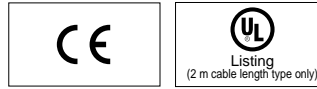
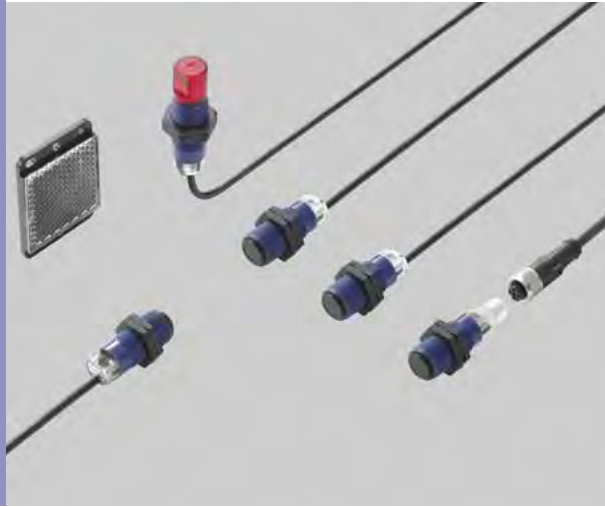


# Cylindrical Photoelectric Sensor **Amplifier Built-in**

## CY-100 SERIES

**Related Information**

- General terms and conditions..... F-3
- Selection guide ..... P.231~
- Glossary of terms ..... P.1549~
- General precautions ..... P.1552~



### FEATURES

- **Wide product range**
- **Shape: Standard type**
- **Side view type**
- **Connector: 2 m (6.562 ft) 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

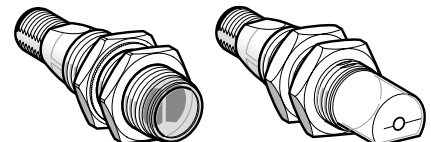
Type	Appearance	Sensing range	Model No. (Note 1)		Output operation
			NPN output	PNP output	
Standard		15 m 49.213 ft	CY-111A	CY-111A-P	Light-ON
			CY-111B	CY-111B-P	Dark-ON
		4 m 13.123 ft	CY-192A-Y	CY-192A-P-Y	Light-ON
			CY-192B-Y	CY-192B-P-Y	Dark-ON
		2 m 6.562 ft	CY-191A-Y	CY-191A-P-Y	Light-ON
			CY-191B-Y	CY-191B-P-Y	Dark-ON
		100 mm 3.937 in	CY-121A	CY-121A-P	Light-ON
			CY-121B	CY-121B-P	Dark-ON
		600 mm 23.622 in	CY-122A	CY-122A-P	Light-ON
			CY-122B	CY-122B-P	Dark-ON
Side view		15 m 49.213 ft	CY-111VA	CY-111VA-P	Light-ON
			CY-111VB	CY-111VB-P	Dark-ON
		4 m 13.123 ft	CY-192VA-Y	CY-192VA-P-Y	Light-ON
			CY-192VB-Y	CY-192VB-P-Y	Dark-ON
		2 m 6.562 ft	CY-191VA-Y	CY-191VA-P-Y	Light-ON
			CY-191VB-Y	CY-191VB-P-Y	Dark-ON
		100 mm 3.937 in	CY-121VA	CY-121VA-P	Light-ON
			CY-121VB	CY-121VB-P	Dark-ON
		600 mm 23.622 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, suffix "-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



- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- SAFETY LIGHT CURTAINS / SAFETY COMPONENTS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- SIMPLE WIRE-SAVING UNITS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- LASER MARKERS
- PLC
- HUMAN MACHINE INTERFACES
- ENERGY MANAGEMENT SOLUTIONS
- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Selection Guide
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- Power Supply Built-in
- Amplifier-separated
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- CX-400
- CY-100
- EX-10
- EX-20
- EX-30
- EX-40
- CX-440
- EQ-30
- EQ-500
- MQ-W
- RX-LS200
- RX
- RT-610

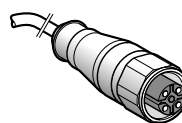
## ORDER GUIDE

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

Type		Model No.	Description	
For M12 plug-in connector type	Straight	<b>CN-24C-C2</b>	Length: 2 m <b>6.562 ft</b>	Clamping ring : ø14mm <b>0.551 in</b>
		<b>CN-24C-C5</b>	Length: 5 m <b>16.404 ft</b>	
	Elbow	<b>CN-24CL-C2</b>	Length: 2 m <b>6.562 ft</b>	Cable outer : ø5.3mm <b>0.209 in</b>
		<b>CN-24CL-C5</b>	Length: 5 m <b>16.404 ft</b>	

