

Amplifier-separated

## Rectangular-shaped Inductive Proximity Sensor

GX-F/H SERIES



# GX-F/H SERIES

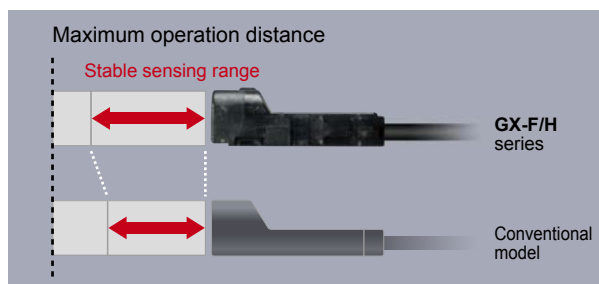


## Industry No. 1\* in stable sensing

\* Based on research conducted by Panasonic Industrial Devices SUNX as of November 2012 among equivalent rectangular inductive sensors.

### Can be installed with ample space

This sensor has the longest stable sensing range among the same level of rectangular inductive proximity sensors in the industry. It is easy to install the sensor.



Type	Maximum operation distance	Stable sensing range	
		GX-F/H series	Conventional model
<b>GX-□6</b>	1.6 mm <b>0.063 in</b>	0 to 1.3 mm <b>0.051 in</b>	0 to 1.2 mm <b>0.047 in</b>
<b>GX-□8</b>	2.5 mm <b>0.098 in</b>	0 to 2.1 mm <b>0.083 in</b>	0 to 1.8 mm <b>0.709 in</b>
<b>GX-□12</b>	4.0 mm <b>0.157 in</b>	0 to 3.3 mm <b>0.130 in</b>	0 to 3.0 mm <b>0.118 in</b>
<b>GX-□15</b>	5.0 mm <b>0.197 in</b>	0 to 4.2 mm <b>0.165 in</b>	0 to 4.0 mm <b>0.157 in</b>
Long sensing range	8.0 mm <b>0.315 in</b>	0 to 6.7 mm <b>0.264 in</b>	0 to 6.4 mm <b>0.252 in</b>

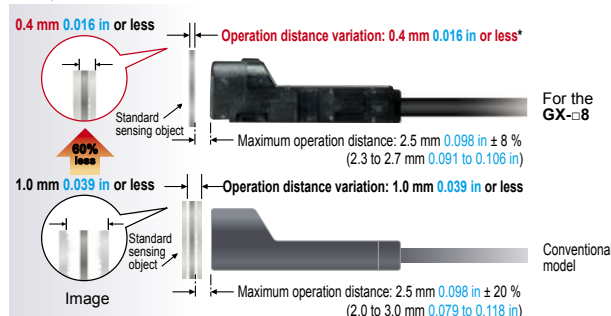
\* With standard sensing object

### Variation at the maximum operation distance is within $\pm 8\%$

Thorough adjustment and control of sensing sensitivity greatly reduces individual sensor differences and variations.

The work of adjusting sensor positions when using multiple sensors and when sensors have been replaced is much easier.

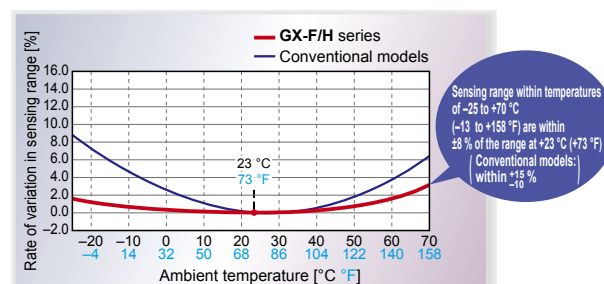
Example: **GX-□8**



### Temperature characteristics vary within $\pm 8\%$

Components such as the sensor coil and core and product design have been totally revised to provide excellent temperature characteristics.

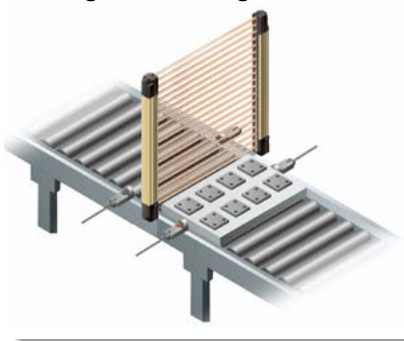
Stable sensing can be obtained regardless of the time of day or the yearly season.



