

# NX5 SERIES

Compact Multi-voltage Photoelectric Sensor **Power Supply Built-in**

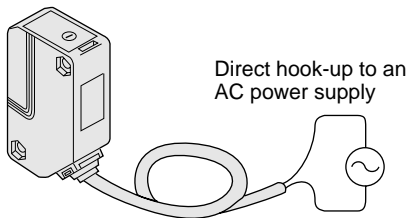


Multi-voltage photoelectric sensor usable worldwide



## Multi-voltage

The **NX5** series can operate at 24 to 240 V AC or 12 to 240 V DC, which makes it suitable for supply voltages all over the world.

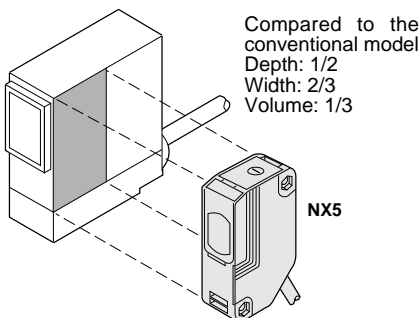


No need to arrange a DC power supply.

## Compact size

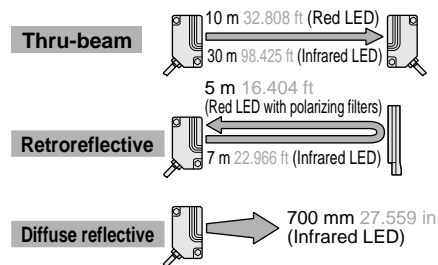
Despite being multi-voltage, it has a depth of just 35 mm 1.378 in. (W18 × H62 × D35 mm W0.709 × H2.441 × D1.378 in)

Conventional model



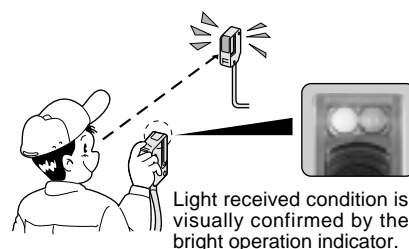
## Long sensing range

Most suitable for conveyor lines and parking lot applications.



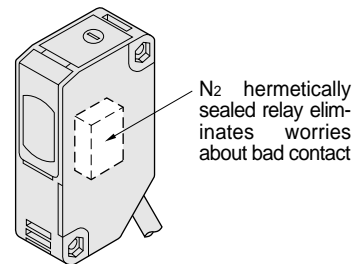
## Easy alignment

The 10 m 32.808 ft thru-beam type sensor and the 5 m 16.404 ft retroreflective type sensor incorporate a red LED beam source. Beam alignment can be attained by visually checking the emitted beam.



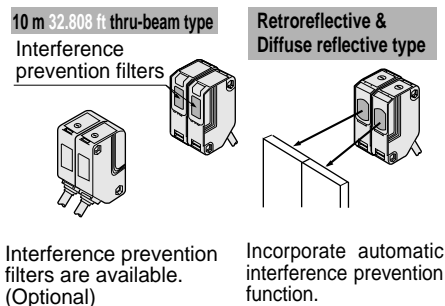
## High reliability

It has IP66 protection. Moderate dust or water splashes do not affect it. The new N<sub>2</sub> hermetically sealed output relay significantly increases its reliability.



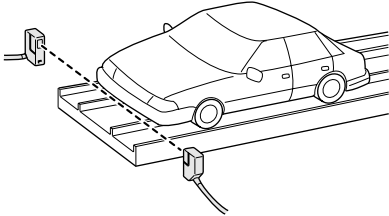
## Interference prevention

Two sensors operate quite normally even if mounted close together. (Excluding the 30 m 98.425 ft thru-beam type sensor)

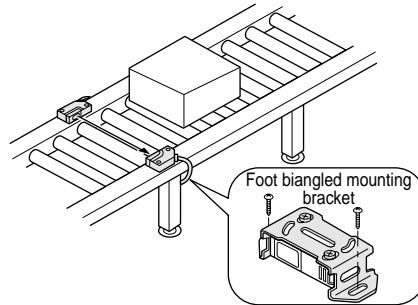


## APPLICATIONS

Detecting car position at parking garage



Detecting workpieces on conveyor line



Detecting golf balls



## ORDER GUIDE

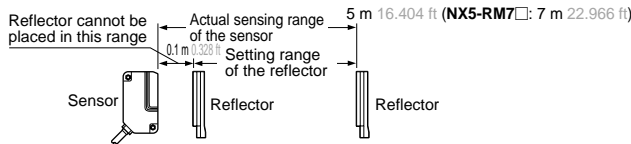
Type	Appearance	Sensing range	Model No. (Note 2)	Emitting element	Output
Thru-beam		10 m 32.808 ft	NX5-M10RA	Red LED	Relay contact 1c
			NX5-M10RB		
		30 m 98.425 ft	NX5-M30A	Infrared LED	
			NX5-M30B		
Retroreflective		0.1 to 5 m 0.328 to 16.404 ft (Note 1)	NX5-PRVM5A	Red LED	
			NX5-PRVM5B		
		0.1 to 7 m 0.328 to 22.966 ft (Note 1)	NX5-RM7A	Infrared LED	
			NX5-RM7B		
Diffuse reflective		700 mm 27.559 in	NX5-D700A	Infrared LED	
			NX5-D700B		

Amplifier Built-in	CY
Sensor Mounting Stand	PX-2
	RT-610
	MS-AJ
Micro	PM
	PM2

Multi-voltage	NX5
	VF

**NOTE: Mounting bracket is not supplied with the sensor. Please select from the range of optional sensor mounting brackets (three types).**

Notes: 1) The sensing range of the retroreflective type sensor is specified for the RF-230 reflector. Further, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 0.1 m 0.328 ft away.



