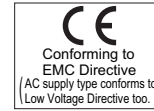


CY SERIES

Related Information

- General terms and conditions..... P.1
- Sensor selection guide.....P.11~ / P.229~
- Glossary of terms / General precautions.. P.983~ / P.986~
- China's CCC mark P.1036

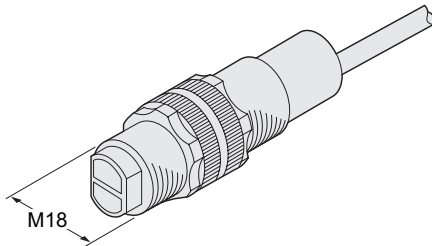


SUNX website <http://www.sunx.com>

Cylindrical type easily mountable with M18 thread

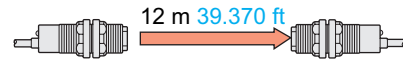
M18 thread

This sensor has an M18 thread size for convenient mounting.

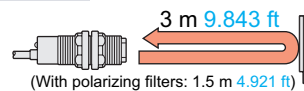


Long sensing range

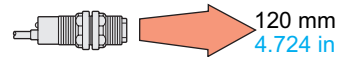
Thru-beam type



Retroreflective type



Diffuse reflective type



ENVIRONMENTAL RESISTANCE

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.

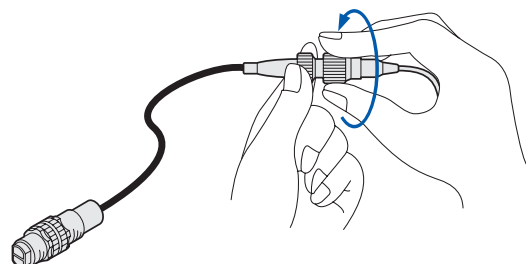


Note: However, take care that if it is exposed to water splashes during operation, it may detect a water drop itself.

MAINTENANCE

Easy to replace

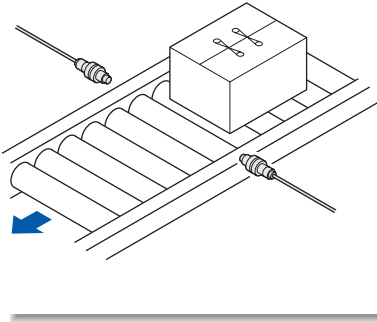
A pigtailed type sensor with connector (CY-□-J), which is easy to replace, is also available.



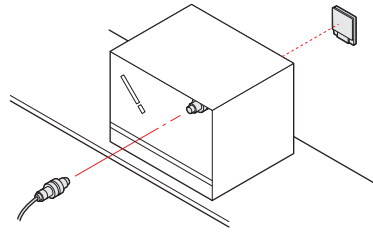
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EQ-30
EQ-500
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RX
CY
PX-2
RT-610
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APPLICATIONS

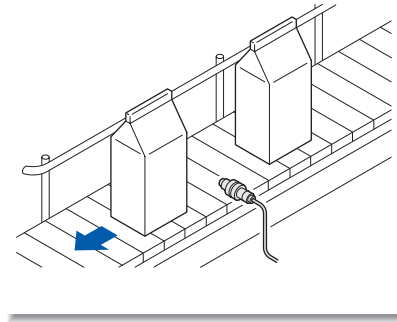
Sensing cardboard boxes



Sensing specular objects



Sensing milk packs



VARIETIES

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.

OPTIONS

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.



