

CX series

Cylindrical Type
Embedded Amplifier Photo Sensors

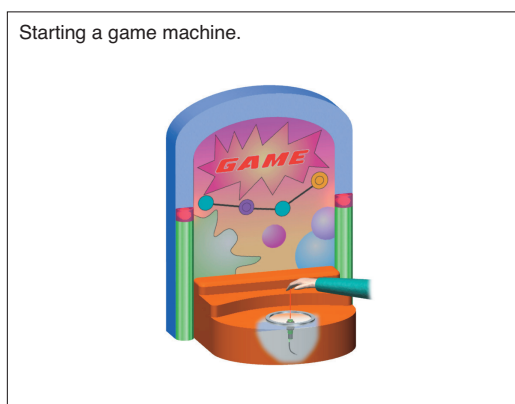


- M18 cylindrical type compatible with European Standards (CENELEC)
- Polarized retroreflective type capable of detecting mirror-like objects
 - Thorough short circuit protection
 - Water resistance of IP 66 achieved by resin molding
 - Dramatic improvement of environment resistance including prevention of damage and falling off electronic components caused by vibration and enhanced robustness

Type

Detection method	Detecting distance	Model		Operation mode	Output mode	Remarks
		NPN type	PNP type			
Through beam	3m	CX-T3D	CX-T3DPN	Dark ON	Open collector	Infrared LED long distance type
Polarized retroreflective	2m	CX-M2RD	CX-M2RDPN	Dark ON		Red LED capable of detecting mirror-like objects
Diffuse reflective	100 mm	CX-R01	CX-R01PN	Light ON		Infrared LED
	300 mm	CX-R03V	CX-R03VPN		Infrared LED type provided with adjustment for ease of fine detection	

Applications



Rating/Performance/Specification

Model	NPN type	CX-T3D	CX-M2RD	CX-R01	CX-R03V
	PNP type	CX-T3DPN	CX-M2RDPN	CX-R01PN	CX-R03VPN
Detection method		Through beam	Polarized retroreflective	Diffuse reflective	
Detecting distance		3m	2m *1	100mm *2	300mm *3
Detection object		φ 15mm (or more) Opaque	Mirror-like / opaque / translucent	Opaque / translucent	
Power supply		12 - 24V DC ±10% / Ripple 10% or less			
Current consumption	NPN type	Transmitter: 17 mA or less Receiver: 17 mA or less	20mA or less	17mA or less	20mA or less
	PNP type	Transmitter: 17 mA or less Receiver: 23 mA or less	24mA or less	23mA or less	26mA or less
Output mode	NPN type	Open collector Rating: sink current 100 mA (30 VDC) or less			
	PNP type	Open collector Rating: source current 100 mA (30 VDC) or less			
Operation mode		Dark ON		Light ON	
Response time		0.35ms or less			
Operating angle		7° (at receiver)	10° (at reflector)	—————	
Hysteresis		—————		5% or less	
Light source (wavelength)		Infrared LED (950nm)	Red LED (700nm)	Infrared LED (880nm)	
Indicator		Transmitter: Power indicator (red LED) Receiver: Light reception indicator (red LED)	Operation indicator (red LED)		
Volume		—————			Sensitivity adjustment
Short circuit protection		Provided			
Material		Lens: Polycarbonate Case: Polycarbonate	Lens: Acrylic Case: Polycarbonate	Lens: Polycarbonate Case: Polycarbonate	
Connection		Attached cable (outer diameter: 4 mm) Transmitter: 0.2 mm ² 2 cores 2 m (gray) Receiver: 0.2 mm ² 3 cores 2 m (black)	Attached cable (outer dimension: dia. 4mm) 0.2mm ² 3 cores 2 m (black)		
Weight		Transmitter: Approx. 65 g Receiver: Approx. 65 g	Approx. 65 g		
Accessory		K-7 reflector		Operation manual	

*1 With K-7 reflector *2 With 50 x 50 mm white drawing paper *3 With 100 x 100 mm white drawing paper

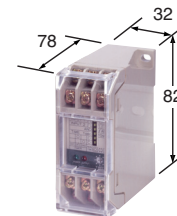
- The detecting distance and detection object of retroreflective types varies, depending on reflector types combined with the sensor.
- The detecting distance is the range which you can set for the reflector. The sensor can detect an object even in extremely short range.
- The detecting distance of diffuse reflective type varies, depending on transmittance of the detection object. Please be sure to check the detection beforehand.

