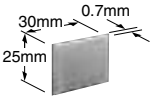


• RF-210

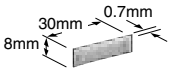


Reflective tape

• RF-12

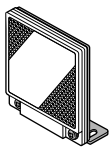


• RF-11



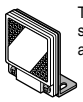
Reflector mounting bracket

• MS-RF23



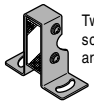
Two M4 (length 10mm) screws with washers are attached.

• MS-RF22



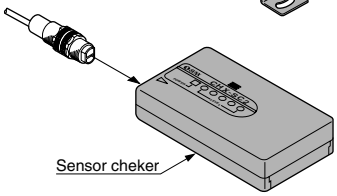
Two M3 (length 8mm) screws with washers are attached.

• MS-RF21-1



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

Sensor checker



SPECIFICATIONS

DC supply type

Item \ Type		Thru-beam	Retroreflective	Retroreflective With polarizing filters	Diffuse reflective
Model No.	NPN output type	**CY-21**	**CY-27**	**CY-29**	**CY-22**
	PNP output type	**CY-21-PN**	**CY-27-PN**	**CY-29-PN**	**CY-22-PN**
Sensing range		12m	3m (Note 1)	1.5m (Note 1)	120mm (Note 2)
Sensing object		ϕ8mm or more opaque object	ϕ50mm or more opaque or translucent object (Note 1)	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)		0.1mm or less			0.3mm or less
Supply voltage		10 to 30V DC Ripple P-P 10% or less			
Current consumption		Emitter: 20mA or less Receiver: 25mA or less	25mA or less		
Output		<NPN output type> NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1.5V or less (at 100mA sink current)	<PNP output type> PNP open-collector transistor • Maximum source current: 100mA • Applied voltage: 30V DC or less (between output and + V) • Residual voltage: 1.5V or less (at 100mA source current)		
	Utilization category	DC-12 or DC-13			
	Output operation	Selectable either Light-ON or Dark-ON by the control input			
	Short-circuit protection	Incorporated			
Response time		2ms or less			
Test input function		Incorporated	———		
Operation indicator		Red LED (lights up when the output is ON)			
Emission indicator		Red LED (lights up during beam emission)	———		
Environmental resistance	Pollution degree	3 (Industrial environment)			
	Protection	IP67 (IEC)			
	Ambient temperature	− 25 to + 55°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: 10,000ℓx at the light-receiving face, Incandescent light: 3,000ℓx at the light-receiving face			
	EMC	Emission: EN50081-2 , Immunity: EN50082-2			
	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: PBT, Lens: Polycarbonate		Enclosure: PBT, Front cover: Acrylic	
Cable		0.34mm² 4-core (thru-beam type emitter: 3-core) cabtyre cable, 2m long			
Cable extension		Extension up to total 100m is possible with 0.34mm², or more, cable (thru-beam type: both emitter and receiver).			
Weight		Emitter: 90g approx. Receiver: 100g approx.	100g approx.		
Accessories		Nut: 4 Nos.	Nut: 2 Nos.		

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 × 200mm) as the object.