2) Light-ON type sensor (model No. with suffix 'A') and Dark-ON type sensor (model No. with suffix 'B') are available in the NX5 series. For the following models, in case of power off, the output relay condition is the same as when an object is detected. (In case of power supply line disconnection, the output operation is the same as when an object is detected.) Refer to p.362 for the output operation of each model.

Thru-beam type	Retroreflective type	Diffuse reflective type
NX5-M10RA and NX5-M30A (Light-ON)	NX5-PRVM5A and NX5-RM7A (Light-ON)	NX5-D700B (Dark-ON)

### 5 m 16.404 ft cable length type

5 m 16.404 ft cable length type (standard: 2 m 6.562 ft) is also available.

### • Table of Model Nos.

Type		Standard	5 m 16.404 ft cable length type
Thru-beam	Light-ON	NX5-M10RA	NX5-M10RA-C5
		NX5-M10RB	NX5-M10RB-C5
	Dark-ON	NX5-M30A	NX5-M30A-C5
		NX5-M30B	NX5-M30B-C5
Retroreflective	With polarizing filters	NX5-PRVM5A	NX5-PRVM5A-C5
		NX5-PRVM5B	NX5-PRVM5B-C5
	Long sensing range	NX5-RM7A	NX5-RM7A-C5
		NX5-RM7B	NX5-RM7B-C5
Diffuse reflective	Light-ON	NX5-D700A	NX5-D700A-C5
	Dark-ON	NX5-D700B	NX5-D700B-C5

### Accessory

- RF-230 (Reflector)



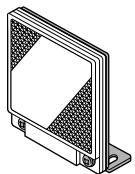
## OPTIONS

Designation	Model No.	Description
Sensor mounting bracket	<b>MS-NX5-1</b>	Foot angled mounting bracket (The thru-beam type sensor needs two brackets.)
	<b>MS-NX5-2</b>	Foot biangled mounting bracket (sensor protection bracket) (The thru-beam type sensor needs two brackets.)
	<b>MS-NX5-3</b>	Back angled mounting bracket (The thru-beam type sensor needs two brackets.)
Slit mask (For thru-beam type sensor only)	<b>OS-NX5-3 × 6</b> (Slit size 3 × 6 mm) (0.118 × 0.236 in)	Slit on one side <ul style="list-style-type: none"> <li>• Sensing range: 3 m 9.843 ft [NX5-M10R□]</li> <li>16 m 52.493 ft [NX5-M30□]</li> <li>• Min. sensing object: <math>\phi</math> 10 mm <math>\phi</math> 0.394 in</li> </ul>
		Slit on both sides <ul style="list-style-type: none"> <li>• Sensing range: 1 m 3.281 ft [NX5-M10R□]</li> <li>6 m 19.685 ft [NX5-M30□]</li> <li>• Min. sensing object: 3 × 6 mm 0.118 × 0.236 in</li> </ul>
Interference prevention filter (For NX5-M10RA or NX5-M10RB only)	<b>PF-NX5-V</b> (Vertical)	Same type of filters on both sides <ul style="list-style-type: none"> <li>• Sensing range: 5 m 16.404 ft</li> <li>• Min. sensing object: <math>\phi</math> 20 mm <math>\phi</math> 0.787 in</li> </ul>
	<b>PF-NX5-H</b> (Horizontal)	(One set consists of 2 pcs. of interference prevention) filters.
Reflector (For retro-reflective type sensor only)	<b>RF-210</b>	<ul style="list-style-type: none"> <li>• Sensing range: 0.1 to 1.5 m 0.328 to 4.921 ft [NX5-PRVM5□]</li> <li>0.1 to 2.5 m 0.328 to 8.202 ft [NX5-RM7□]</li> <li>• Min. sensing object: <math>\phi</math> 30 mm <math>\phi</math> 1.181 in</li> </ul>
	<b>RF-220</b>	<ul style="list-style-type: none"> <li>• Sensing range: 0.1 to 3.5 m 0.328 to 11.483 ft [NX5-PRVM5□]</li> <li>0.1 to 5m 0.328 to 16.404 ft [NX5-RM7□]</li> <li>• Min. sensing object: <math>\phi</math> 35 mm <math>\phi</math> 1.378 in</li> </ul>
Reflector mounting bracket	<b>MS-RF21-1</b>	Protective mounting bracket for <b>RF-210</b> It protects the reflector from damage and maintains alignment.
	<b>MS-RF22</b>	For <b>RF-220</b>
	<b>MS-RF23</b>	For <b>RF-230</b>
Reflective tape (For retro-reflective type sensor only)	<b>RF-11</b>	<ul style="list-style-type: none"> <li>• Ambient temperature: -25 to +50 °C -13 to +122 °F</li> <li>• Ambient humidity: 35 to 85 % RH</li> <li>Notes: i) Keep the tape free from stress. If it is pressed too much, its capability may deteriorate.</li> <li>ii) Do not cut the tape. It will deteriorate the sensing performance.</li> </ul>
	<b>RF-12</b>	<ul style="list-style-type: none"> <li>• Sensing range: 0.1 to 1 m 0.328 to 3.281 ft [NX5-PRVM5□]</li> <li>0.1 to 1 m 0.328 to 3.281 ft [NX5-RM7□]</li> <li>• Sensing range: 0.1 to 1.5 m 0.328 to 4.921 ft [NX5-PRVM5□]</li> <li>0.1 to 1.5 m 0.328 to 4.921 ft [NX5-RM7□]</li> </ul>
Sensor checker (Note)	<b>CHX-SC2</b>	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.

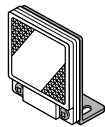
Note: Refer to p.414~ for details of the sensor checker **CHX-SC2**.

### Reflector mounting bracket

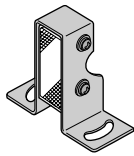
- **MS-RF23**
- **MS-RF22**
- **MS-RF21-1**



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



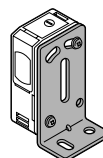
Two M3 (length 8 mm 0.315 in) screws with washers are attached.



