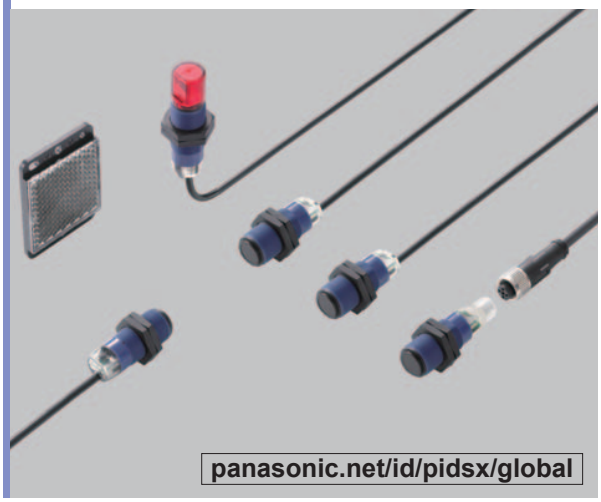
Cylindrical Photoelectric Sensor

CY-100 SERIES

Related Information
■ General terms and conditions..... F-7
■ Glossary of terms ..... P.1455~
■ Sensor selection guide..... P.271~
■ General precautions ..... P.1458~



CE Conforming to EMC Directive

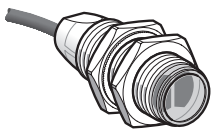
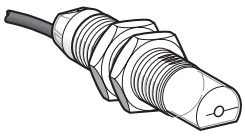
UL Listing (2 m cable length type only)

FEATURES

- **Wide product range**
  Shape: Standard type
  Side view type
  Connector: 2 m cable length type
  M12 plug-in connector type
- **Diffuse reflective type sensor with sensitivity adjuster is available.**
- **M18 thread size for convenient mounting**
- **Strong resistance IP67**
- **Convenient universal sensor mounting stand is available.**

ORDER GUIDE

2 m cable length type

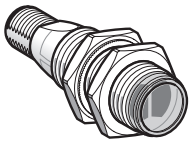
Type			Appearance	Sensing range	Model No. (Note 1) NPN output	Model No. (Note 1) PNP output	Output operation
Standard	Thru-beam			15 m 49.21 ft	**CY-111A**	**CY-111A-P**	Light-ON
					CY-111B	**CY-111B-P**	Dark-ON
	Retroreflective (Note 2,3)	With polarizing filters		4 m 13.12 ft	**CY-192A-Y**	**CY-192A-P-Y**	Light-ON
					CY-192B-Y	**CY-192B-P-Y**	Dark-ON
				2 m 6.56 ft	**CY-191A-Y**	**CY-191A-P-Y**	Light-ON
					CY-191B-Y	**CY-191B-P-Y**	Dark-ON
	Diffuse reflective			100 mm 0.33 ft	**CY-121A**	**CY-121A-P**	Light-ON
					CY-121B	**CY-121B-P**	Dark-ON
		With sensitivity adjuster		600 mm 1.97 ft	**CY-122A**	**CY-122A-P**	Light-ON
					CY-122B	**CY-122B-P**	Dark-ON
Side view	Thru-beam			15 m 49.21 ft	**CY-111VA**	**CY-111VA-P**	Light-ON
					CY-111VB	**CY-111VB-P**	Dark-ON
	Retroreflective (Note 2,3)	With polarizing filters		4 m 13.12 ft	**CY-192VA-Y**	**CY-192VA-P-Y**	Light-ON
					CY-192VB-Y	**CY-192VB-P-Y**	Dark-ON
				2 m 6.56 ft	**CY-191VA-Y**	**CY-191VA-P-Y**	Light-ON
					CY-191VB-Y	**CY-191VB-P-Y**	Dark-ON
	Diffuse reflective			100 mm 3.94 in	**CY-121VA**	**CY-121VA-P**	Light-ON
					CY-121VB	**CY-121VB-P**	Dark-ON
		With sensitivity adjuster		600 mm 23.62 in	**CY-122VA**	**CY-122VA-P**	Light-ON
					CY-122VB	**CY-122VB-P**	Dark-ON

Notes: 1) The model No. with "**E**" shown on the label affixed to the thru-beam type sensor is the emitter, "**D**" shown on the label is the receiver. (e.g.)
2) The reflector is sold separately.
3) The sensing range of the retroreflective type sensor is specified for the **RF-420** reflector (optional).