SPECIFICATIONS

AC supply type

Item \ Type		Thru-beam	Retroreflective		Diffuse reflective
				With polarizing filters	
Model No.	Light-ON	**CY-11A**	**CY-17A**	**CY-19A**	**CY-12A**
	Dark-ON	**CY-11B**	**CY-17B**	**CY-19B**	**CY-12B**
Sensing range		12m	3m (Note 1)	1.5m (Note 1)	120mm (Note 2)
Sensing object		ϕ8mm or more opaque object	ϕ50mm or more opaque or translucent object (Note 1)	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)		0.1mm or less			0.3mm or less
Supply voltage		24 to 240V AC ± 10%			
Power consumption		Emitter: 1.5VA or less Receiver: 2.5VA or less	2.7VA or less		
Output		AC non-contact (thyristor) output • Load current: 5 to 200mA • Applied voltage: 24 to 240V AC ± 10% • Residual voltage: 4V AC or less (at 200mA load current)			
Response time		20ms or less			
Operation indicator		Red LED (lights up when the output is ON), incorporated on the receiver for the thru-beam type sensor			
Power indicator		Red LED (lights up when the power is ON), incorporated on the emitter	———		
Environmental resistance	Protection	IP67 (IEC)			
	Ambient temperature	− 25 to + 55°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: 10,000ℓx at the light-receiving face, Incandescent light: 3,000ℓx at the light-receiving face			
	EMC	Emission: EN50081-2 , Immunity: EN50082-2			
	Voltage withstandability	1,500V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance	20MΩ, or more, with 500V 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: PBT, Lens: Polycarbonate		Enclosure: PBT, Front cover: Acrylic	
Cable		0.34mm² 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2m long			
Cable extension		Extension up to total 100m is possible with 0.34mm², or more, cable (thru-beam type: both emitter and receiver).			
Weight		Emitter: 90g approx. Receiver: 100g approx.	100g approx.		
Accessories		Nut: 4 Nos.	Nut: 2 Nos.		

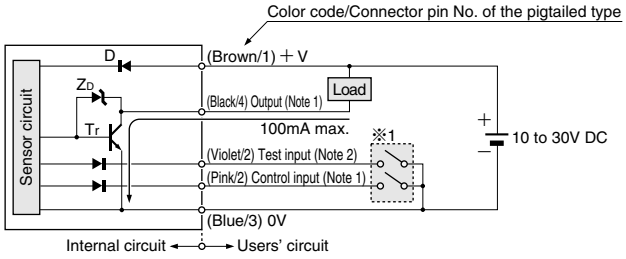
NOTE: Reflector is not supplied with the retroreflective type sensor. Please select the suitable reflector or reflective tape from the options.

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 × 200mm) as the object.

I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

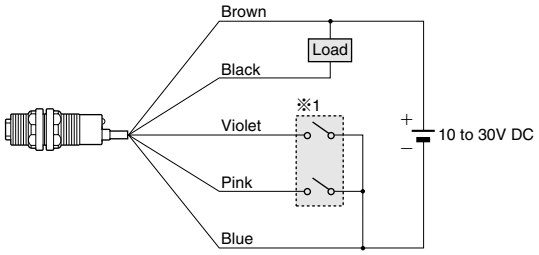
I/O circuit diagram



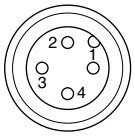
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is white.
2) Incorporated only on the emitter of the thru-beam type sensor. When the mating cable is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

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

Wiring diagram



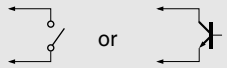
Connector pin position (Pigtailed type)



1: + V
2: Test input or control input
3: 0V
4: Output or not connected

※1

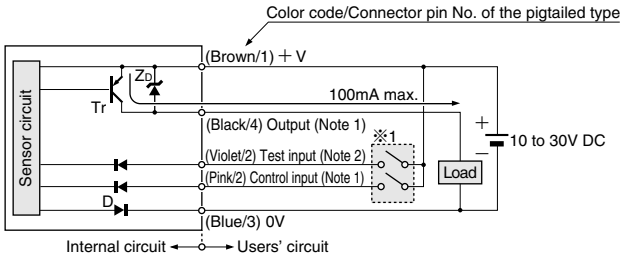
Non-voltage contact or
NPN open-collector transistor



- **Test input**
  Low (0 to 2.5V): emission stopped
  High (6 to 30V or open): emission
- **Control input**
  Low (0 to 1.5V): Dark-ON
  High (6 to 30V, or open): Light-ON