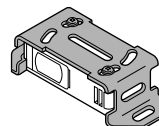
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

### Sensor mounting bracket

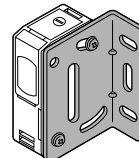
- **MS-NX5-1**
- **MS-NX5-2**
- **MS-NX5-3**



Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.



Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

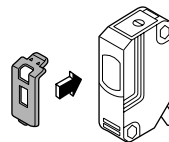


Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

### Slit mask

- **OS-NX5-3 × 6**

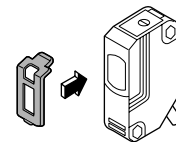
Fitted on the front face of the sensor with one-touch.



### Interference prevention filter

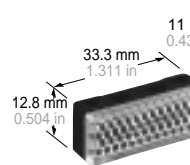
- **PF-NX5-V**
- **PF-NX5-H**

(For NX5-M10R□ only)  
Two sets of thru-beam type sensors (Red LED type) can be mounted close together.

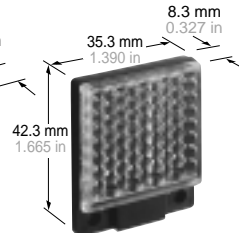


### Reflector

- **RF-210**

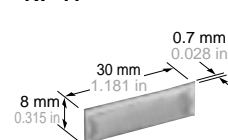


- **RF-220**

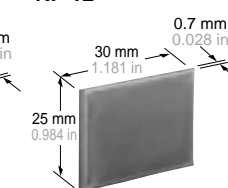


### Reflective tape

- **RF-11**

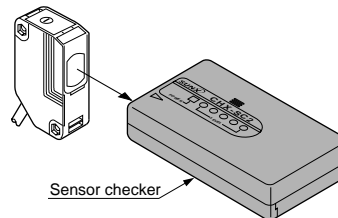


- **RF-12**



### Sensor checker

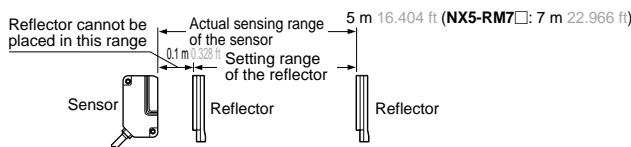
- **CHX-SC2**



## SPECIFICATIONS

Item	Type Model No.	Thru-beam				Retroreflective				Diffuse reflective	
		NX5-M10RA	NX5-M10RB	NX5-M30A	NX5-M30B	With polarizing filters		Long sensing range		NX5-D700A	NX5-D700B
Sensing range		10 m 32.808 ft		30 m 98.425 ft		0.1 to 5 m 0.328 to 16.404 ft (Note 1)		0.1 to 7 m 0.328 to 22.966 ft (Note 1)		700 mm 27.559 in (Note 2)	
Sensing object		φ20 mm φ0.787 in or more opaque object (Note 3)				φ50 mm φ1.969 in or more opaque, translucent or specular object (Note 1)		φ50 mm φ1.969 in or more opaque or translucent object (Note 1)		Opaque, translucent or transparent object	
Hysteresis		_____									15 % or less of operation distance
Repeatability (perpendicular to sensing axis)		0.1 mm 0.004 in or less		0.2 mm 0.008 in or less				0.3 mm 0.012 in or less			
Supply voltage		24 to 240 V AC ± 10 % or 12 to 240 V DC ± 10 % Ripple P-P 10 % or less									
Power consumption		Emitter: 1 VA or less Receiver: 2 VA or less		Emitter: 1.5 VA or less Receiver: 2 VA or less		2 VA or less					
Output		Relay contact 1 c • Switching capacity: 250 V AC 1 A (resistive load) 30 V DC 2 A (resistive load) • Electrical life: 500,000 or more switching operations (switching frequency 3,600 operations/hour) • Mechanical life: 100 million or more switching operations (switching frequency 36,000 operations/hour)									
	Output operation	Light-ON	Dark-ON	Light-ON	Dark-ON	Light-ON	Dark-ON	Light-ON	Dark-ON	Light-ON	Dark-ON
Response time		10 ms or less									
Operation indicator		Red LED (lights up when the output is ON)									
Stability indicator		Green LED (lights up under stable light received condition or stable dark condition)									
Power indicator		_____		Red LED (lights up when the power is ON)		_____					
Sensitivity adjuster		Continuously variable adjuster		_____		Continuously variable adjuster		_____		Continuously variable adjuster	
Automatic interference prevention function		(Use optional interference prevention filters)		_____		Incorporated (Two units of sensors can be mounted close together.)					
Environmental resistance	Pollution degree	3 (Industrial environment)									
	Protection	IP66 (IEC)									
	Ambient temperature	- 20 to + 55 °C - 4 to + 131 °F (No dew condensation or icing allowed)(Note 4), Storage: - 30 to + 70 °C - 22 to + 158 °F									
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH									
	Ambient illuminance	Sunlight: 11,000 lx at the light-receiving face, Incandescent light: 3,500 lx at the light-receiving face									
	EMC	EN 50081-2, EN 50082-2, EN 61000-6-2									
	Voltage withstandability	1,500 V AC for one min. between power supply and output terminals, 1,000 V AC for one min. between relay contact terminals									
	Insulation resistance	20 MΩ, or more, with 500 V DC megger between power supply and output terminals, and between relay contact terminals									
	Vibration resistance	10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each									
	Shock resistance	500 m/s <sup>2</sup> (50 G approx.) in X, Y and Z directions for three times each									
Emitting element		Red LED (modulated)		Infrared LED (modulated)		Red LED (modulated)		Infrared LED (modulated)			
Material		Enclosure: Polycarbonate, Lens: Polycarbonate, Cover: Polycarbonate, Front cover (retroreflective type sensor only): Acrylic									
Cable		0.3 mm <sup>2</sup> 5-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 0.3 mm <sup>2</sup> , or more, cable (thru-beam type: both emitter and receiver).									
Weight		Emitter: 100 g approx. Receiver: 140 g approx.		Emitter: 125 g approx. Receiver: 140 g approx.		140 g approx.					
Accessories		Adjusting screwdriver: 1 pc.		_____		RF-230 (Reflector): 1 pc. Adjusting screwdriver: 1 pc.		RF-230 (Reflector): 1 pc.		Adjusting screwdriver: 1 pc.	