### Mating cable

• Straight type



• Elbow type



## OPTIONS

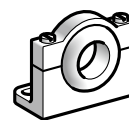
Designation	Model No.	Description
Sensor mounting bracket	<b>MS-CY1-1</b>	Material: Stainless steel
	<b>MS-CY1-2</b>	Material: Plastic, For beam axis alignment
Universal sensor mounting stand	<b>MS-AJ3</b>	It can adjust the height of the sensor and reflector <b>RF-420</b> . (The thru-beam type sensor needs two brackets.)
Reflector	<b>RF-420</b>	50 × 50 mm <b>1.969 × 1.969 in</b>
	<b>RF-410</b>	24 × 21 mm <b>0.945 × 0.827 in</b>
Reflective tape	<b>RF-40RL5</b>	22 mm × 5 m <b>0.866 × 196.850 in</b> , Thickness: 0.4 mm <b>0.016 in</b>

### Sensor mounting bracket

• MS-CY1-1

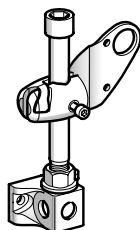


• MS-CY1-2



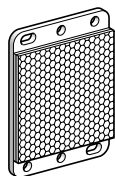
### Universal sensor mounting stand

• MS-AJ3

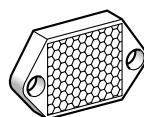


### Reflector

• RF-420

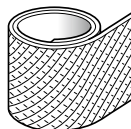


• RF-410



### Reflective tape

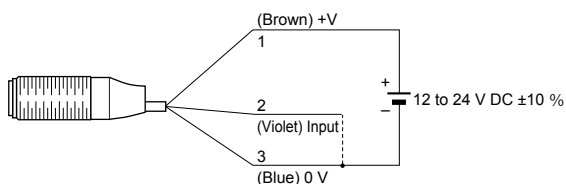
• RF-40RL5



## WIRING DIAGRAMS

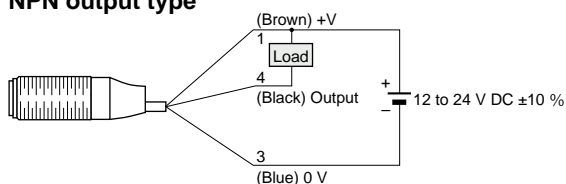
### Wiring diagram

#### Emitter of thru-beam type



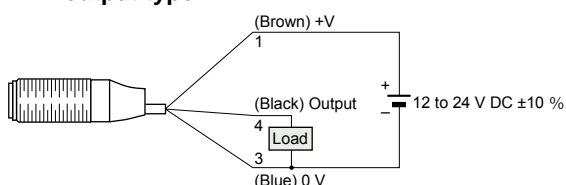
#### Receiver of thru-beam / Reflective type