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PX-2

RT-610

Power Supply Built-in

NX5

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ORDER GUIDE


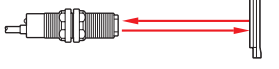
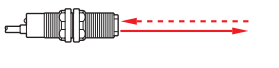
Type	Appearance	Sensing range	Model No.	Supply voltage	Output	Output operation	
DC supply type	Thru-beam	 12 m 39.370 ft	CY-21	10 to 30 V DC	NPN open-collector transistor	Selectable either Light-ON or Dark-ON by the control input	
			CY-21-PN		PNP open-collector transistor		
	Retroreflective	 3 m 9.843 ft (Note)	CY-27		NPN open-collector transistor		
			CY-27-PN		PNP open-collector transistor		
			With polarizing filters		CY-29		NPN open-collector transistor
					CY-29-PN		PNP open-collector transistor
	Diffuse reflective	 120 mm 4.724 in	CY-22		NPN open-collector transistor		
			CY-22-PN		PNP open-collector transistor		

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).

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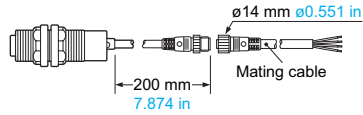
Type	Appearance	Sensing range	Model No.	Supply voltage	Output	Output operation			
AC supply type	Thru-beam		12 m 39.370 ft	CY-11A	24 to 240 V AC + 10% - 15%	AC non-contact (thyristor) output	Light-ON		
			CY-11B	Dark-ON					
	Retroreflective		3 m 9.843 ft (Note)	CY-17A			Light-ON		
				CY-17B			Dark-ON		
				With polarizing filters			1.5 m 4.921 ft (Note)	CY-19A	Light-ON
								CY-19B	Dark-ON
Diffuse reflective		120 mm 4.724 in	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: The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector (optional).

Pigtailed type

Pigtailed type is also available. When ordering this type, suffix "J" to the model No. (e.g.) Pigtailed type of **CY-22-PN** is "**CY-22-PN-J**". Please order the suitable mating cable separately.



• Mating cable

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

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**.

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- Amplifier-separated
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- Other Products

OPTIONS

Designation	Model No.	Description		
Slit mask (For thru-beam type sensor only)	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: ø8 mm ø0.315 in	
			Slit on receiver • Sensing range: 2.5 m 8.202 ft • Min. sensing object: ø8 mm ø0.315 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: ø8 mm ø0.315 in	
			Slit on receiver • Sensing range: 4.5 m 14.764 ft • Min. sensing object: ø8 mm ø0.315 in	
			Slit on both sides • Sensing range: 2 m 6.562 ft • Min. sensing object: 10 × 2 mm 0.394 × 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: ø8 mm ø0.315 in	
			Slit on receiver • Sensing range: 7 m 22.966 ft • Min. sensing object: ø8 mm ø0.315 in	
			Slit on both sides • Sensing range: 4.5 m 14.764 ft • Min. sensing object: 10 × 3 mm 0.394 × 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 (For retroreflective type sensor only) (Note 1)	RF-230	• Sensing range: 3 m 9.843 ft [CY-27□ & CY-17□], 1.5 m 4.921 ft [CY-29□ & CY-19□]	
		RF-220	• Sensing range: 2 m 6.562 ft [CY-27□ & CY-17□], 1.2 m 3.937 ft [CY-29□ & CY-19□]	
RF-210		• Sensing range: 1 m 3.281 ft [CY-27□ & CY-17□], 0.7 m 2.297 ft [CY-29□ & CY-19□]		
Reflector mounting bracket (Note 1)	MS-RF21-1	Protective mounting bracket for RF-210 It protects the reflector from damage and maintains alignment.		
	MS-RF22	For RF-220		
	MS-RF23	For RF-230		
Reflective tape (For retroreflective type sensor only) (Note 1)	RF-12	• Sensing range: 0.7 m 2.297 ft [CY-27□ & CY-17□], 0.4 m 1.312 ft [CY-29□ & CY-19□]		
	RF-11	• Sensing range: 0.5 m 1.640 ft [CY-27□ & CY-17□]		
Sensor checker (Note 2)	CHX-SC2	It is useful for beam alignment of thru-beam type sensors. The optimum receiver position is given by indicators, as well as an audio signal.		

