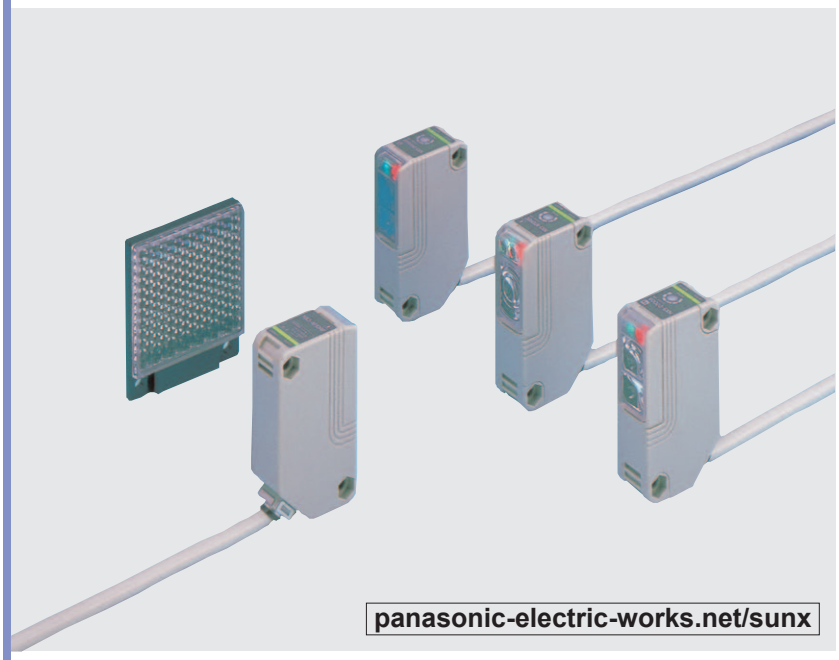
Compact Multi-voltage Photoelectric Sensor Power Supply Built-in

NX5 SERIES

Related Information
■ General terms and conditions..... F-17
■ Glossary of terms / General precautions.....P.1359~ / P.1405
■ Sensor selection guide ..... P.283~
■ China's CCC mark..... P.1409



Conforming to Low Voltage and EMC Directive

Certified

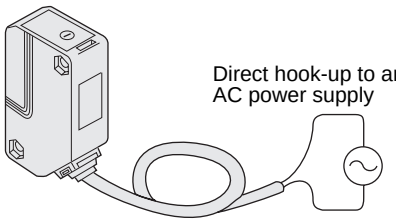
Multi-voltage

Interference prevention

Multi-voltage photoelectric sensor usable worldwide

Multi-voltage

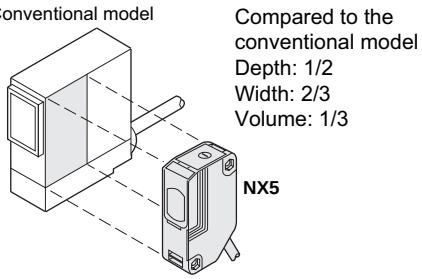
The **NX5** series can operate at 24 to 240 V AC or 12 to 240 V DC, which is suitable for supply voltages around the world.



No need to arrange a DC power supply.

Compact size

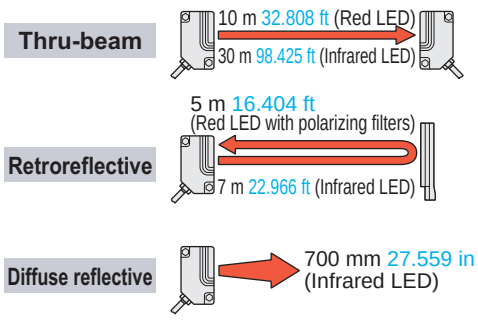
Despite of being multi-voltage, it has a depth of just 35 mm 1.378 in. (W18 × H62 × D35 mm W0.709 × H2.441 × D1.378 in)



BASIC PERFORMANCE

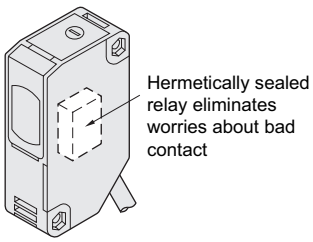
Long sensing range

It is most suitable for conveyor lines and parking lot applications.



High reliability

It has an IP66 protection. Moderate dust or water splashes will not affect the sensor.
The hermetically sealed output relay significantly increases its reliability.