\* Typical

## APPLICATIONS

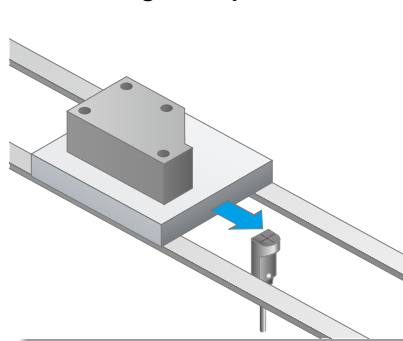
### Muting control of light curtains



### Positioning processing equipment



### Positioning metal pallets

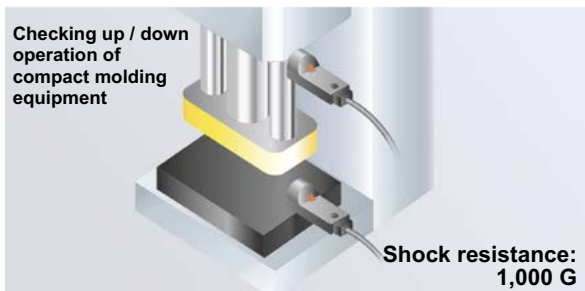


## ENVIRONMENTAL RESISTANCE

### 10 times the durability! (Compared to conventional models)

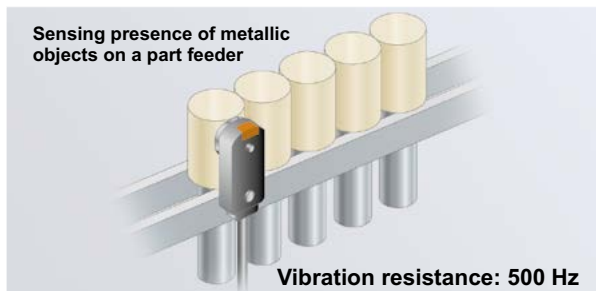
The new integrated construction method used provides shock resistance of 10,000 m/s<sup>2</sup> (approx. 1,000 G in X, Y and Z directions for three times each), and vibration resistance clears durability tests of between 10 and 500 Hz (3 mm 0.118 in double amplitude in X, Y and Z directions for 2 hours each). In addition, resistance to impulse noise is approx. three times greater than for conventional models.

Checking up / down  
operation of  
compact molding  
equipment



Shock resistance:  
1,000 G

Sensing presence of metallic  
objects on a part feeder



Vibration resistance: 500 Hz

### Highly resistant to water or oil! IP68G\* protective construction

The new integrated construction method used improves environmental resistance performance. The IP68G prevents damage to the sensor by stopping water and oil getting inside.

\* For details, refer to the "SPECIFICATIONS (p.7~)".



## FUNCTIONS

### Indicators are easy to see over a wide field of view

A prism with a wide field of view has been developed. This has greatly improved the visibility of the operation indicators.

GX-H□



GX-F□



## MOUNTING

### Tightening strength increased with no damage! (excluding GX-□6)

A metal sleeve has been inserted. It prevents the sensor from being damaged by tightening too much.

GX-□8, GX-□12



Approx. 1.4 times  
greater than before

M3 screw  
Tightening torque: 0.7 N·m or less

GX-□15



M3 screw  
Tightening torque: 1 N·m or less

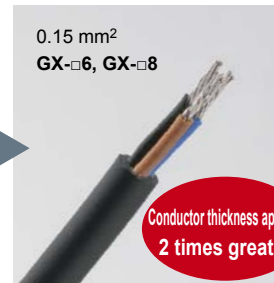
### Conductor thickness doubled to make wiring much easier! (GX-□6 / GX-□8 only)

The conductor's thickness was doubled for the GX-□6 / GX-□8. This makes it easier to handle and perform crimping work on the cables. In addition, the tensile strength of the crimping area has become higher.