PNP output type

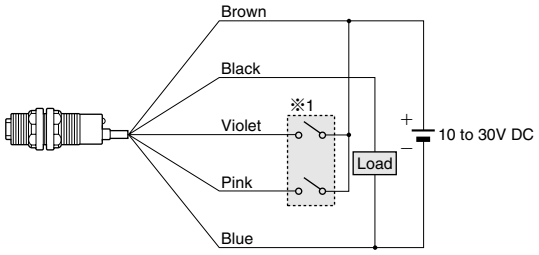
I/O circuit diagram



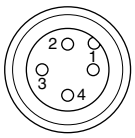
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is white.
2) Incorporated only on the emitter of the thru-beam type sensor. When the mating cable is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

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

Wiring diagram



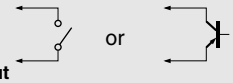
Connector pin position (Pigtailed type)



1: + V
2: Test input or control input
3: 0V
4: Output or not connected

※1

Non-voltage contact or
PNP open-collector transistor



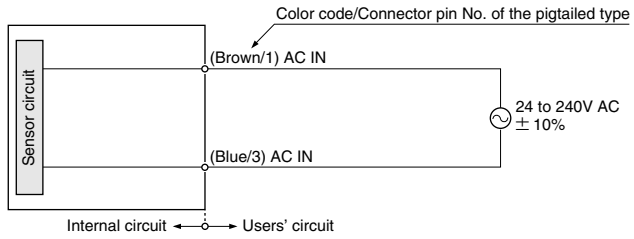
- **Test input**
  Low (0 to 1.5V, or open): emission
  High (3 to 30V): emission stopped
- **Control input**
  Low [(supply voltage − 6V) or less, or open]: Light-ON
  High [(supply voltage − 1.5V) or more]: Dark-ON

I/O CIRCUIT AND WIRING DIAGRAMS

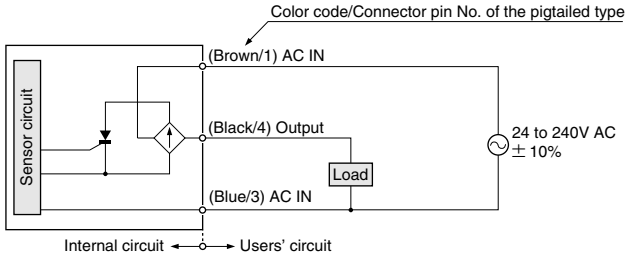
AC non-contact output type

I/O circuit diagrams

Emitter of thru-beam type sensor

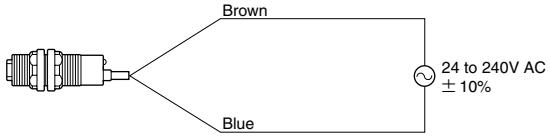


Receiver of thru-beam type sensor, retroreflective & diffuse reflective type sensors

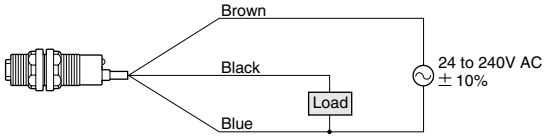


Wiring diagrams

Emitter of thru-beam type sensor

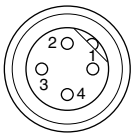


Receiver of thru-beam type sensor, retroreflective & diffuse reflective type sensors



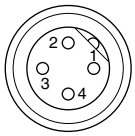
Connector pin position (Pigtailed type)