FUNCTIONS / MOUNTING

Easy alignment

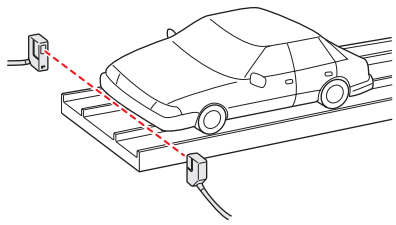
The 10 m 32.808 ft thru-beam type sensor and the 5 m 16.404 ft retroreflective type sensor incorporate a red LED beam source. Beam alignment can be attained by checking the emitted beam visually.

Interference prevention

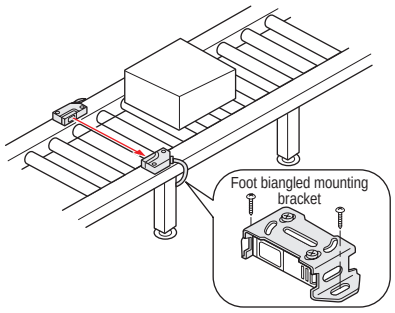
Two sensors can operate normally even if mounted close together.
(Excluding the 30 m 98.425 ft thru-beam type sensor)

APPLICATIONS

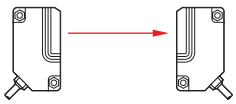
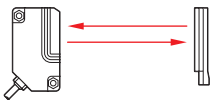
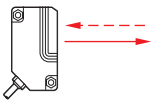
Detecting car position at parking garage



Detecting objects on conveyor line

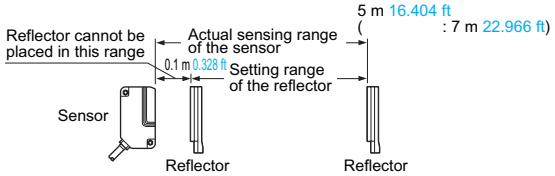


ORDER GUIDE

Type			Appearance	Sensing range	Model No. (Note 2, 3)	Emitting element	Output
Thru-beam		Light-ON		10 m 32.808 ft	**NX5-M10RA**	Red LED	Relay contact 1c
		Dark-ON			**NX5-M10RB**		
	Long sensing range	Light-ON		30 m 98.425 ft	**NX5-M30A**	Infrared LED	
		Dark-ON			**NX5-M30B**		
Retroreflective	With polarizing filters	Light-ON		0.1 to 5 m 0.328 to 16.404 ft (Note 1)	**NX5-PRVM5A**	Red LED	
		Dark-ON			**NX5-PRVM5B**		
	Long sensing range	Light-ON		0.1 to 7 m 0.328 to 22.966 ft (Note 1)	**NX5-RM7A**	Infrared LED	
		Dark-ON			**NX5-RM7B**		
Diffuse reflective		Light-ON		700 mm 27.559 in	**NX5-D700A**	Infrared LED	
		Dark-ON			**NX5-D700B**		

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) The model No. with "**P**" shown on the label affixed to the thru-beam type sensor is the emitter, "**D**" shown on the label is the receiver.
(e.g.) Emitter of **NX5-M10RA**: **NX5-M10RP**,
Receiver of **NX5-M10RA**: **NX5-M10RAD**

3) 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 **"I/O CIRCUIT DIAGRAM AND OUTPUT OPERATION"** 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.
When ordering this type, suffix "**-C5**" to the model No.
(e.g.) 5 m 16.404 ft cable length type of **NX5-M10RA** is "**NX5-M10RA-C5**".

Accessory

• **RF-230** (Reflector)