0.08 mm<sup>2</sup>  
Conventional model

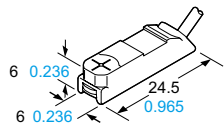
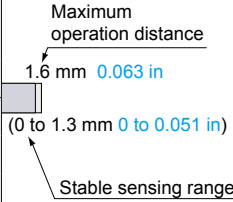
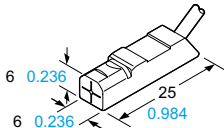
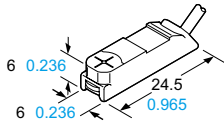
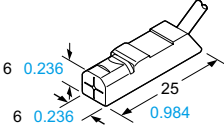


0.15 mm<sup>2</sup>  
GX-□6, GX-□8



Conductor thickness approx.  
2 times greater

**ORDER GUIDE****GX-6 type**

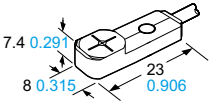
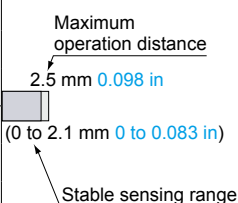
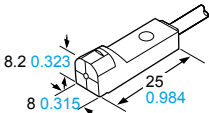
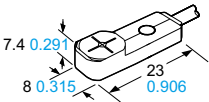
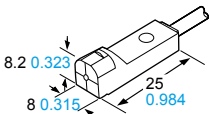
Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
NPN output	Front sensing			GX-F6A	NPN open-collector transistor	Normally open
	Top sensing			GX-F6AI		
				GX-F6B		Normally closed
				GX-F6BI		
				GX-H6A		Normally open
				GX-H6AI		
				GX-H6B		Normally closed
				GX-H6BI		
PNP output	Front sensing			GX-F6A-P	PNP open-collector transistor	Normally open
	Top sensing			GX-F6AI-P		
				GX-F6B-P		Normally closed
				GX-F6BI-P		
				GX-H6A-P		Normally open
				GX-H6AI-P		
			GX-H6B-P			
			GX-H6BI-P	Normally closed		

Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

2) "I" in the model No. indicates a different frequency type.

**GX-8 type**

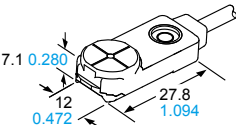
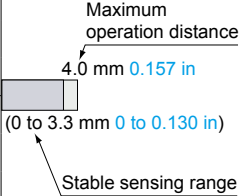
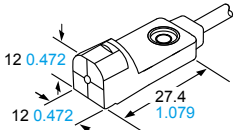
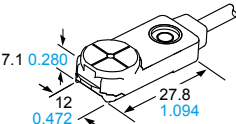
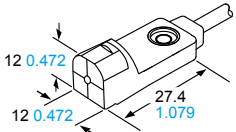
Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
NPN output	Front sensing			GX-F8A	NPN open-collector transistor	Normally open	
				GX-F8AI			
				GX-F8B			Normally closed
				GX-F8BI			
	Top sensing			GX-H8A		Normally open	
				GX-H8AI			
PNP output					GX-H8B	PNP open-collector transistor	Normally closed
					GX-H8BI		
	Front sensing			GX-F8A-P	Normally open		
				GX-F8AI-P			Normally closed
				GX-F8B-P			
				GX-F8BI-P			
	Top sensing		GX-H8A-P	Normally open			
			GX-H8AI-P		Normally closed		
			GX-H8B-P				
				GX-H8BI-P			

Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

2) "I" in the model No. indicates a different frequency type.

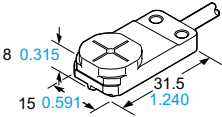
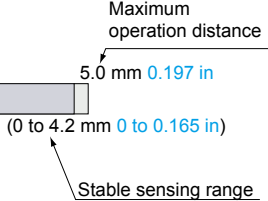
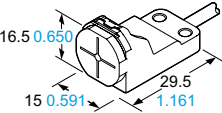
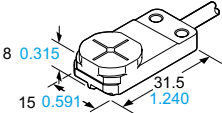
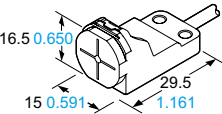
**ORDER GUIDE****GX-12 type**

Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
NPN output	Front sensing			GX-F12A	NPN open-collector transistor	Normally open	
		GX-F12AI		Normally closed			
		GX-F12B					
		GX-F12BI					
	Top sensing			GX-H12A		Normally open	
		GX-H12AI					
	GX-H12B						
	GX-H12BI						
PNP output	Front sensing			(0 to 3.3 mm 0 to 0.130 in)	GX-F12A-P	PNP open-collector transistor	Normally open
				GX-F12AI-P	Normally closed		
				GX-F12B-P			
				GX-F12BI-P			
	Top sensing			GX-H12A-P	Normally open		
			GX-H12AI-P				
			GX-H12B-P				
			GX-H12BI-P	Normally closed			

Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.  
The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

2) "I" in the model No. indicates a different frequency type.