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

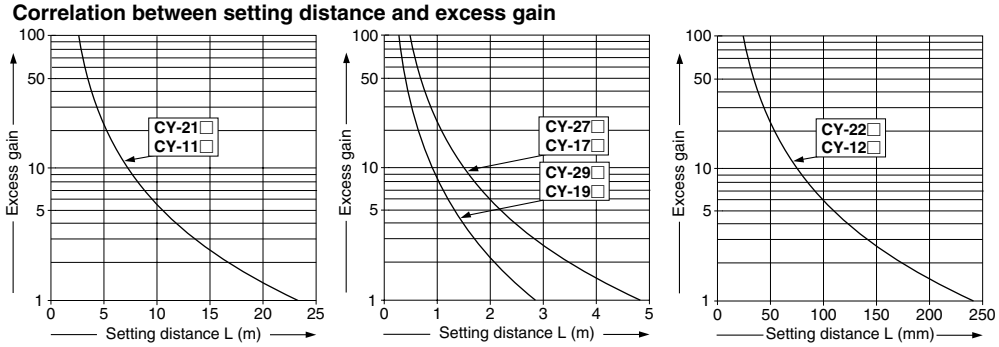


1: AC IN
2: Not connected
3: AC IN
4: Output

SENSING CHARACTERISTICS (TYPICAL)

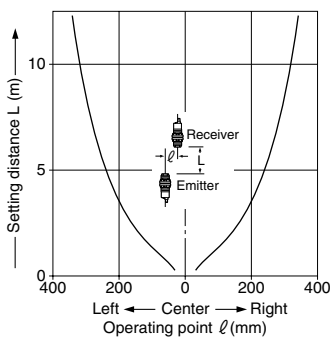
All models

Correlation between setting distance and excess gain

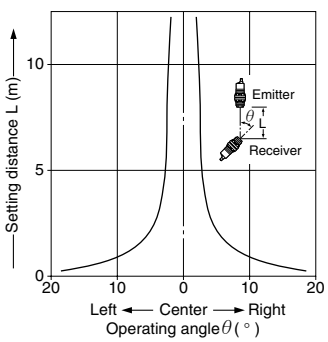


CY-21□ CY-11□ Thru-beam type

Parallel deviation

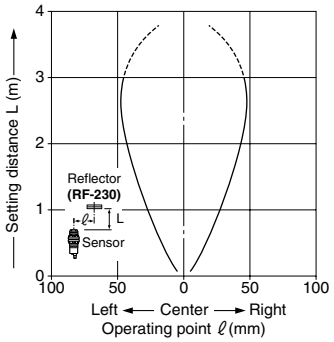


Angular deviation

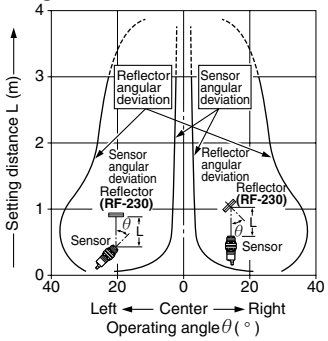


CY-27□ CY-17□ Retroreflective type

Parallel deviation



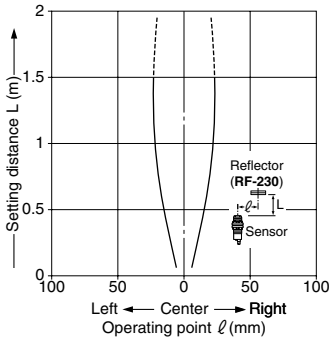
Angular deviation



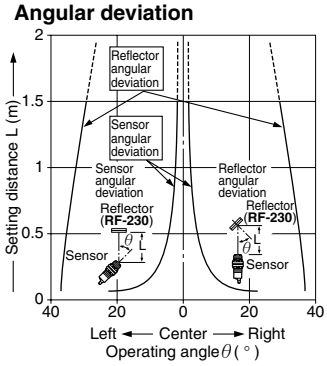
SENSING CHARACTERISTICS (TYPICAL)

CY-29□
CY-19□ Retroreflective type

Parallel deviation

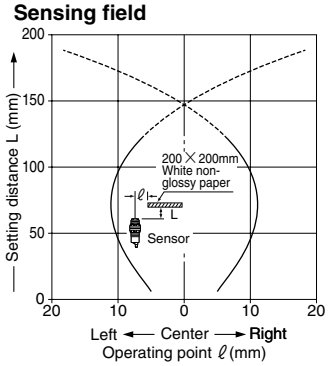


Angular deviation



CY-22□
CY-12□ Diffuse reflective type

Sensing field

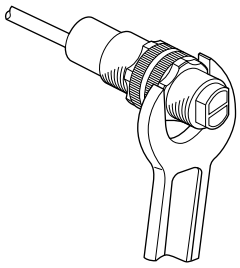


PRECAUTIONS FOR PROPER USE

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 2N·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 (glossy) label or wrapping paper