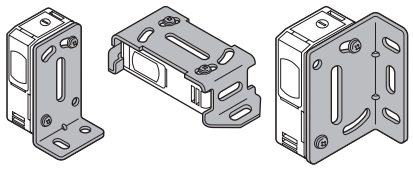
OPTIONS

Designation	Model No.	Description	
Sensor mounting bracket	**MS-NX5-1**	Foot angled mounting bracket (The thru-beam type sensor needs two brackets.)	
	MS-NX5-2	Foot biangled mounting bracket (sensor protection bracket) (The thru-beam type sensor needs two brackets.)	
	MS-NX5-3	Back angled mounting bracket (The thru-beam type sensor needs two brackets.)	
Slit mask (For thru-beam type sensor only)	**OS-NX5-3×6** (Slit size 3 × 6 mm 0.118 × 0.236 in)	Slit on one side	• Sensing range: 3 m 9.843 ft [**NX5-M10R□**] 16 m 52.493 ft [**NX5-M30□**] • Min. sensing object: ø10 mm ø0.394 in [**NX5-M10R□**] ø20 mm ø0.787 in [**NX5-M30□**]
		Slit on both sides	• Sensing range: 1 m 3.281 ft [**NX5-M10R□**] 6 m 19.685 ft [**NX5-M30□**] • Min. sensing object: 3 × 6 mm 0.118 × 0.236 in
Interference prevention filter (For **NX5-M10RA** or **NX5-M10RB** only)	**PF-NX5-V** (Vertical,Silver)	Same type of filters on both sides • Sensing range: 5 m 16.404 ft • Min. sensing object: ø20 mm ø0.787 in (One set consists of 2 pcs. of interference prevention filters.)	
	PF-NX5-H (Horizontal, Light brown)		
Reflector (For retrore-flective type sensor only)	**RF-210**	• Sensing range: 0.1 to 1.5 m 0.328 to 4.921 ft [**NX5-PRVM5□**] 0.1 to 2.5 m 0.328 to 8.202 ft [**NX5-RM7□**] • Min. sensing object: ø30 mm ø1.181 in	
	RF-220	• Sensing range: 0.1 to 3.5 m 0.328 to 11.483 ft [**NX5-PRVM5□**] 0.1 to 5 m 0.328 to 16.404 ft [**NX5-RM7□**] • Min. sensing object: ø35 mm ø1.378 in	
Reflector mounting bracket	**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 retrore-flective type sensor only)	**RF-11**	• Ambient temperature: –25 to +50 °C –13 to +122 °F • Ambient humidity: 35 to 85 % RH Notes • Keep the tape free from stress. If it is pressed too much, its capability may deteriorate. • Do not cut the tape. It will deteriorate the sensing performance.	• Sensing range: 0.1 to 0.8 m 0.328 to 2.625 ft [**NX5-PRVM5□**] 0.1 to 1 m 0.328 to 3.281 ft [**NX5-RM7□**]
	RF-12		• Sensing range: 0.1 to 1 m 0.328 to 3.281 ft [**NX5-PRVM5□**] 0.1 to 1.5 m 0.328 to 4.921 ft [**NX5-RM7□**]
Sensor checker (Note)	**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.	

Note: Refer to the sensor checker **CHX-SC2** pages for details.

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**

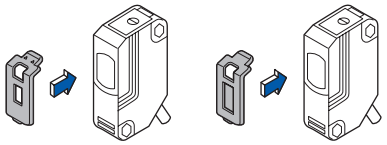
Fitted on the front face of the sensor with one touch.

Interference prevention filter

(For **NX5-M10R□** only)

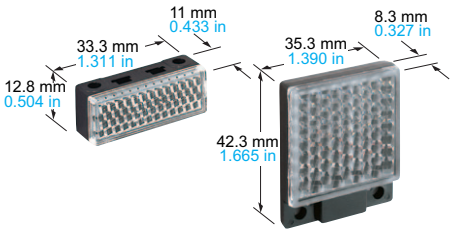
• **PF-NX5-V**(Vertical, Silver color)
• **PF-NX5-H**(Horizontal, Light brown)

Two sets of thru-beam type sensors (Red LED type) can be mounted close together.



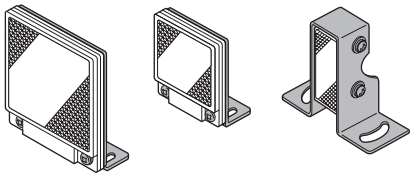
Reflector

• **RF-210** • **RF-220**



Reflector mounting bracket

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



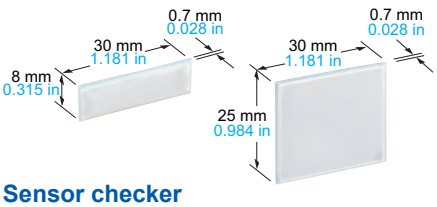
Two M4 (length 10 mm 0.394 in) screws with washers are attached.

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.