**GX-15 type**

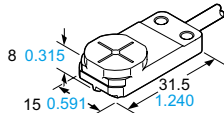
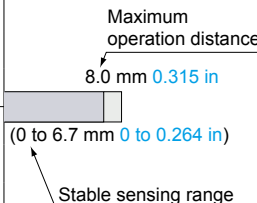
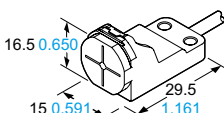
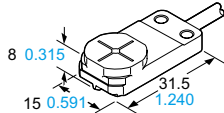
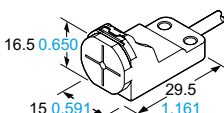
Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
NPN output	Front sensing			GX-F15A	NPN open-collector transistor	Normally open
	Top sensing			GX-F15AI		Normally closed
				GX-F15B		Normally open
				GX-F15BI		Normally closed
				GX-H15A		Normally open
				GX-H15BI		Normally closed
PNP output	Front sensing			GX-F15A-P	PNP open-collector transistor	Normally open
	Top sensing			GX-F15AI-P		Normally closed
				GX-F15B-P		Normally open
				GX-F15BI-P		Normally closed
				GX-H15A-P		Normally open
				GX-H15BI-P		Normally closed

Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.  
The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

2) "I" in the model No. indicates a different frequency type.

## ORDER GUIDE

### GX-15 (Long sensing range) type

Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
NPN output	Front sensing		 <p>Maximum operation distance</p> <p>8.0 mm 0.315 in</p> <p>(0 to 6.7 mm 0 to 0.264 in)</p> <p>Stable sensing range</p>	GX-FL15A	NPN open-collector transistor	Normally open
	Top sensing			GX-FL15AI		Normally closed
				GX-FL15B		Normally open
				GX-FL15BI		Normally closed
				GX-HL15A		Normally open
				GX-HL15AI		Normally closed
PNP output	Front sensing			GX-FL15A-P	PNP open-collector transistor	Normally open
	Top sensing			GX-FL15AI-P		Normally closed
				GX-FL15B-P		Normally open
				GX-FL15BI-P		Normally closed
				GX-HL15A-P		Normally open
				GX-HL15AI-P		Normally closed
			GX-HL15B-P	Normally open		
			GX-HL15BI-P	Normally closed		

Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

2) "I" in the model No. indicates a different frequency type.

### 5 m 16.404 ft cable length type, bending-resistant cable type

5 m 16.404 ft cable length type (standard: 1 m 3.281 ft) and bending-resistant cable (excluding 5 m 16.404 ft cable length type) are available. However, long sensing range type is not available. When ordering 5 m 16.404 ft cable length type, suffix "-C5" to the model No. When ordering bending-resistant cable type, suffix "-R" to the model No.  
(e.g.) 5 m 16.404 ft cable length type of **GX-F15AI-P** is "**GX-F15AI-P-C5**". Bending-resistant cable type of **GX-F15AI-P** is "**GX-F15AI-P-R**".

## OPTIONS

Designation	Model No.	Description
Sensor mounting bracket	<b>MS-GX6-1</b>	Mounting bracket for <b>GX-6</b> type (recommended). Sensors can be mounted closely together for space-saving.
	<b>MS-GL6-1</b>	Mounting brackets for <b>GX-6</b> type
	<b>MS-GL6-2</b>	Sensor mounting brackets for <b>GL-6</b> can be used. Interchange is possible.
	<b>MS-GXL8-4</b>	Mounting bracket for <b>GX-8</b> type
	<b>MS-GXL15</b>	Mounting bracket for <b>GX-15</b> type
Aluminum sheet	<b>MS-A15F</b>	For <b>GX-FL15□(-P)</b>
	<b>MS-A15H</b>	For <b>GX-HL15□(-P)</b>
Mounting sleeve	<b>MS-GX8-1×10</b> 10 pcs. per set	Mounting sleeve for <b>GX-8</b> type Screw, nut, bracket of <b>GXL-8</b> series can be used by inserting the bracket into the mounting hole of <b>GX-8</b> type when replacing 3-wire type <b>GXL-8</b> series (discontinued model) with <b>GX-8</b> type.