##### 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)

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Amplifier-separated

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CY-100

EX-10

EX-20

EX-30

EX-40

CX-440

EQ-30

EQ-500

MQ-W

RX-LS200

RX

RT-610

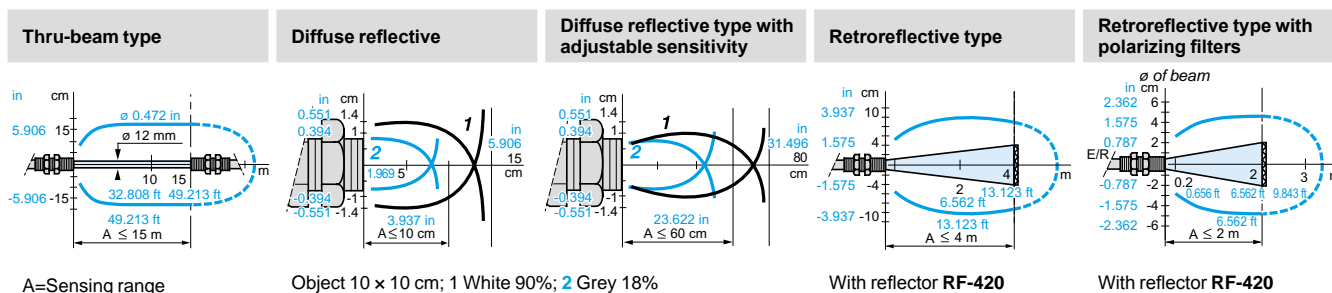
**SPECIFICATIONS**

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RX  
RT-610

Item	Model No.	Type	Thru-beam		Retroreflective				Diffuse reflective			
			Standard	Side view	Standard	Side view	With polarizing filters		Standard	Side view	With sensitivity adjuster	
							Standard	Side view			Standard	Side view
		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□
CE marking directive compliance			EMC Directive, RoHS Directive									
Sensing range			15 m <b>49.213 ft</b>		4 m <b>13.123 ft</b> (Note 2)		2 m <b>6.562 ft</b> (Note 2)		100 mm <b>3.937 in</b> (Note 3)		600 mm <b>23.622 in</b> (Note 3)	
Sensing object			ø18 mm <b>ø0.709 in</b> or more opaque object (Setting distance between emitter and receiver: 15 m <b>49.213ft</b> )		ø50 mm <b>ø1.969 in</b> or more opaque, translucent or transparent object (Note 2, 4)		ø50 mm <b>ø1.969 in</b> or more opaque, translucent, 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 <b>-13 to +131 °F</b> (No dew condensation or icing allowed), Storage: -40 to +70 °C <b>-22 to +158 °F</b>									
	Ambient humidity		50 % RH (at +70 °C <b>+158 °F</b> )									
	Ambient illuminance		Incandescent light: 5,000 lx or less at the light-receiving face									
	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 <b>0.020 in</b> double amplitude in X, Y and Z directions for 1.5 hours each									
	Shock resistance		294 m/s <sup>2</sup> acceleration (30 G approx.) in X, Y and Z directions three times each									
Emitting element			Infrared LED (modulated)				Red LED (modulated)		Infrared LED (modulated)			
Peak emission wavelength			890 nm <b>0.035 mil</b>		875 nm <b>0.034 mil</b>		665 nm <b>0.026 mil</b>		875 nm <b>0.034 mil</b>			
Material			Enclosure: PBT, Lens: PMMA									
Cable (except for M12 plug-in connection type)			0.44 mm <sup>2</sup> 3-core cabtyre cable, 2 m <b>6.562 ft</b> long									
Cable extension			Extension up to total 10 m <b>32.808 ft</b> is possible with 0.34 mm <sup>2</sup> , 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 **7.874 × 7.874 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



## PRECAUTIONS FOR PROPER USE

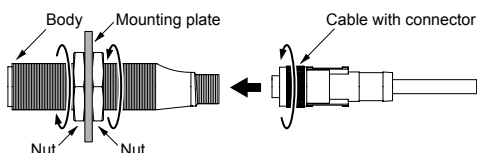
Refer to p.1552~ for general precautions.



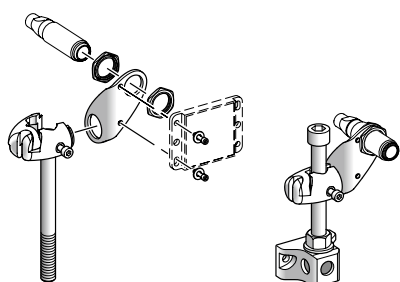
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

### 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

- This device has 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 inflammable or explosive gases.
- Never disassemble or modify the product.

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CY-100

EX-10

EX-20

EX-30

EX-40

CX-440

EQ-30

EQ-500

MQ-W

RX-LS200

RX

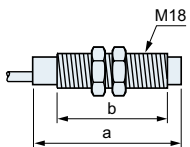
RT-610

**DIMENSIONS (Unit: mm in)**

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RX  
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**CY-1□**

Sensor



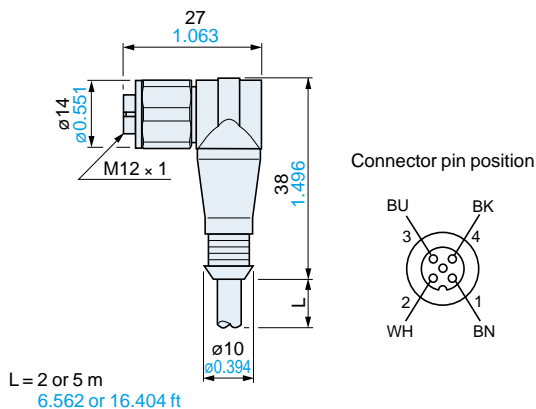
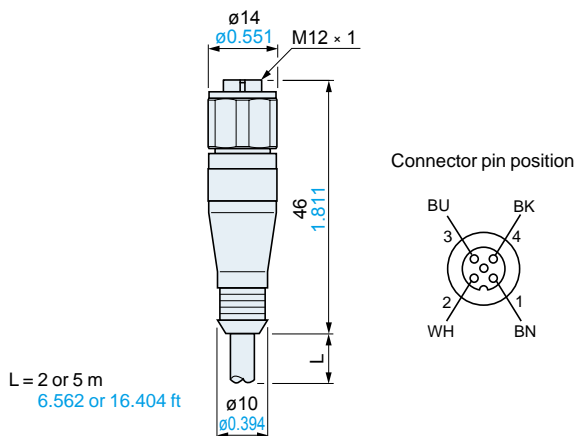
	2 m cable length type (mm in)		M12 plug-in connector type (mm in)	
	a	b	a	b
Standard type <b>CY-111□/121□/192□</b>	46 1.811	28 1.102	60 2.362	28 1.102
Standard type <b>CY-191□</b>	48 1.890	28 1.102	62 2.441	28 1.102
Side view type <b>CY-111V□/121V□/191V□/192V□</b>	62 2.441	28 1.102	76 2.992	28 1.102
Standard type <b>CY-122□</b>	62 2.441	44 1.732	76 2.992	44 1.732
Side view type <b>CY-122V□</b>	78 3.071	44 1.732	92 3.622	44 1.732