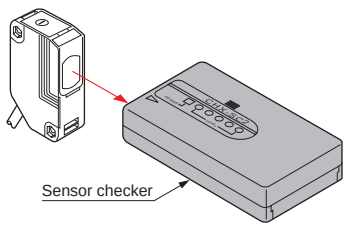
Reflective tape

• **RF-11** • **RF-12**



Sensor checker

• **CHX-SC2**

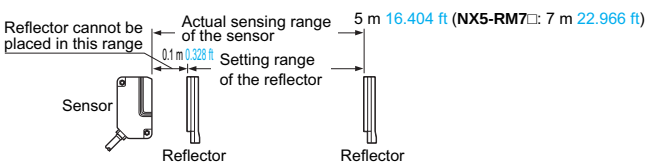


SPECIFICATIONS

Item \ Type	Thru-beam				Retroreflective				Diffuse reflective	
			Long sensing range		With polarizing filters		Long sensing range			
Model No.	NX5-M10RA	NX5-M10RB	NX5-M30A	NX5-M30B	NX5-PRVM5A	NX5-PRVM5B	NX5-RM7A	NX5-RM7B	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 2)		0.1 to 7 m 0.328 to 22.966 ft (Note 2)		700 mm 27.559 in (Note 3)	
Sensing object	ø20 mm ø0.787 in or more opaque object (Note 4)		ø20 mm ø0.787 in or more opaque object (Completely beam interrupted object) (Note 4)		ø50 mm ø1.969 in or more opaque, translucent or specular object (Note 2, 5)		ø50 mm ø1.969 in or more opaque or translucent object (Note 2, 5)		Opaque, translucent or transparent object (Note 5)	
Hysteresis	—								15 % or less of operation distance (Note 3)	
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 $^{+10}_{-15}$ % or 12 to 240 V DC $^{+10}_{-15}$ % 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) 100,000 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)									
Environmental resistance: Protection	IP66 (IEC)									
Environmental resistance: Ambient temperature	–20 to +55 °C – 4 to +131 °F (No dew condensation or icing allowed) (Note 6), Storage: –30 to +70 °C –22 to +158 °F									
Environmental resistance: Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH									
Environmental resistance: Ambient illuminance	Incandescent light: 3,500 ℓx at the light-receiving face									
Environmental resistance: EMC	EN 61000-6-2, EN 61000-6-4									
Environmental resistance: 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									
Environmental resistance: Insulation resistance	20 MΩ, or more, with 500 V DC megger between power supply and output terminals, and between relay contact terminals									
Environmental resistance: Vibration resistance	10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each									
Environmental resistance: Shock resistance	500 m/s² (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)			
Peak emission wavelength	660 nm 0.026 mil		880 nm 0.035 mil		660 nm 0.026 mil		880 nm 0.035 mil			
Material	Enclosure: Polycarbonate, Lens: Polycarbonate, Cover: Polycarbonate, Front cover (retroreflective type sensor only): Acrylic									
Cable	0.3 mm² 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 mm², or more, cable (thru-beam type: both emitter and receiver).									
Net 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) 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 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.



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.

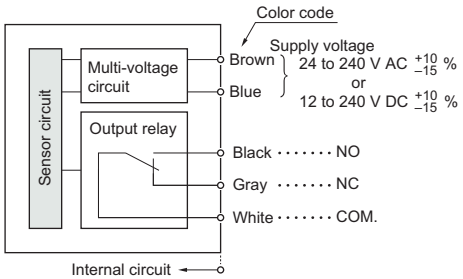
4) If slit masks (optional) are fitted, an object as small as 3 × 6 mm 0.118 × 0.236 in can be detected.

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

6) In case the sensor is to be used at an ambient temperature of –15 °C +5 °F, or less, please contact our office.

I/O CIRCUIT DIAGRAM AND OUTPUT OPERATION

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

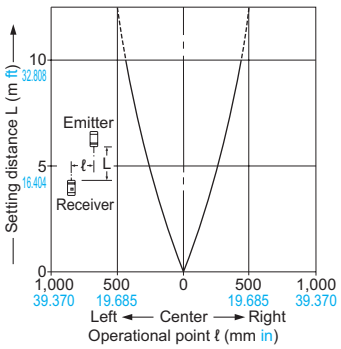
: Object detected state.