Environmental Specification

Ambient light	5,000 lx or less
Ambient temperature	-25 - +55°C (non-freezing)
Ambient humidity	35 - 85%RH (non-condensing)
Protective structure	IP66
Vibration	10 - 55 Hz / 1.5 mm double amplitude / 2 hours each in 3 direction
Shock	100 m/s ² / 3 times each in 3 directions
Dielectric withstanding	500 VAC for 1 minute
Insulation resistance	1,000 VDC, 20 MΩ or higher

Applicable power supply unit

PS Series
High capacity of 200 mA at 12 VDC

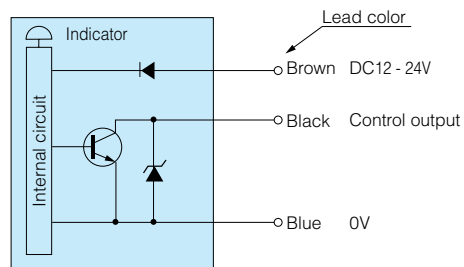


(General-purpose type) PS3N
PS3N-SR
(Multifunctional type) PS3F
PS3F-SR

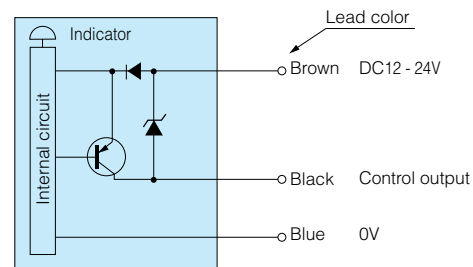
CX

Input/Output Circuit and Connection

NPN output



PNP output

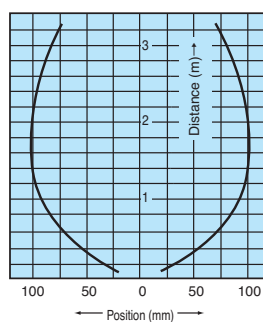


- The output transistor turns off when load short circuit or overload occurs. Check the load and turn the power back on.
- A through beam transmitter has only power supply cables (brown: 12-24DVC, blue 0DVC).

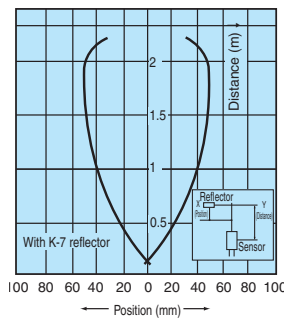
Performance Curves (Typical)