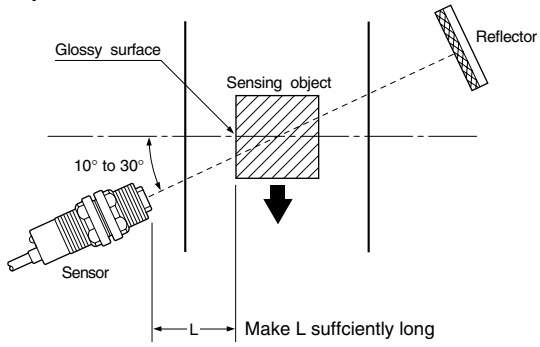
Steps

- 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.



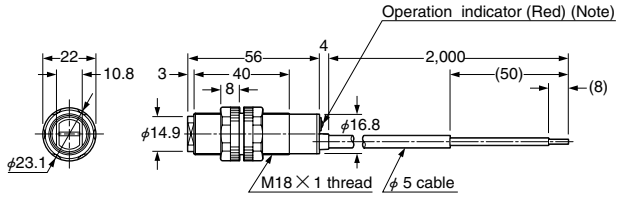
※**CY-29**□ and **CY-19**□ do not need the above adjustment.

Others

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

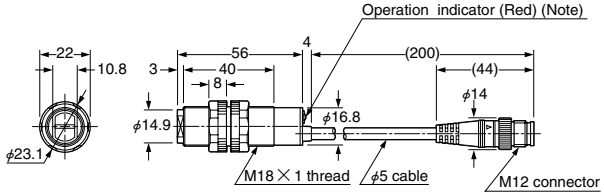
DIMENSIONS (Unit: mm)

CY-21□ CY-27□ Sensor



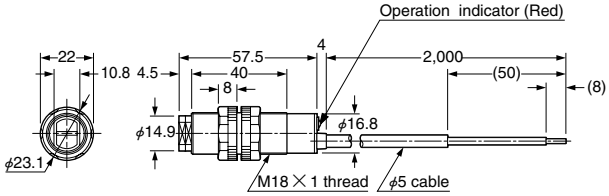
Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