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)
Output condition	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

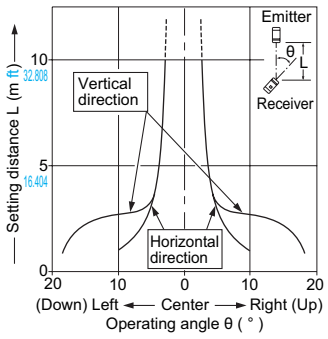
SENSING CHARACTERISTICS (TYPICAL)

NX5-M10RA NX5-M10RB — Thru-beam type

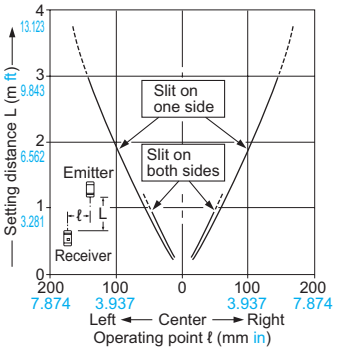
Parallel deviation



Angular deviation

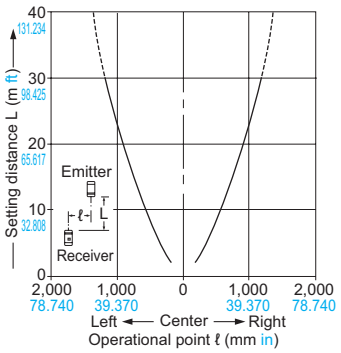


Parallel deviation with slit masks (3 × 6 mm 0.118 × 0.236 in)

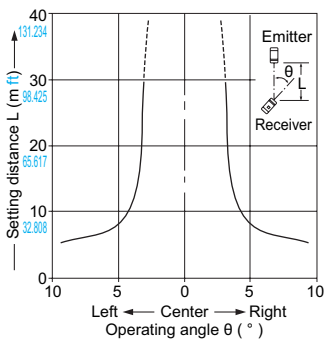


NX5-M30A NX5-M30B — Thru-beam type

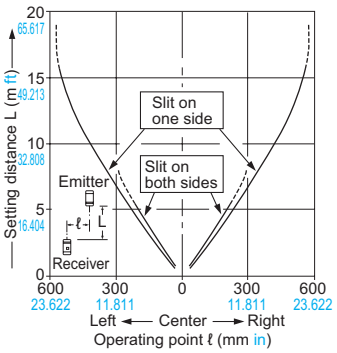
Parallel deviation



Angular deviation



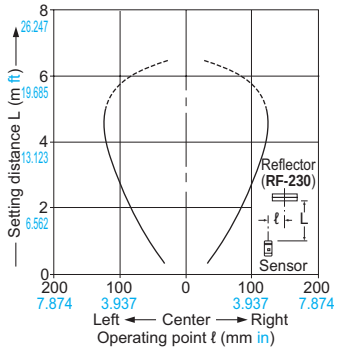
Parallel deviation with slit masks (3 × 6 mm 0.118 × 0.236 in)



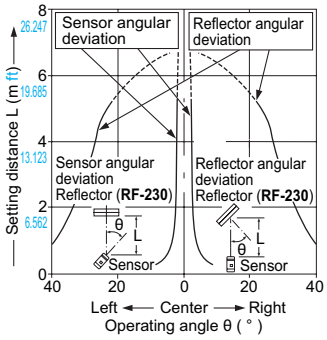
SENSING CHARACTERISTICS (TYPICAL)