Notes: 1) The sensing range and the sensing object of the retroreflective type sensor is specified for the **RF-230** reflector. Further, the sensing range is the possible setting range for the reflector.  
The sensor can detect an object less than 0.1 m 0.328 ft away.



- The sensing range of the diffuse reflective type sensor is specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.
- If slit masks (optional) are fitted, an object as small as 3 × 6 mm 0.118 × 0.236 in can be detected.
- In case the sensor is to be used at an ambient temperature of - 15 °C + 5 °F, or less, please contact our office.

CY

Amplifier Built-in

PX-2

RT-610

Sensor Mounting Stand

MS-AJ

Micro

PM

PM2

NX5

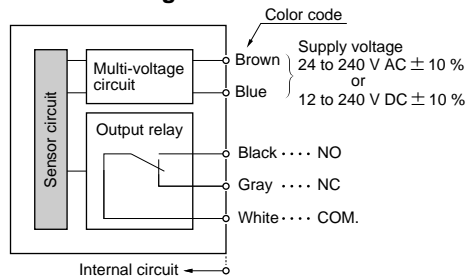
Multi-voltage

VF

EQ-500

## I/O CIRCUIT DIAGRAM

### I/O circuit diagram



Note: The emitter of the thru-beam type sensor has two wires for power (+ V and 0 V) only.

### Output operation

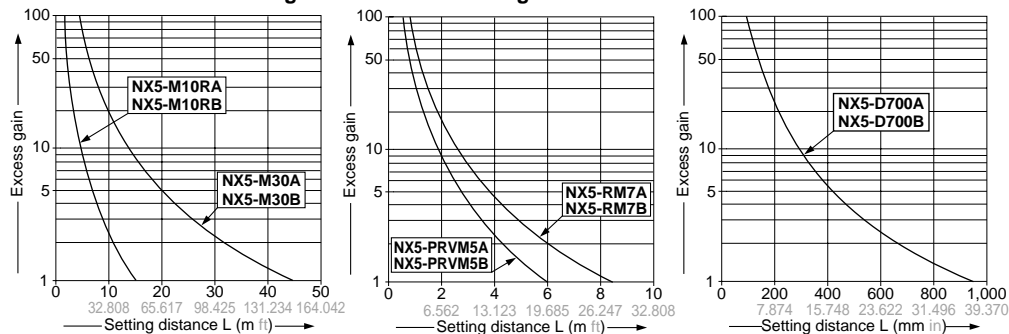
■: Object detected state.

Sensing mode	Thru-beam & Retroreflective type				Diffuse reflective type			
	Light-ON (A) type		Dark-ON (B) type		Light-ON (A) type		Dark-ON (B) type	
Output	NO (Black cable)	NC (Gray cable)	NO (Black cable)	NC (Gray cable)	NO (Black cable)	NC (Gray cable)	NO (Black cable)	NC (Gray cable)
Power OFF	Open	Close	Open	Close	Open	Close	Open	Close
Beam-received	Close	Open	Open	Close	Close	Open	Open	Close
Beam-interrupted	Open	Close	Close	Open	Open	Close	Close	Open

## SENSING CHARACTERISTICS (TYPICAL)

### All models

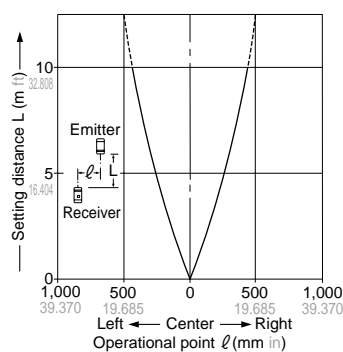
#### Correlation between setting distance and excess gain



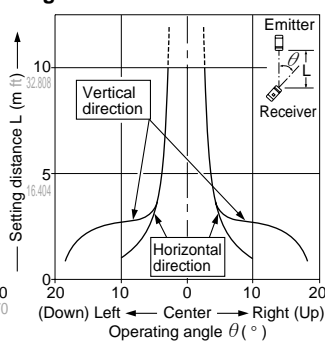
### NX5-M10RA NX5-M10RB

Thru-beam type

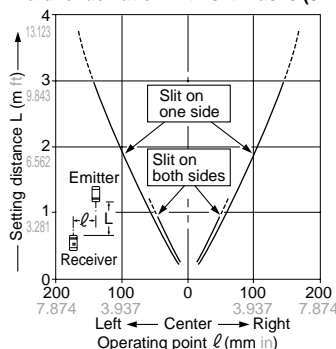
#### Parallel deviation



#### Angular deviation



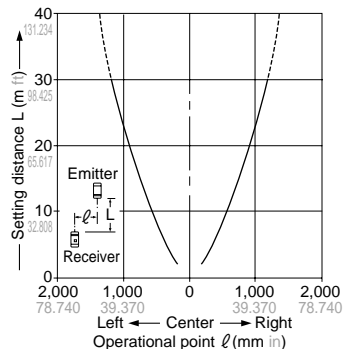
#### Parallel deviation with slit masks (3 X 6 mm 0.118 X 0.236 in)