Notes: 1) Refer to the **CX-400** series (p.251~) for dimensions of reflector, reflector mounting bracket and reflective tape.
2) Refer to p.800 for details of the sensor checker **CHX-SC2**.

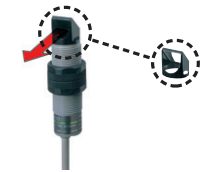
Slit mask

• **OS-CYS**



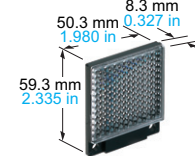
Side-view attachment

• **CY-SV1**

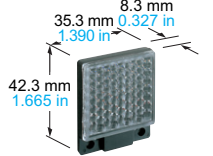


Reflector

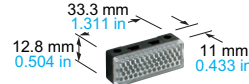
• **RF-230**



• **RF-220**

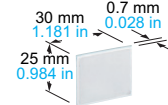


• **RF-210**

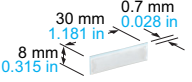


Reflective tape

• **RF-12**

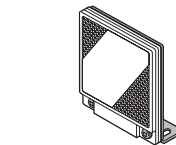


• **RF-11**



Reflector mounting bracket

• **MS-RF23**



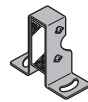
Two M4 (length 10 mm **0.394 in**) screws with washers are attached.

• **MS-RF22**



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

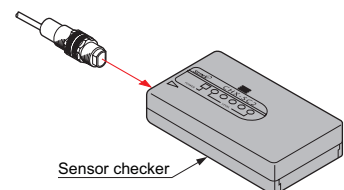
• **MS-RF21-1**



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

Sensor checker

• **CHX-SC2**



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EX-40

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EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

SS-A5 / SH

Other Products

SPECIFICATIONS

DC supply type

Item	Model No.	Type	Thru-beam	Retroreflective		Diffuse reflective
		NPN output	CY-21	CY-27	With polarizing filters	CY-29
		PNP output	CY-21-PN	CY-27-PN	CY-29-PN	CY-22-PN
Sensing range			12 m 39.370 ft	3 m 9.843 ft (Note 2)	1.5 m 4.921 ft (Note 2)	120 mm 4.724 in (Note 3)
Sensing object			ø8 mm ø0.315 in or more opaque object (Completely beam interrupted object)	ø50 mm ø1.969 in or more opaque or translucent object (Note 2, 4)	ø50 mm ø1.969 in or more opaque, translucent or specular object (Note 2, 4)	Opaque, translucent or transparent object (Note 4)
Hysteresis			—————			15 % or less of operation distance (Note 3)
Repeatability (perpendicular to sensing axis)			0.1 mm 0.004 in or less			0.3 mm 0.012 in or less
Supply voltage			10 to 30 V DC Ripple P-P 10 % or less			
Current consumption			Emitter: 20 mA or less Receiver: 25 mA or less	25 mA or less		
Output			<NPN output type> NPN open-collector transistor <ul style="list-style-type: none"> • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 100 mA sink current) 		<PNP output type> PNP open-collector transistor <ul style="list-style-type: none"> • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1.5 V or less (at 100 mA 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			2 ms or less			
Test input (emission halt) function			Incorporated	—————		
Operation indicator			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) (Refer to p.984 for details of standards.)			
Ambient temperature			-25 to +55 °C -13 to +131 °F (No dew condensation or icing allowed), Storage: -30 to +70 °C -22 to +158 °F			
Ambient humidity			35 to 85 % RH, Storage: 35 to 85 % RH			
Ambient illuminance			Incandescent light: 3,000 lx at the light-receiving face			
EMC			EN 60947-5-2			
Voltage withstandability			1,000 V AC for one min. between all supply terminals connected together and enclosure			
Insulation resistance			20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure			
Vibration resistance			10 to 500 Hz frequency, 1.5 mm 0.059 in amplitude (10 G max.) in X, Y and Z directions for two hours each			
Shock resistance			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)	
Peak emission wavelength			950 nm 0.037 mil	660 nm 0.026 mil	950 nm 0.037 mil	
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).			
Net Weight			Emitter: 90 g approx. Receiver: 100 g approx.	100 g approx.		
Accessories			Nut: 4 pcs.	Nut: 2 pcs.		