NX5-PRVM5A NX5-PRVM5B — Retroreflective type

Parallel deviation

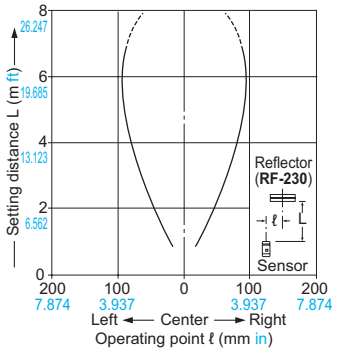


Angular deviation

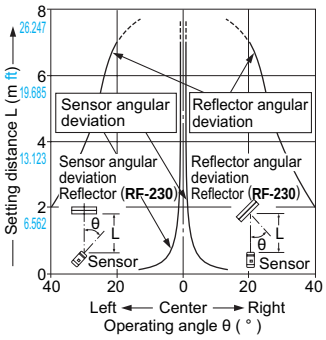


NX5-RM7A NX5-RM7B — Retroreflective type

Parallel deviation

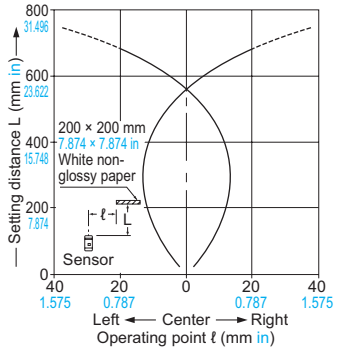


Angular deviation

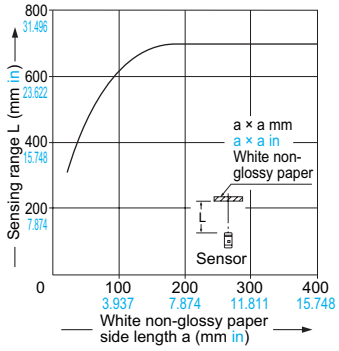


NX5-D700A NX5-D700B — Diffuse reflective type

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 × 200 mm 7.874 × 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 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 700 mm 27.559 in.

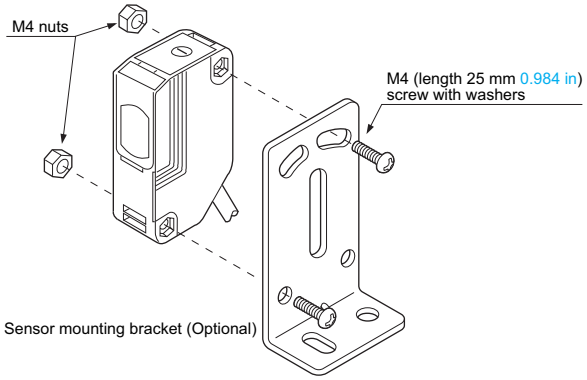
PRECAUTIONS FOR PROPER USE

Refer to 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 0.8 N·m or less.

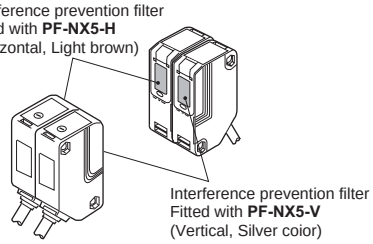


Others

- Do not use during the initial transient time (50 ms) after the power supply is switched on.
- Although the protection degree is specified for the sensor including the cable, the cable end is not waterproof, and is not covered by the protection specified. Hence, make sure that water does not seep in from the cable end.

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. However, take note that the sensing range will become short.
- There are 2 types of interference prevention filters. Install **PF-NX5-H** (Horizontal, Light brown) for 1 set, and install **PF-NX5-V** (Vertical, Silver color) for the other set.



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

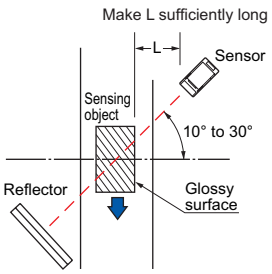
PRECAUTIONS FOR PROPER USE

Refer to 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

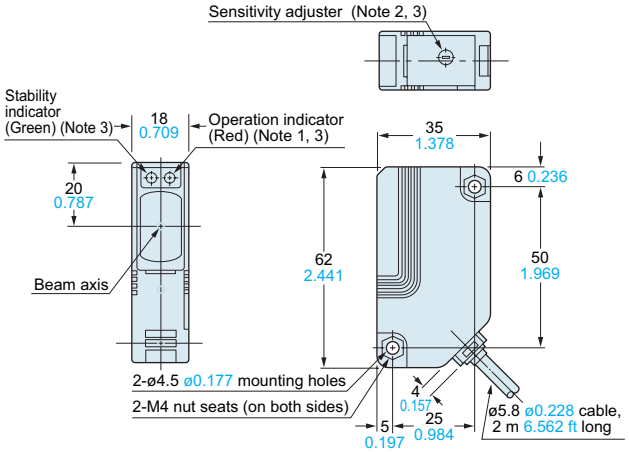
Steps

- 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)

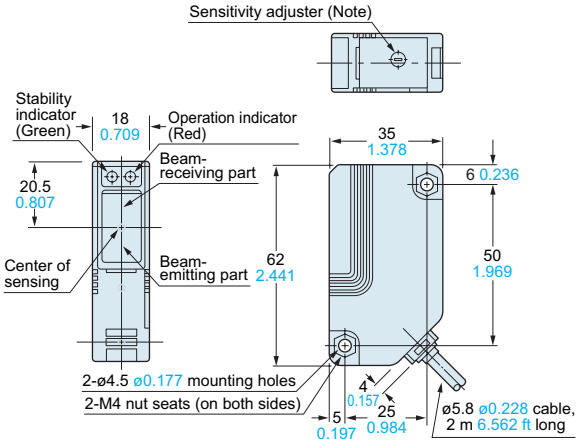
The CAD data in the dimensions can be downloaded from our website.