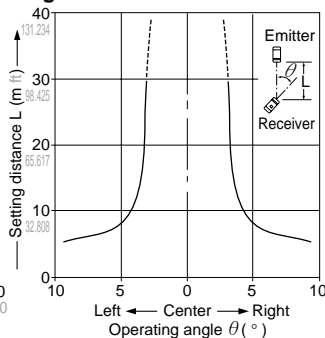
### NX5-M30A NX5-M30B

Thru-beam type

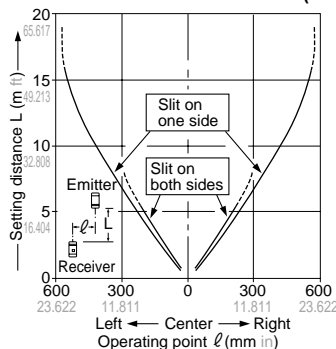
#### Parallel deviation



#### Angular deviation



#### Parallel deviation with slit masks (3 X 6 mm 0.118 X 0.236 in)

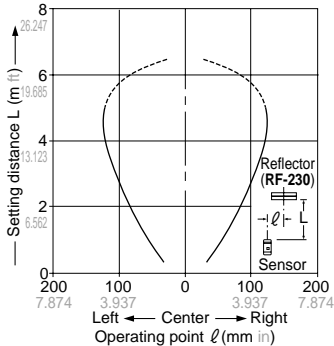


## SENSING CHARACTERISTICS (TYPICAL)

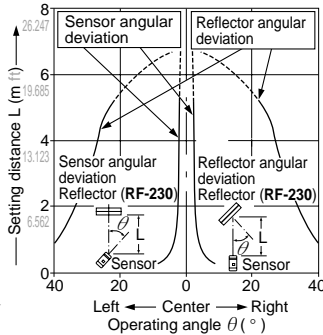
### NX5-PRVM5A NX5-PRVM5B

Retroreflective type

#### Parallel deviation



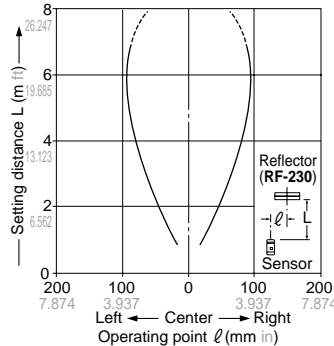
#### Angular deviation



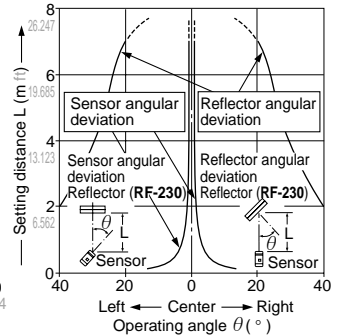
### NX5-RM7A NX5-RM7B

Retroreflective type

#### Parallel deviation



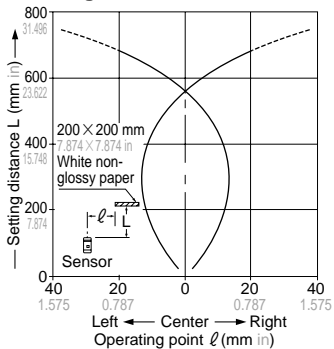
#### Angular deviation



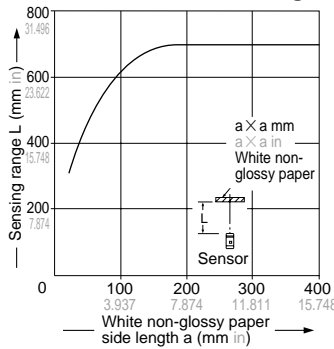
### NX5-D700A NX5-D700B

Diffuse reflective type

#### Sensing field



#### Correlation between sensing object size and sensing range



As the sensing object size becomes smaller than the standard size (white non-glossy paper  $200 \times 200$  mm  $7.874 \times 7.874$  in), the sensing range shortens, as shown in the left graph.

(For plotting the left graph, the sensitivity has been set such that a  $200 \times 200$  mm  $7.874 \times 7.874$  in white non-glossy paper is just detectable at a distance of 700 mm 27.559 in.)

## PRECAUTIONS FOR PROPER USE

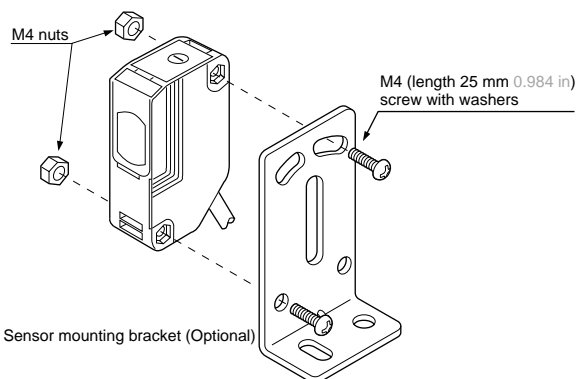
Refer to p.1135~ for general precautions.



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.

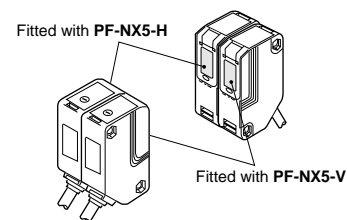
### Mounting

- The tightening torque should be 0.8 N·m or less.



### Interference prevention filter (Exclusively for NX5-M10R□)

- Use the interference prevention filters (optional) when two units of thru-beam type sensors are mounted close together.



- There are two types of interference prevention filters. The two sets of thru-beam type sensors should be fitted with different types of interference prevention filters.

Note: The filters cannot be used for NX5-M30A or NX5-M30B.

### Others

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

CY

Amplifier Built-in  
PX-2

RT-610

Sensor Mounting Stand  
MS-AJ

PM

Micro

PM2

NX5

Multi-voltage  
VF

EQ-500

## PRECAUTIONS FOR PROPER USE

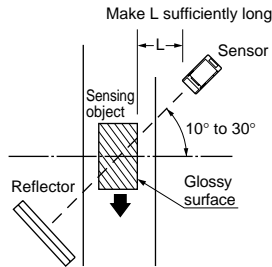
Refer to p.1135~ for general precautions.