CY-21□-J CY-27□-J CY-22□-J Sensor

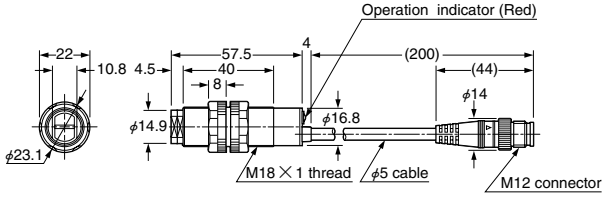


Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

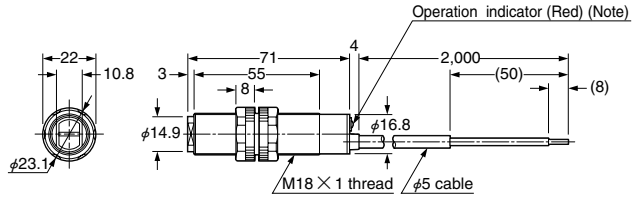
CY-29□ Sensor



CY-29□-J Sensor

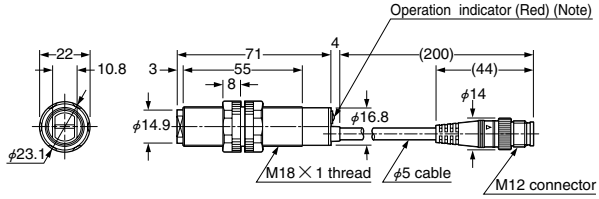


CY-11□ CY-17□ Sensor



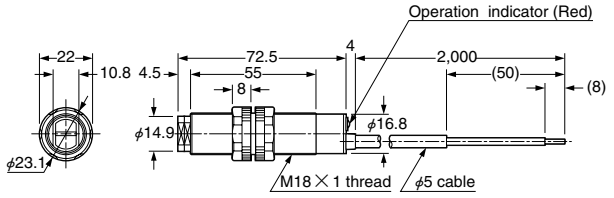
Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.

CY-11□-J CY-17□-J CY-12□-J Sensor

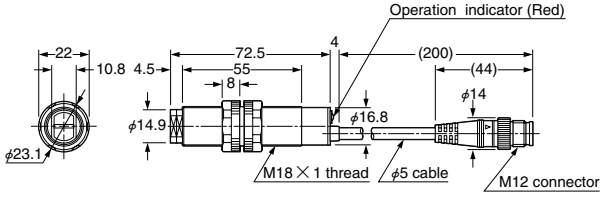


Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.

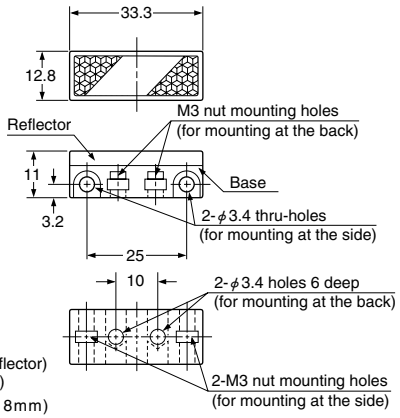
CY-19□ Sensor



CY-19□-J Sensor



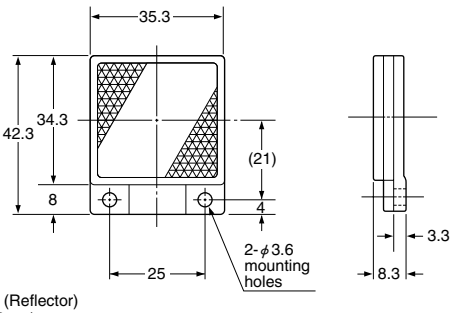
RF-210 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

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

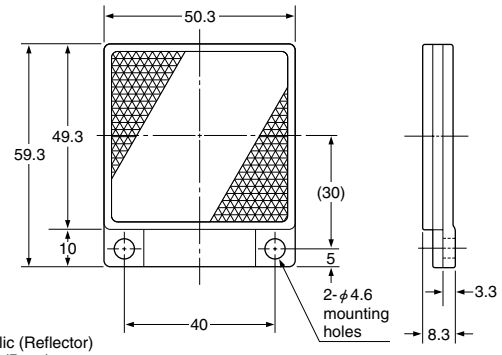
RF-220 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

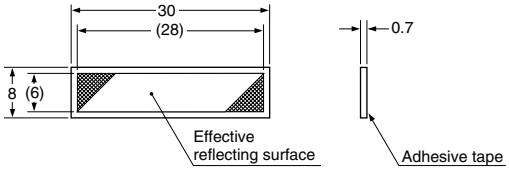
DIMENSIONS (Unit: mm)

RF-230 Reflector (Optional)



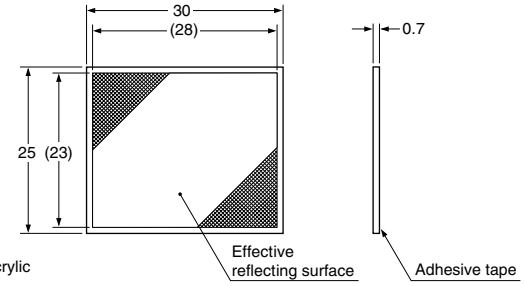
Material: Acrylic (Reflector)
ABS (Base)