**CN-24C-C2 CN-24C-C5**

Mating cable

**CN-24CL-C2 CN-24CL-C5**

Mating cable

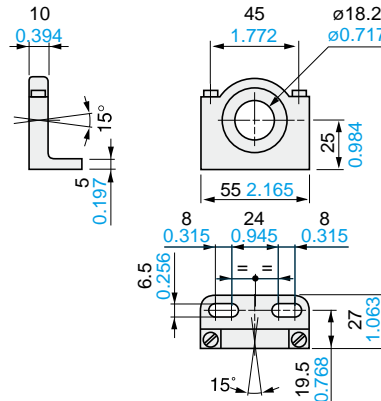
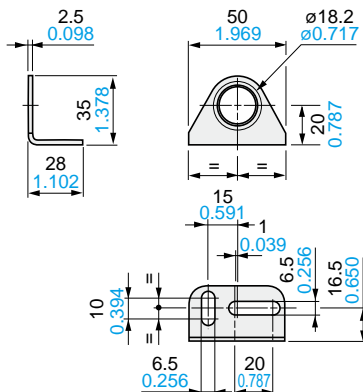


**MS-CY1-1**

Sensing mounting bracket

**MS-CY1-2**

Sensing mounting bracket

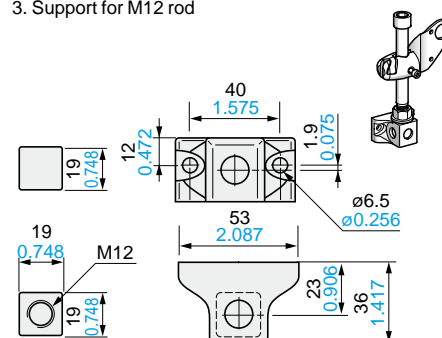
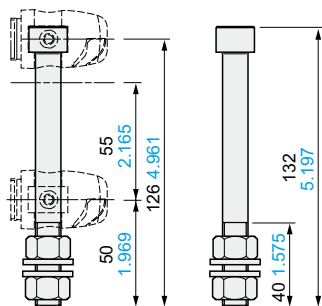
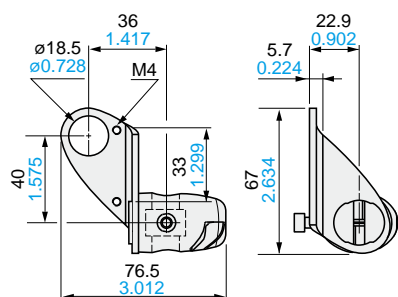


**MS-AJ3**

Universal sensor mounting stand

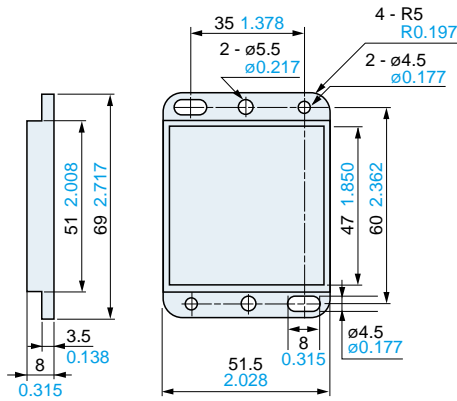
1. Ball-joint mounted fixing bracket **CY-100 series or RF-420** 2. M12 rod

3. Support for M12 rod

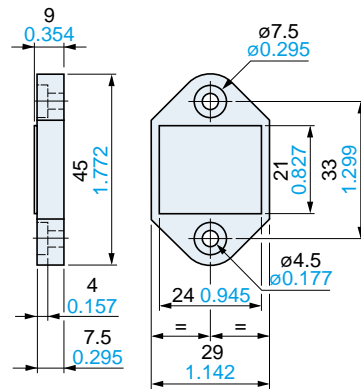


**DIMENSIONS (Unit: mm in)**

**RF-420 Reflector**



**RF-410 Reflector**



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EX-20

EX-30

EX-40

CX-440

EQ-30

EQ-500

MQ-W

RX-LS200

RX

RT-610