### Retroreflective type sensor (NX5-RM7□)

• 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.

※ NX5-PRVM5□ does not need the above adjustment.



### Retroreflective type sensor with polarizing filters (NX5-PRVM5□)

• 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

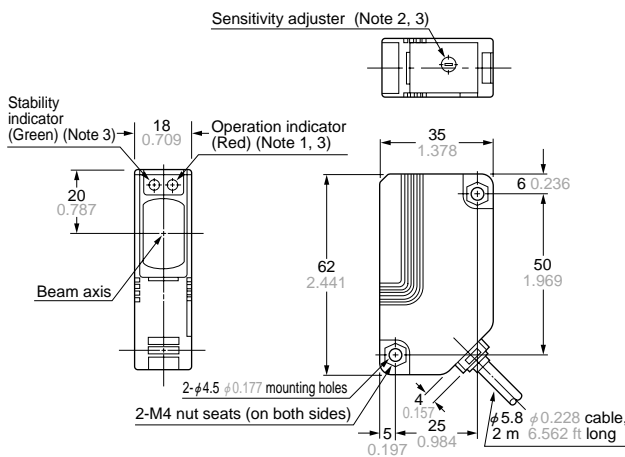
- Tilt the sensor with respect to the sensing object while fitting.
- Reduce the sensitivity.
- Increase the distance between the sensor and the sensing object.

## DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.co.jp/>

NX5-M10RA NX5-M30A  
NX5-M10RB NX5-M30B

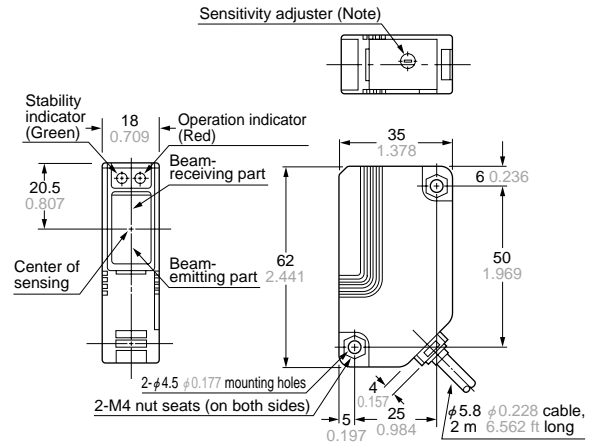
Sensor



Notes: 1) It is the power indicator (red) on the emitter of NX5-M30□.  
2) Not incorporated on NX5-M30□.  
3) Not incorporated on the emitter.

NX5-PRVM5A NX5-RM7A  
NX5-PRVM5B NX5-RM7B

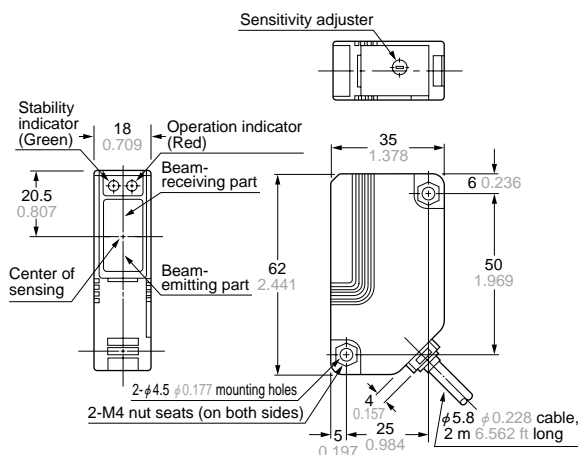
Sensor



Note: Not incorporated on NX5-RM7□.

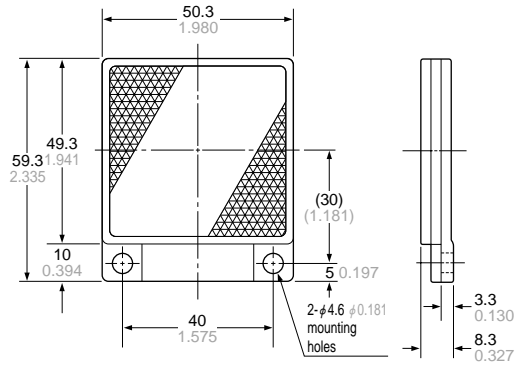
NX5-D700A  
NX5-D700B

Sensor



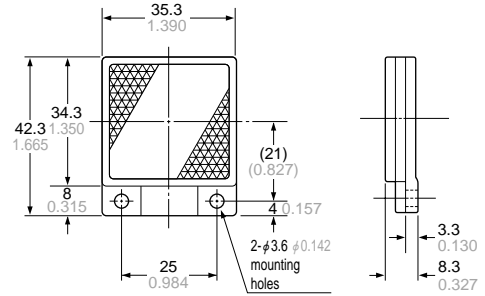
**DIMENSIONS (Unit: mm in)** The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.co.jp/>

**RF-230** Reflector (Accessory for the retroreflective type sensor)



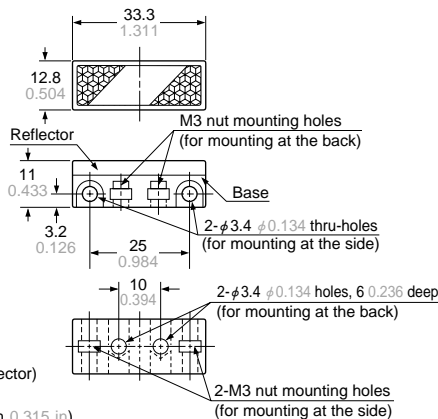
Material: Acrylic (Reflector)  
ABS (Base)