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

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

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

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

SPECIFICATIONS

AC supply type

Item	Model No.	Type	Thru-beam	Retroreflective		Diffuse reflective			
				Light-ON	CY-11A		CY-17A	CY-19A	CY-12A
Sensing range			12 m 39.370 ft	3 m 9.843 ft (Note 2)	1.5 m 4.921 ft (Note 2)	120 mm 4.724 in (Note 3)			
Sensing object			ø8 mm ø0.315 in or more opaque object (Completely beam interrupted object)	ø50 mm ø1.969 in or more opaque or translucent object (Note 2, 4)	ø50 mm ø1.969 in or more opaque, translucent or specular object (Note 2, 4)	Opaque, translucent or transparent object (Note 4)			
Hysteresis			—————			15 % or less of operation distance (Note 3)			
Repeatability (perpendicular to sensing axis)			0.1 mm 0.004 in or less			0.3 mm 0.012 in or less			
Supply voltage			24 to 240 V AC $\pm 10\%$ / -15%						
Power consumption			Emitter: 1.5 VA or less Receiver: 2.5 VA or less	2.7 VA or less					
Output			AC non-contact (thyristor) output <ul style="list-style-type: none"> • Load current: 5 to 200 mA • Applied voltage: 24 to 240 V AC $\pm 10\%$ / -15% • Residual voltage: 4 V or less (at 200 mA load current) 						
Response time			20 ms 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	Pollution degree		3 (Industrial environment)						
	Protection		IP67 (IEC) (Refer to p.984 for details of standards.)						
	Ambient temperature		-25 to +55 °C -13 to +131 °F (No dew condensation or icing allowed), Storage: -30 to +70 °C -22 to +158 °F						
	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH						
	Ambient illuminance		Incandescent light: 3,000 lx at the light-receiving face						
	EMC		EN 61000-6-2, EN 61000-6-4						
	Voltage withstandability		1,500 V AC for one min. between all supply terminals connected together and enclosure						
	Insulation resistance		20 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure						
	Vibration resistance		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						
Shock resistance		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)				
	Peak emission wavelength		950 nm 0.037 mil	660 nm 0.026 mil	950 nm 0.037 mil				
Material			Enclosure: PBT, Lens: Polycarbonate	Enclosure: PBT, Front cover: Acrylic					
Cable			0.34 mm ² 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 mm ² , or more, cable (thru-beam type: both emitter and receiver).						
Net weight			Emitter: 90 g approx. Receiver: 100 g approx.	100 g approx.					
Accessories			Nut: 4 pcs.	Nut: 2 pcs.					

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

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

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

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

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Power Supply Built-in

NX5**VF**

Amplifier-separated

SU-7 / SH**SS-A5 / SH**

Other Products

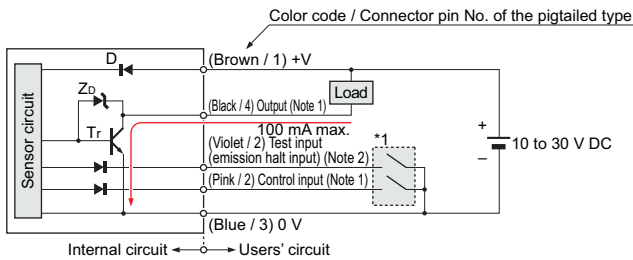
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I/O CIRCUIT AND WIRING DIAGRAMS