RF-11 Reflective tape (Optional)



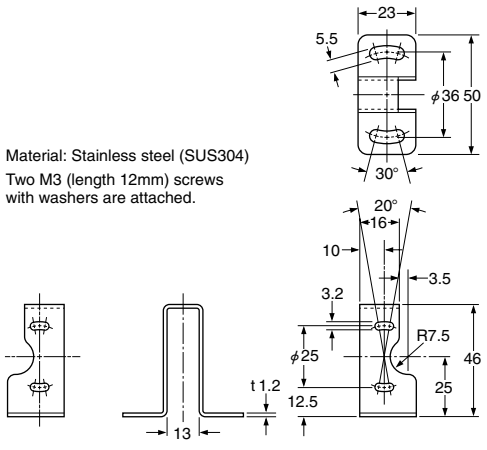
Material: Acrylic

RF-12 Reflective tape (Optional)



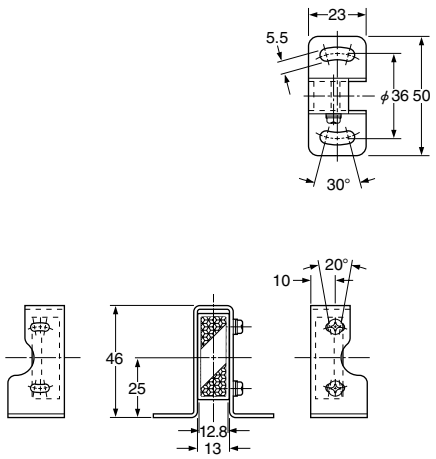
Material: Acrylic

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



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

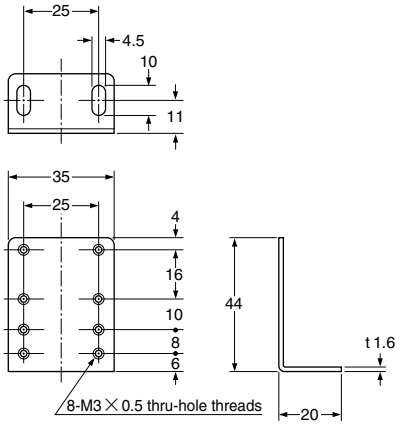
Assembly dimensions



DIMENSIONS (Unit: mm)

MS-RF22

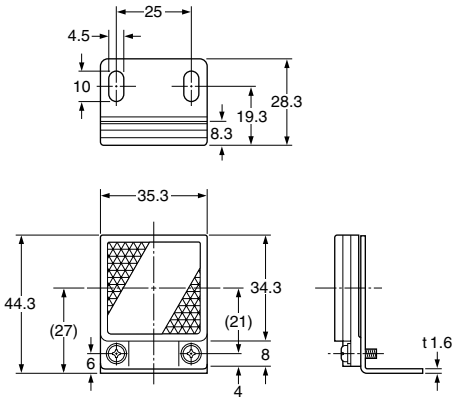
Reflector mounting bracket for **RF-220** (Optional)



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

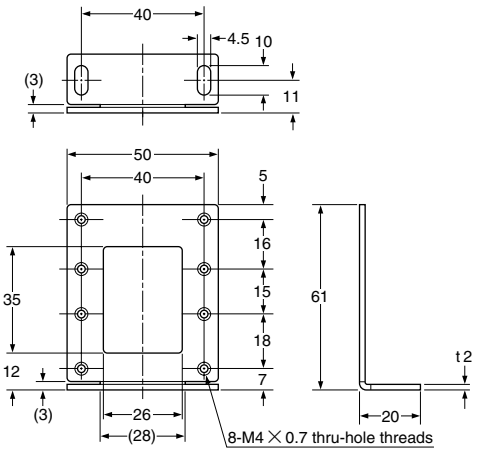
Two M3 (length 8mm) screws with washers are attached.

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