**RF-220** Reflector (Optional)



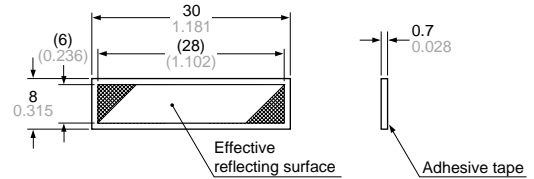
Material: Acrylic (Reflector)  
ABS (Base)

**RF-210** Reflector (Optional)



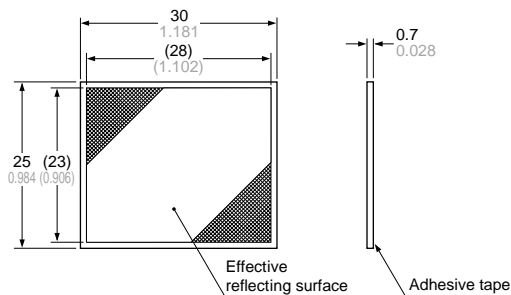
Material: Acrylic (Reflector)  
ABS (Base)  
Two M3 (length 8 mm 0.315 in) screws with washers and two nuts are attached.

**RF-11** Reflective tape (Optional)



Material: Acrylic

**RF-12** Reflective tape (Optional)



Material: Acrylic

Amplifier Built-in

PX-2

RT-610

Sensor/Mounting Stand

MS-AJ

Micro

PM

PM2

Multi-voltage

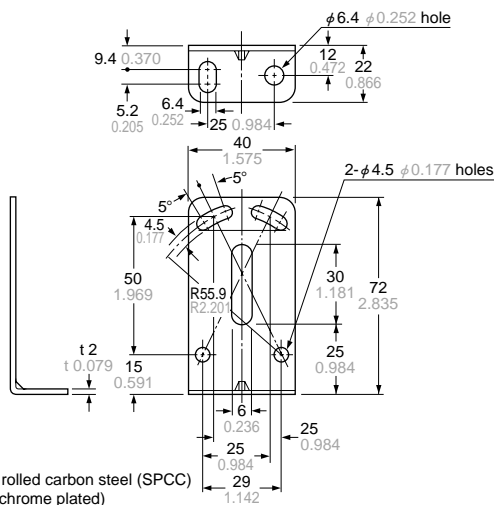
VF

NX5

EQ-500

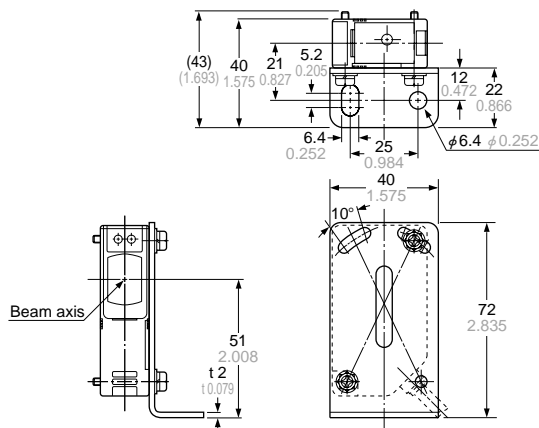
**DIMENSIONS (Unit: mm in)** The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.co.jp/>

### MS-NX5-1 Sensor mounting bracket (Optional)

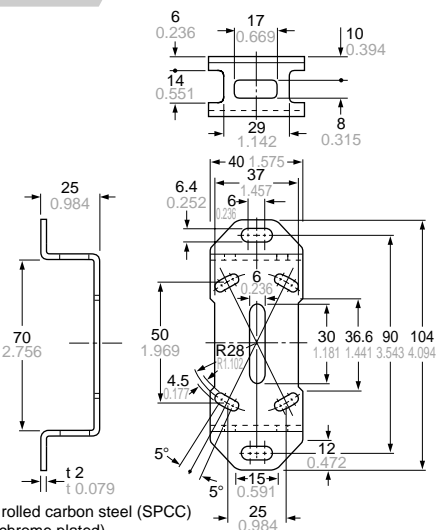


Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)  
Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

### Assembly dimensions Mounting drawing with the receiver of NX5-M10R□

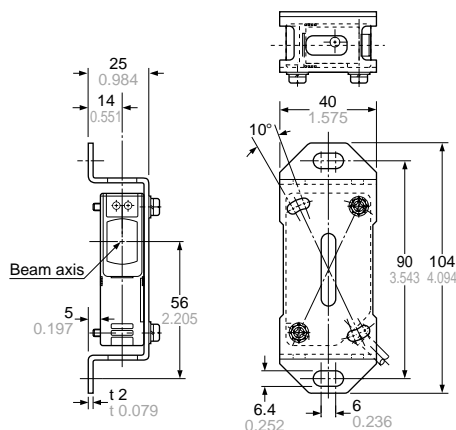


### MS-NX5-2 Sensor mounting bracket (Optional)

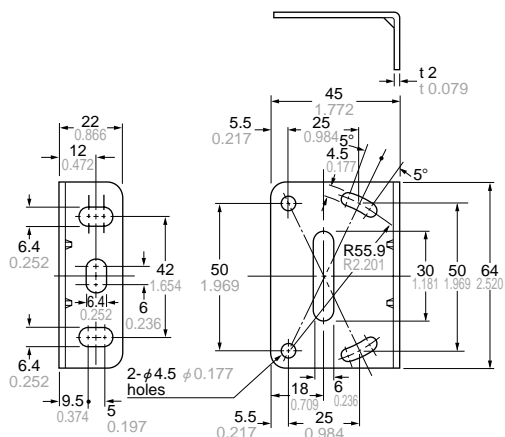


Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)  
Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