CY-2□

NPN output type

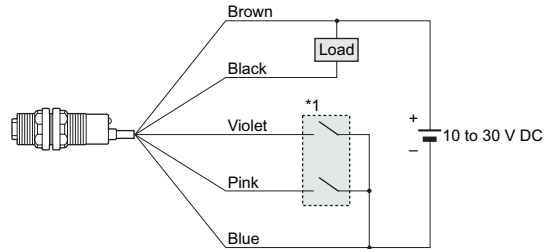
I/O circuit diagram



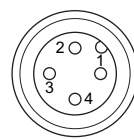
- Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is white.
- 2) Test input (emission halt input) is incorporated only on the emitter of the thru-beam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

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

Wiring diagram



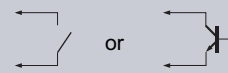
Connector pin position (Pigtailed type)



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

* 1

Non-voltage contact or NPN open-collector transistor



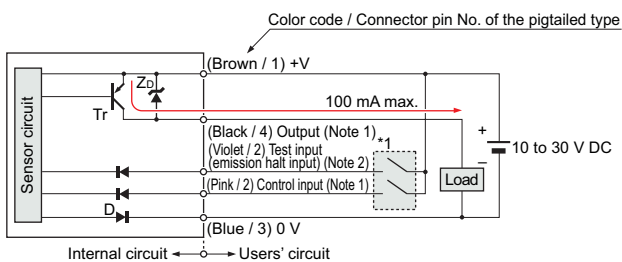
- Test input (emission halt input)
 Low (0 to +2.5 V): Emission halt
 High (+6 to +30 V or open): Emission
- Control input
 Low (0 to +1.5 V): Dark-ON
 High (+6 to +30 V, or open): Light-ON

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

CY-2□-PN

PNP output type

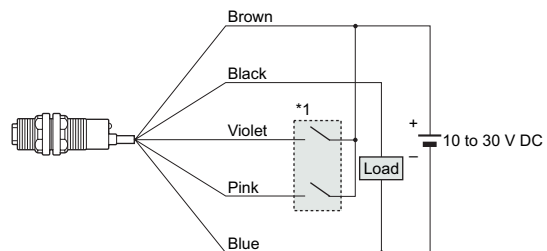
I/O circuit diagram



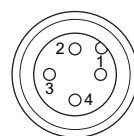
- Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output and the control input. When the mating cable is connected to the pigtailed type, the color of the control input wire is white.
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Symbols ... D : Reverse supply polarity protection diode
 ZD: Surge absorption zener diode
 Tr : PNP output transistor

Wiring diagram



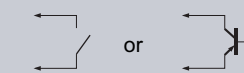
Connector pin position (Pigtailed type)



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

* 1

Non-voltage contact or PNP open-collector transistor



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

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

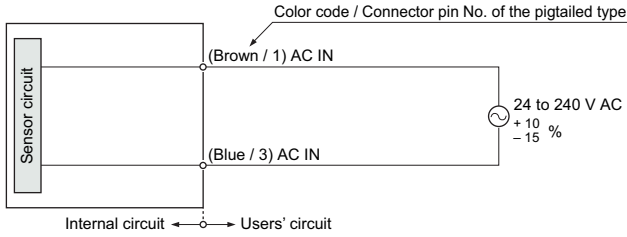
I/O CIRCUIT AND WIRING DIAGRAMS

CY-1 □

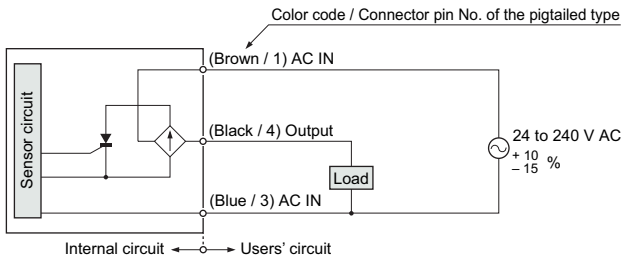
AC non-contact output type

I/O circuit diagrams

Emitter of thru-beam type sensor

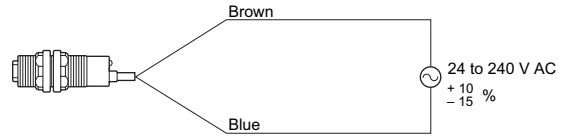


Receiver of thru-beam type sensor, retroreflective & diffuse reflective type sensors