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



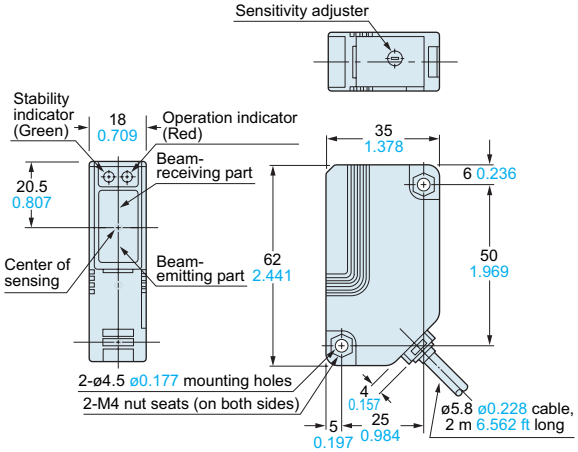
Notes: 1) It is the power indicator (red) on the emitter of **NX5-M30**□.
2) Not incorporated on **NX5-M30**□.
3) Not incorporated on the emitter.

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



Note: Not incorporated on **NX5-RM7**□.

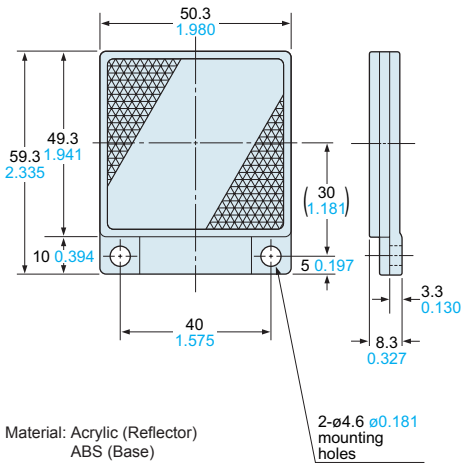
NX5-D700A NX5-D700B Sensor



DIMENSIONS (Unit: mm in)

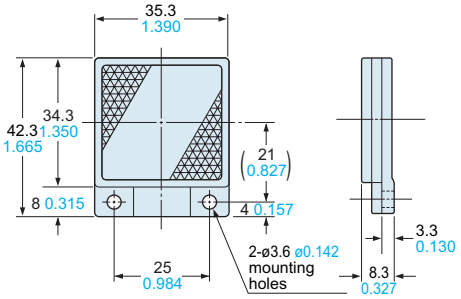
The CAD data in the dimensions can be downloaded from our website.

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



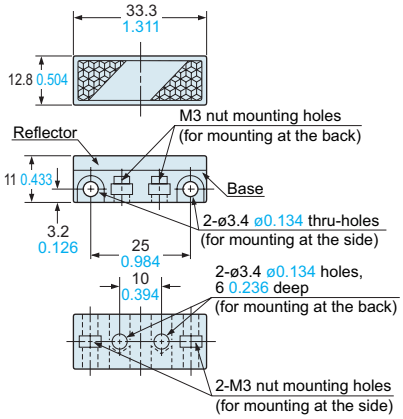
Material: Acrylic (Reflector)
ABS (Base)

RF-220 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

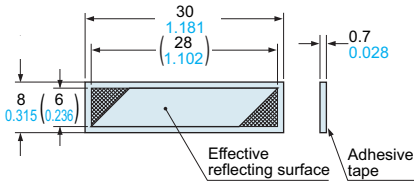
RF-210 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

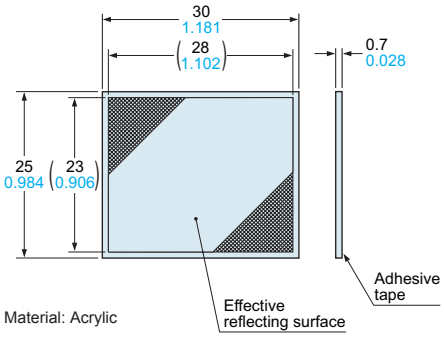
Two M3 (length 8 mm 0.315 in)
screws with washers and two nuts are attached.

RF-11 Reflective tape (Optional)



Material: Acrylic

RF-12 Reflective tape (Optional)



Material: Acrylic