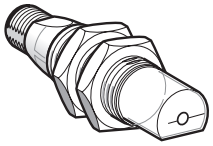
M12 plug-in connector type

M12 plug-in connector type is also available.
When ordering this type, "**-Z**" for the M12 plug-in connector type to the model No.
(e.g.) M12 plug-in connector type of **CY-111A-P** is "**CY-111A-P-Z**".
In case of the retroreflective type, M12 plug-in connector type of **CY-19□-P-Y** is "**CY-19□-P-Z-Y**".

• **Standard type**



• **Side view type**



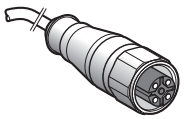
ORDER GUIDE

Mating cable (2 cables are required for the thru-beam type.)

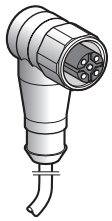
Type		Model No.	Description	
For M12 plug-in connector type	Straight	CN-24C-C2	Length: 2 m 6.56 ft	Clamping ring : ø14mm 0.55 in
		CN-24C-C5	Length: 5 m 16.40 ft	
	Elbow	CN-24CL-C2	Length: 2 m 6.56 ft	Cable outer : ø5.3mm 0.21 in
		CN-24CL-C5	Length: 5 m 16.40 ft	

Mating cable

• Straight type



• Elbow type



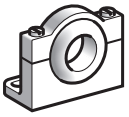
OPTIONS

Designation	Model No.	Description
Sensor mounting bracket	MS-CY1-1	Material: Stainless steel
	MS-CY1-2	Material: Plastic, For beam axis alignment
Universal sensor mounting stand	MS-AJ3	It can adjust the height of the sensor and reflector **RF-420**. (The thru-beam type sensor needs two brackets.)
Reflector	RF-420	50 × 50 mm 1.97 × 1.97 in
	RF-410	24 × 21 mm 0.94 × 0.83 in
Reflective tape	RF-40RL5	22 mm × 5 m 0.87 × 196.85 in, Thickness: 0.4 mm 0.02 in

Sensor mounting bracket

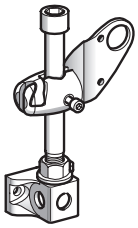
• MS-CY1-1

• MS-CY1-2



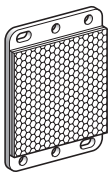
Universal sensor mounting stand

• MS-AJ3

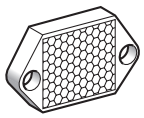


Reflector

• RF-420

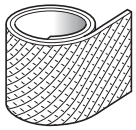


• RF-410



Reflective tape

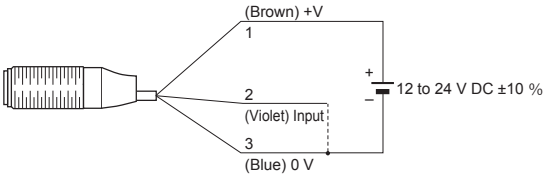
• RF-40RL5



WIRING DIAGRAMS

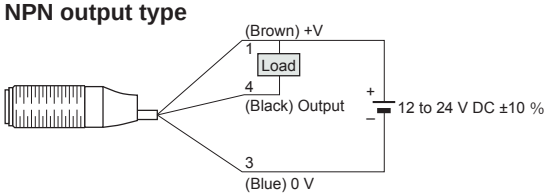
Wiring diagram

Emitter of thru-beam type



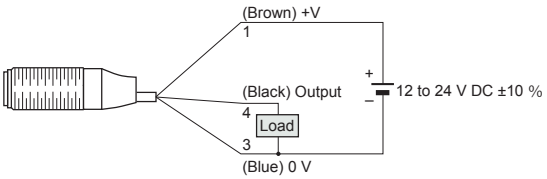
Receiver of thru-beam / Reflective type

NPN output type



Receiver of thru-beam / Reflective type

PNP output type



Connector pin position

M12 connector

1 : +V
2 : Input (Only emitter of thru-beam type)
3 : 0 V
4 : Output (Only receiver of thru-beam type and reflective type)