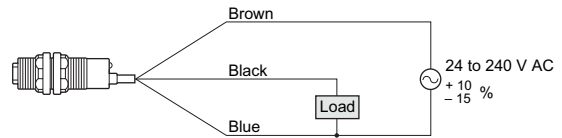


Wiring diagrams

Emitter of thru-beam type sensor

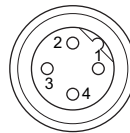


Receiver of thru-beam type sensor, retroreflective & diffuse reflective type sensors



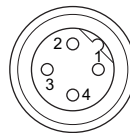
Connector pin position (Pigtailed type)

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

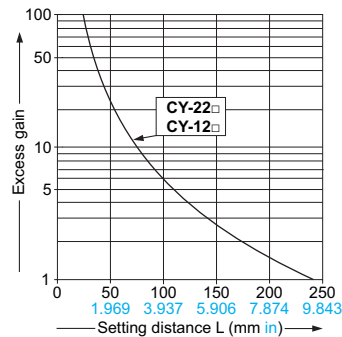
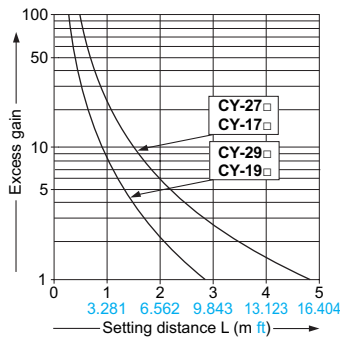
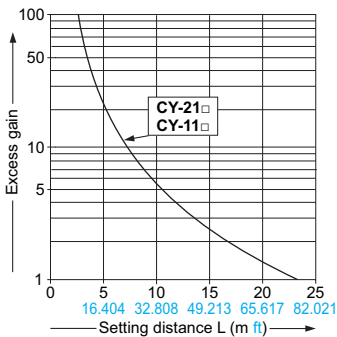


- 1: AC IN
- 2: Not connected
- 3: AC IN
- 4: Output

SENSING CHARACTERISTICS (TYPICAL)

All models

Correlation between setting distance and excess gain



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Amplifier Built-in

CX-400

EX-10

EX-20

EX-30

EX-40

EQ-30

EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

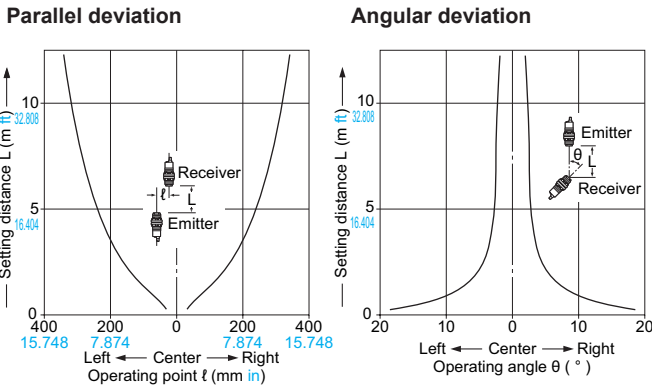
SS-A5 / SH

Other Products

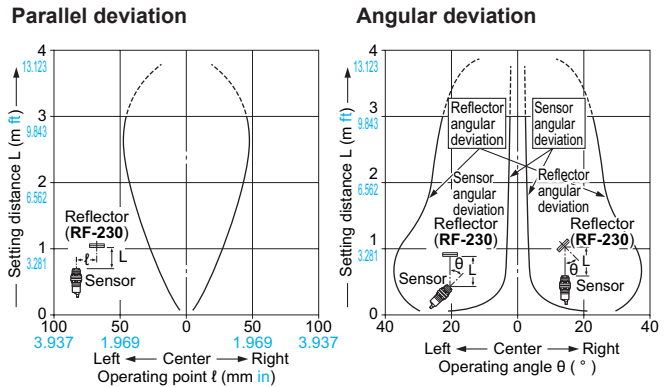
SENSING CHARACTERISTICS (TYPICAL)