### Assembly dimensions Mounting drawing with the receiver of NX5-M10R□

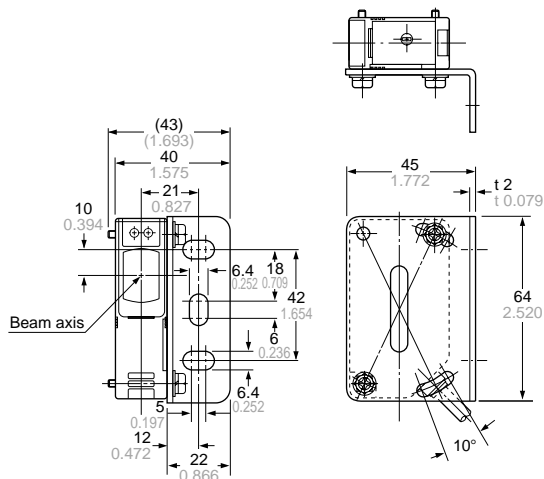


### MS-NX5-3 Sensor mounting bracket (Optional)



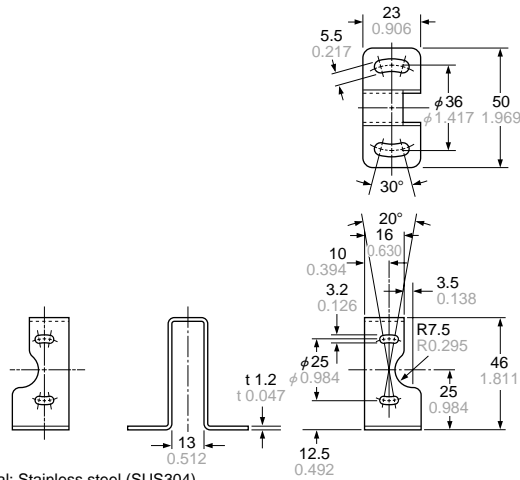
Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)  
Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

### Assembly dimensions Mounting drawing with the receiver of NX5-M10R□

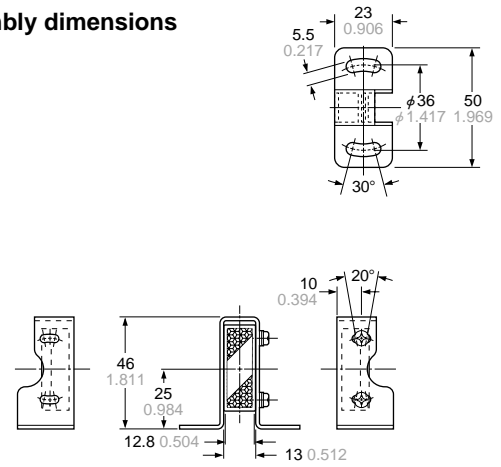


**DIMENSIONS (Unit: mm in)** The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.co.jp/>

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

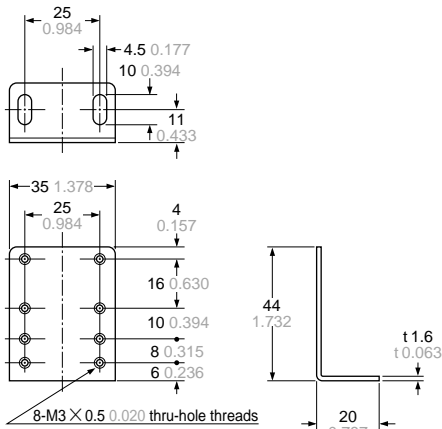


### Assembly dimensions

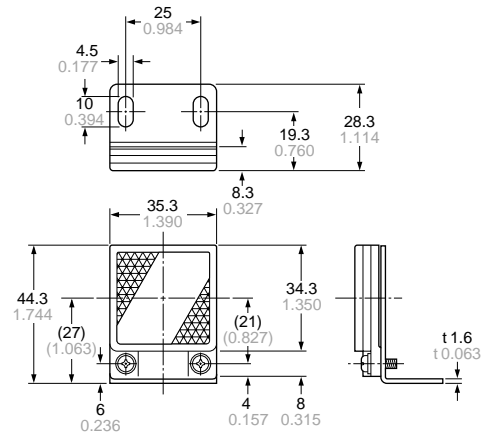


Material: Stainless steel (SUS304)  
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

## MS-RF22 Reflector mounting bracket for RF-220 (Optional)

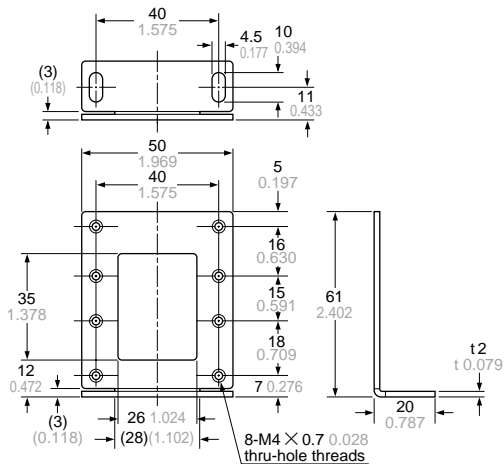


### Assembly dimensions

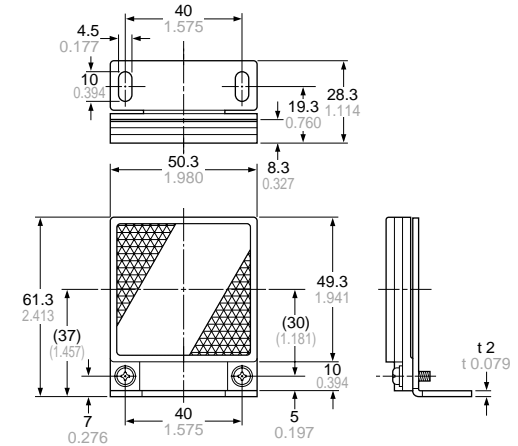


Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)  
Two M3 (length 8 mm 0.315 in) screws with washers are attached.

## MS-RF23 Reflector mounting bracket for RF-230 (Optional)



### Assembly dimensions



Material: Cold rolled carbon steel (SPCC)  
(Uni-chrome plated)  
Two M4 (length 10 mm 0.394 in) screws with washers are attached.