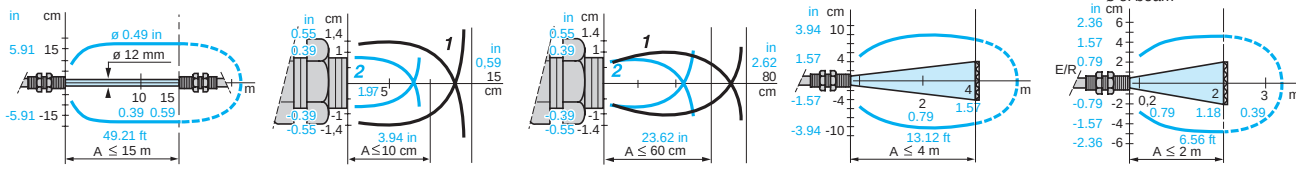
SPECIFICATIONS

Item		Type	Thru-beam		Retroreflective				Diffuse reflective			
							With polarizing filters				With sensitivity adjuster	
			Standard	Side view	Standard	Side view	Standard	Side view	Standard	Side view	Standard	Side view
	Model No.	Light-ON	CY-111A□	CY-111VA□	CY-192A□	CY-192VA□	CY-191A□	CY-191VA□	CY-121A□	CY-121VA□	CY-122A□	CY-122VA□
		Dark-ON	CY-111B□	CY-111VB□	CY-192B□	CY-192VB□	CY-191B□	CY-191VB□	CY-121B□	CY-121VB□	CY-122B□	CY-122VB□
Sensing range			15 m 49.21 ft		4 m 13.12 ft (Note 2)		2 m 6.56 ft (Note 2)		100 mm 3.94 in (Note 3)		600 mm 23.62 in (Note 3)	
Sensing object			ø18 mm ø0.71 in or more opaque object (Setting distance between emitter and receiver: 15 m 49.21ft)		ø50 mm ø1.97 in or more opaque, translucent or transparent object (Note 2, 4)		ø50 mm ø1.97 in or more opaque, translu-cent, transparent or specular object (Note 2, 4)		Opaque, translucent or transparent object (Note 4)			
Hysteresis			—						3 to 15 % of operation distance (Note 3)			
Supply voltage			12 to 24 V DC ±10 % Ripple P-P 10 % or less									
Current consumption			Emitter: 35 mA or less Receiver: 35 mA or less		35 mA or less							
Output			<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 24 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less				<PNP output type> PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 24 V DC or less (between output and +V) • Residual voltage: 1.5 V or less					
	Utilization category		DC-12 or DC-13									
	Short-circuit protection		Incorporated									
Response time			1 ms or less									
Test input (emission halt) function			Incorporated		—							
Operation indicator			Yellow LED (lights up when the output is ON) (incorporated on the receiver for thru-beam type)									
Power indicator			Green LED (lights up when the power is ON) (incorporated on the emitter)		—							
Environmental resistance	Pollution degree		3 (Industrial environment)									
	Protection		IP67 (IEC)									
	Ambient temperature		–25 to +55 °C –13 to +131 °F (No dew condensation or icing allowed), Storage: –40 to +70 °C –22 to +158 °F									
	Ambient humidity		50 % RH (at +70 °C +158 °F)									
	Ambient illuminance		Incandescent light: 5,000 ℓx at the light-receiving face									
	EMC		EN 60947-5-2									
	Voltage withstandability		500 V AC for one min. between all supply terminals connected together and enclosure									
	Vibration resistance		10 to 55 Hz frequency, 0.5 mm 0.02 in amplitude in X, Y and Z directions for 1.5 hours each									
	Shock resistance		294 m/s² acceleration (30 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		890 nm 0.04 mil		875 nm 0.03 mil		665 nm 0.03 mil		875 nm 0.03 mil			
Material			Enclosure: PBT, Lens: PMMA									
Cable (except for M12 plug-in connection type)			0.44 mm² 3-core cabtyre cable, 2 m 6.56 ft long									
Cable extension			Extension up to total 10 m 32.81 ft is possible with 0.34 mm², or more, cable (thru-beam type: both emitter and receiver).									
Net weight (Note 5)	2 m cable length type		Emitter/ Receiver: 65 g approx.	Emitter/ Receiver: 70 g approx.	65 g approx.	70 g approx.	65 g approx.	70 g approx.	65 g approx.	70 g approx.	75 g approx.	
	M12 plug-in connector type		Emitter/ Receiver: 15 g approx.	Emitter/ Receiver: 20 g approx.	15 g approx.	20 g approx.	15 g approx.	20 g approx.	15 g approx.	20 g approx.	25 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-420** 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 7.87 × 7.87 in) as the object.
4) Make sure to confirm detection with an actual sensor before use for detection of the transparent object and the translucent object.
5) The weight includes the weight of nuts.