Response Curves : Beam Pattern

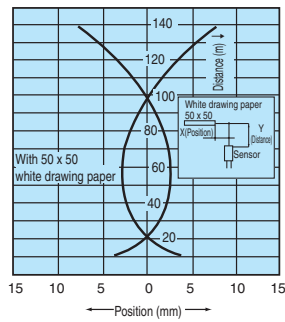
CX-T3D·CX-T3DPN



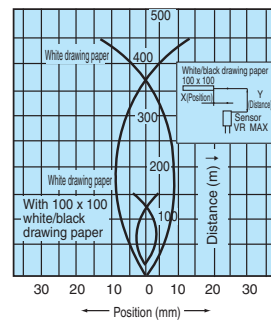
CX-M2RD·CX-M2RDPN



CX-R01·CX-R01PN

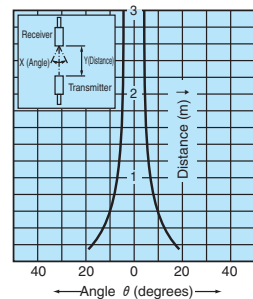


CX-R03V·CX-R03VPN



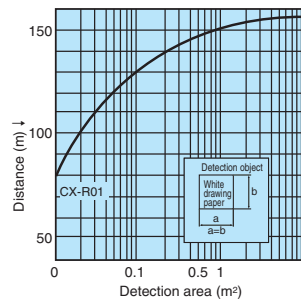
Response Curves: Tilt Angle

CX-T3D·CX-T3DPN

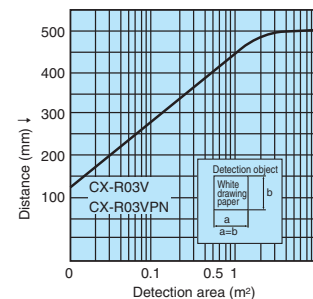


Response Curves: Target Size

CX-R01·CX-R01PN

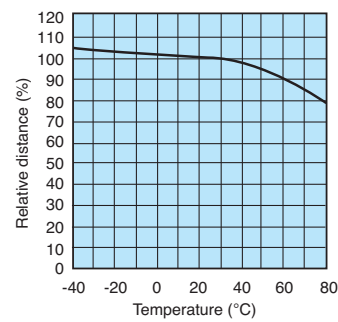


CX-R03V·CX-R03VPN

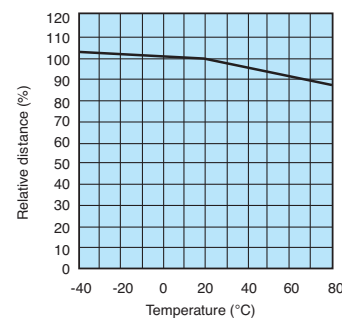


● Response Curves : Ambient Temperature

CX-M2RD
CX-M2RDPN



CX-R01
CX-R01PN
CX-R03V
CX-R03VPN



■ Dimensions (in mm)

CAD

(In mm)

Model	A	B	C
CX-M2RD CX-M2RDPN	66.2	56.2	38.2
CX-T3D CX-T3DPN CX-R01 CX-R01PN CX-R03V CX-R03VPN	65	55	37

CAD K-7 reflector Accessory of CX-M2RD

- Materials
- Mirror: Acrylic
- Base: Heat-resistant ABS

(Applicable to polarization reflector type)
Effective reflecting surface : 56 x 36 mm
Mounting: secured with M3 screws
(alternatively adhesive may be used)
Protective structure: IP 67

(Notes on mounting)

- Excessive tightening torque may damage the thread of the nut to cause loosening. Make sure that the tightening torque is up to 0.98 N·m.
- This sensor does not allow adjustment of mounting angle once it is secured. Pay attention to the light axis especially for through-beam types to avoid misalignment.

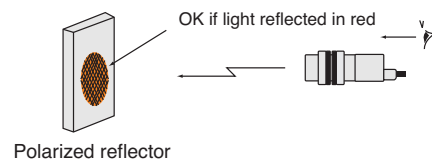
■ Setting

(Through beam type)

- For light axis alignment, swivel the receiver vertically and horizontally to install it at the center of the area in which the light reception indicator (red LED) is illuminated for the individual direction.
- Repeat activation and deactivation to check the operation.

(Polarized retroreflective type)

- Arrange the sensor in line with the reflector. Swivel the sensor vertically and horizontally with reference to the reflector, use the operation indicator to check the area in which the sensor is activated (indicator goes out) and install the sensor at the center of the area. Taking advantage of the red light spot on the reflector seen from behind the sensor allows easy setting.

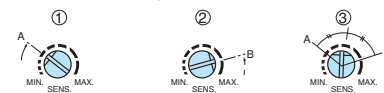


(Diffuse reflective type)

- Set the sensor so that the operation indicator (red LED) is illuminated with the detection object placed at a given position and not illuminated with the object removed.
- Bring any background of the detection object as far away as possible or use black surface with low reflectance.
- The detecting distance depends on the surface condition of the detection object. This sensor is not provided with a sensitivity adjustment volume and needs to be adjusted for stable operation by changing the distance, angle, background object, etc.

(Diffuse reflective type with adjustment)

- Adjustment with any light-reflecting object in the background
- Place the object to be detected in a given position, turn up the sensitivity adjustment volume (SENS) gradually from the minimum (MIN) and find the point at which the operation indicator (red LED) is illuminated (Point A).
 - Remove the object, turn down the sensitivity adjustment volume gradually from the maximum (MAX) and find the point at which the operation indicator (red LED) goes out (Point B). (If the operation indicator is not illuminated even at MAX, MAX is regarded as Point B.)
 - Set the volume at midway between Points A and B.



CAD To download CAD data including dimensions, please visit www.takex-elec.co.jp/index_e.html.