FIBER SENSORS
LASER SENSORS
PHOTO-ELECTRIC SENSORS
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Other Products

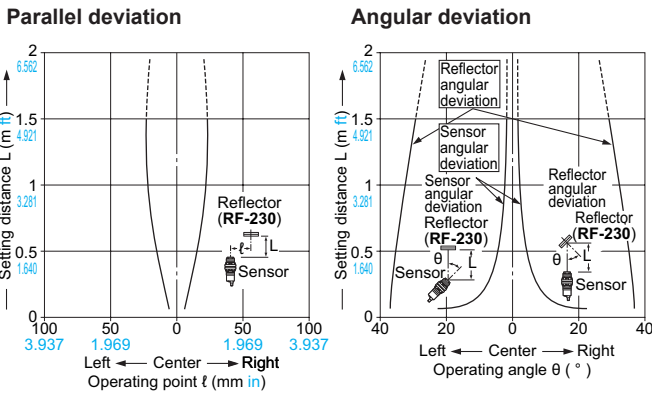
CY-21□ CY-11□ Thru-beam type



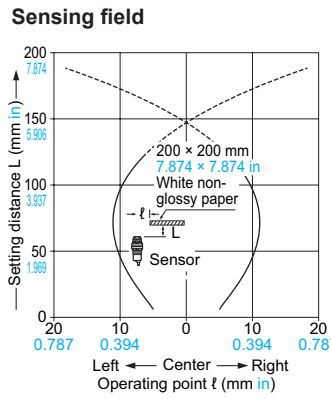
CY-27□ CY-17□ Retroreflective type



CY-29□ CY-19□ Retroreflective type



CY-22□ CY-12□ Diffuse reflective type



PRECAUTIONS FOR PROPER USE

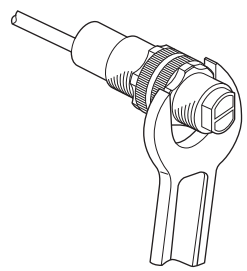
Refer to p.986~ for general precautions.



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

Mounting

- The tightening torque should be 2 N·m or less.



Others

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

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

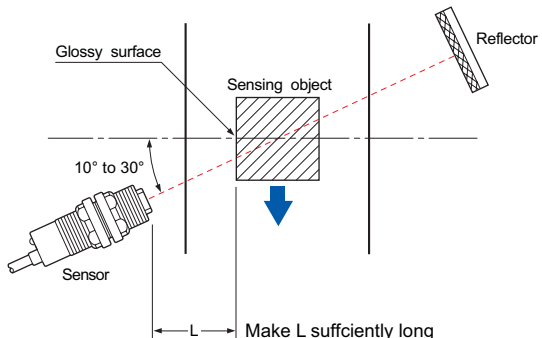
Steps

- 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.

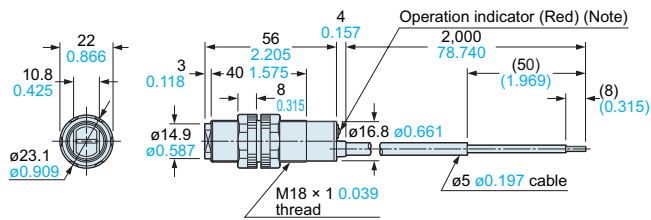


* **CY-29□** and **CY-19□** do not need the above adjustment.