DETECTION CURVES

Thru-beam type	Diffuse reflective	Diffuse reflective type with adjustable sensitivity	Retroreflective type	Retroreflective type with polarizing filters



A=Sensing range

Object 10 × 10 cm; 1 White 90%; 2 Grey 18%

With reflector **RF-420**

With reflector **RF-420**

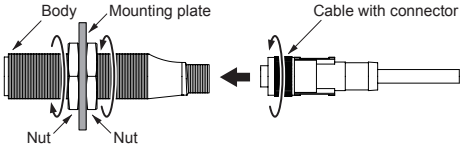
PRECAUTIONS FOR PROPER USE

Refer to p.1458~ for general precautions.

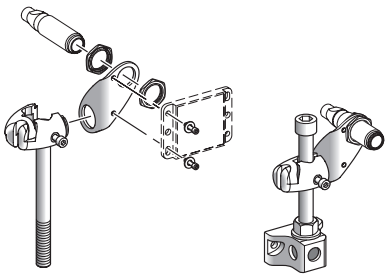
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Mounting

- The tightening torque should be 3 N·m or less.
- Use a cable with connector **CN-24C(L)-C□** (optional) for M12 connector type.
  Tightening torque for connector part is 2 N·m or less.



Mounting drawing with sensor or reflector RF-420



Wiring

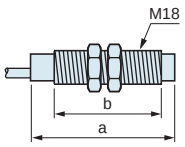
- Make sure that the power supply is off while wiring.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- Ensure that an isolation transformer is utilized for the DC power supply. If an autotransformer is utilized, the main body or power supply may be damaged.
- If the used power supply generates a surge, connect a surge absorber to the power supply to absorb the surge.
- Do not use during the initial transient time (0.5 sec) after the power supply is switched on.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Damage or burnout may result in case of short circuit of load or miswiring.
- Make a cable length as short as possible to lessen noise pickup.

Others

- Our products have been developed / produced for industrial use only.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- Avoid using a product where there is excessive vapor, dust or corrosive gas, or in a place where it could be exposed directly to water or chemicals.
- Take care that the sensor does not come in direct contact with water, oil, grease or organic solvents, such as, thinner, etc.
- Do not use in an environment containing infammable or explosive gases.
- Never disassemble or modify the product.

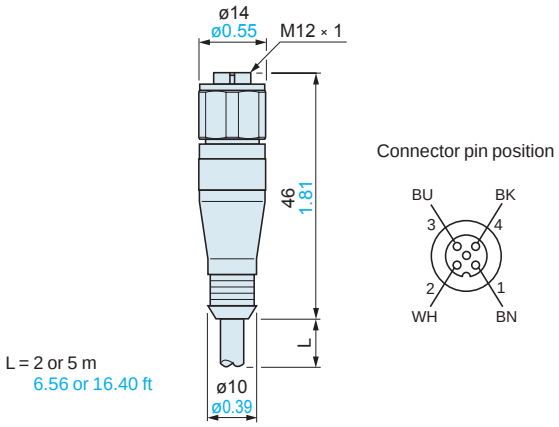
DIMENSIONS (Unit: mm in)

CY-1□ — Sensor

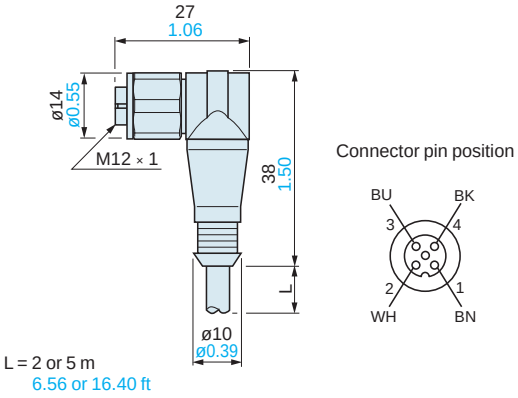


	2 m cable length type (mm in)		M12 plug-in connector type (mm in)	
	a	b	a	b
Standard type **CY-111□/121□/192□**	46 1.81	28 1.10	60 2.36	28 1.10
Standard type **CY-191□**	48 1.89	28 1.10	62 2.44	28 1.10
Side view type **CY-111V□/121V□/191V□/192V□**	62 2.44	28 1.10	76 2.99	28 1.10
Standard type **CY-122□**	62 2.44	44 1.73	76 2.99	44 1.73
Side view type **CY-122V□**	78 3.07	44 1.73	92 3.62	44 1.73

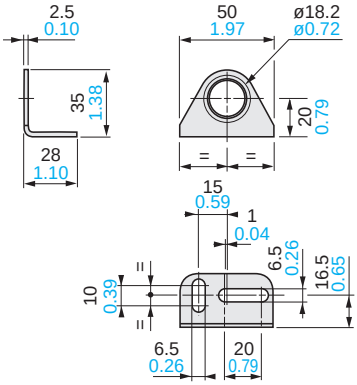
CN-24C-C2 CN-24C-C5 — Mating cable



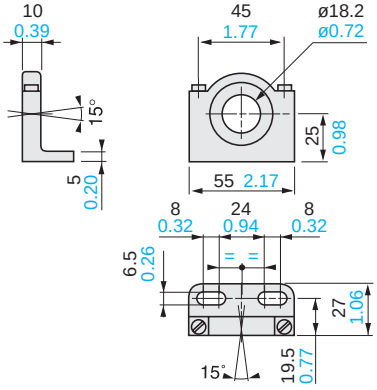
CN-24CL-C2 CN-24CL-C5 — Mating cable



MS-CY1-1 — Sensing mounting bracket

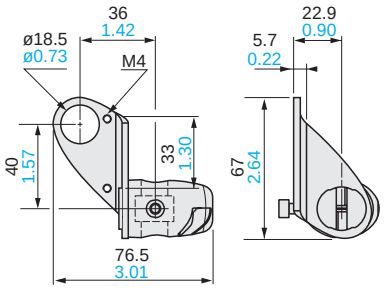


MS-CY1-2 — Sensing mounting bracket

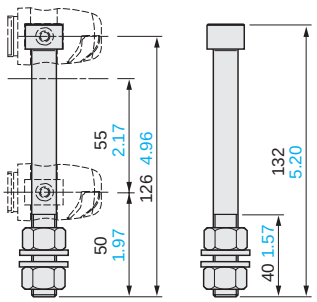


MS-AJ3 — Universal sensor mounting stand

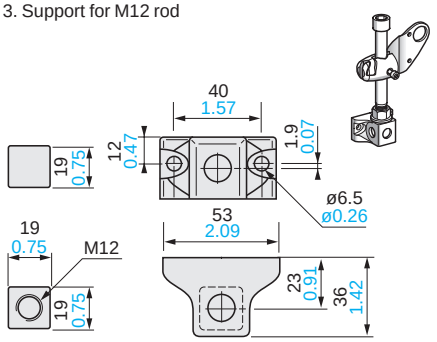
1. Ball-joint mounted fixing bracket **CY-100** series or **RF-420**



2. M12 rod

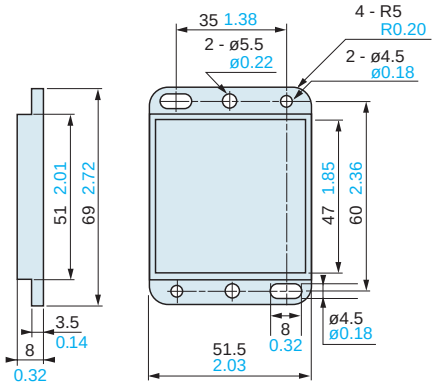


3. Support for M12 rod



DIMENSIONS (Unit: mm in)

RF-420 Reflector



RF-410 Reflector