DIMENSIONS (Unit: mm in)

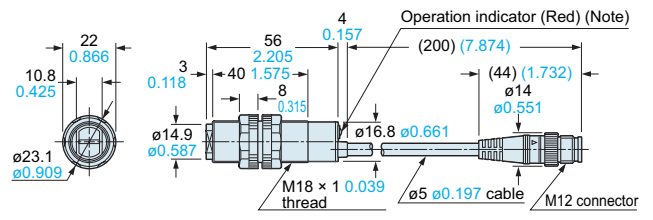
The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>
Refer to the **CX-400** series (p.251~) for dimensions of reflector, reflector mounting bracket and reflective tape.

CY-21□ CY-22□ CY-27□ Sensor



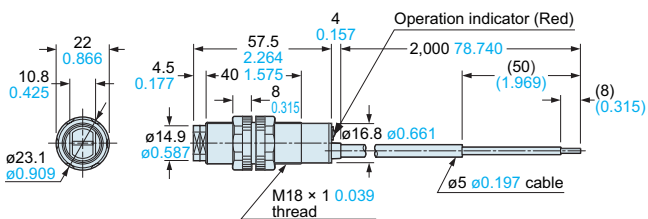
Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

CY-21□-J CY-22□-J CY-27□-J Sensor

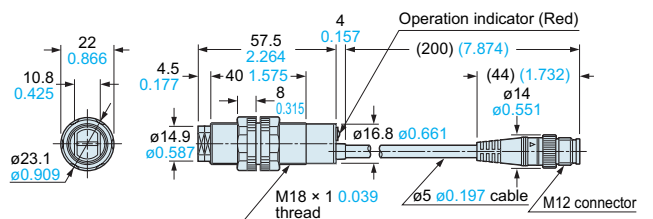


Note: It is the emitting indicator (red) on the emitter of the thru-beam type sensor.

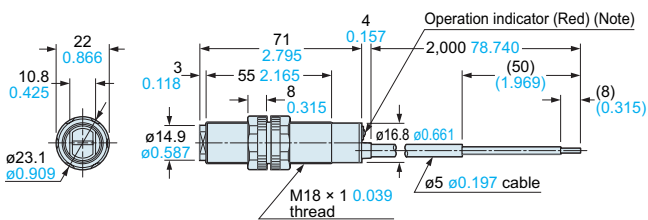
CY-29□ Sensor



CY-29□-J Sensor

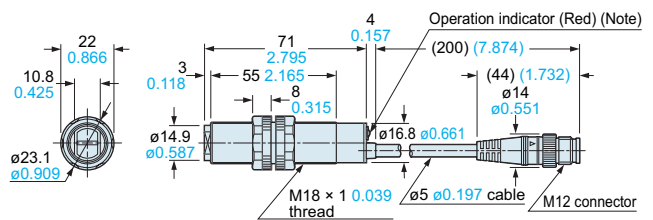


CY-11□ CY-12□ CY-17□ Sensor



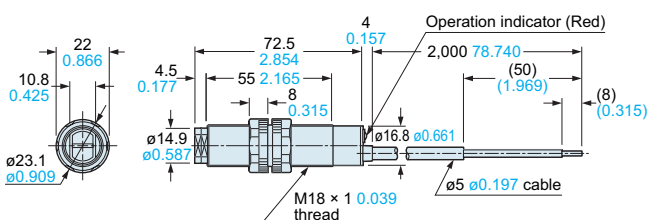
Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.

CY-11□-J CY-12□-J CY-17□-J Sensor

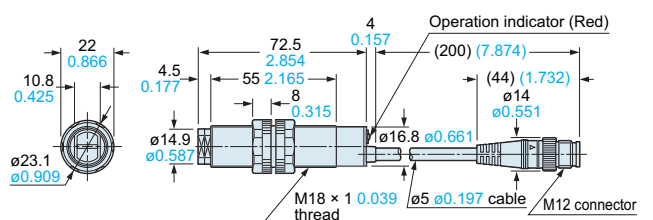


Note: It is the power indicator (red) on the emitter of the thru-beam type sensor.

CY-19□ Sensor



CY-19□-J Sensor



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