### Sensor mounting bracket

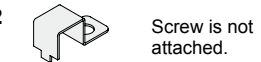
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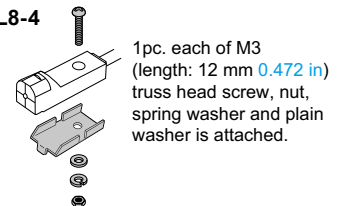
#### • MS-GL6-1



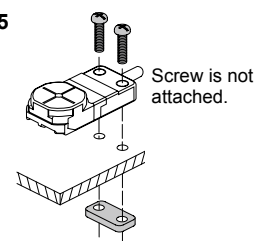
#### • MS-GL6-2



#### • MS-GXL8-4

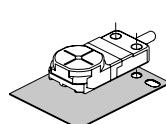


#### • MS-GXL15



### Aluminum sheet

- **MS-A15F**
- **MS-A15H**





## SPECIFICATIONS

### GX-6 type

Item	Model No. (Note 2)	Type	NPN output		PNP output	
		Front sensing	GX-F6A(I)	GX-F6B(I)	GX-F6A(I)-P	GX-F6B(I)-P
		Top sensing	GX-H6A(I)	GX-H6B(I)	GX-H6A(I)-P	GX-H6B(I)-P
CE marking directive compliance			EMC Directive, RoHS Directive			
Max. operation distance (Note 3)			1.6 mm 0.063 in ± 8 %			
Stable sensing range (Note 3)			0 to 1.3 mm 0 to 0.051 in			
Standard sensing object			Iron sheet 12 × 12 × t 1 mm 0.472 × 0.472 × t 0.039 in			
Hysteresis			20 % or less of operation distance (with standard sensing object)			
Repeatability			Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less			
Supply voltage			12 to 24 V DC <sup>+10</sup> <sub>-15</sub> % Ripple P-P 10 % or less			
Current consumption			15 mA or less			
Output		NPN open-collector transistor		PNP open-collector transistor		
		• Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current)		• Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at 100 mA source current)		
		Utilization category				
		DC-12 or DC-13				
		Output operation	Normally open	Normally closed	Normally open	Normally closed
Max. response frequency			400 Hz			
Operation indicator			Orange LED (lights up when the output is ON)			
Environmental resistance	Pollution degree		3 (Industrial environment)			
	Protection		IP68 (IEC), IP68G (Note 4, 5)			
	Ambient temperature		−25 to +70 °C −13 to +158 °F, Storage: −40 to +85 °C −40 to +185 °F			
	Ambient humidity		35 to 85 % RH, Storage: 35 to 95 % RH			
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance		50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance		10 to 500 Hz frequency, 3 mm 0.118 in double amplitude (Max. 20 G) in X, Y and Z directions for two hours each			
	Shock resistance		10,000 m/s <sup>2</sup> acceleration (1,000 G approx.) in X, Y and Z directions three times each			
Sensing range variation	Temperature characteristics	Over ambient temperature range −25 to +70 °C −13 to +158 °F: Within ± 8 % of sensing range at +23 °C +73 °F				
	Voltage characteristics	Within ±2 % for <sup>+10</sup> <sub>-15</sub> % fluctuation of the supply voltage				
Material			Enclosure: PBT, Indicator part: Polyester			
Cable			0.15 mm <sup>2</sup> 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 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.			
Net weight			15 g approx.			

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73 °F**.

2) "I" in the model No. indicates a different frequency type.

3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

4) Panasonic Industrial Devices SUNX's IP68 test method

① Immerse at 0 m below 0 °C **+32 °F** water surface and leave for 30 min. Then, immerse at 0 m below +70 °C **+158 °F** water surface and leave for 30 min.

② Regard the heat shock test in ① as one cycle and perform 20 cycles.

③ Leave in water at a depth of 1 m **3.281 ft** in water for 500 hours.

④ After tests ① to ③, insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.

5) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil.

Please check the resistivity of the sensor against the cutting oil you are using beforehand.

## SPECIFICATIONS

### GX-8 type

Item	Model No. (Note 2)	Type	NPN output		PNP output			
		Front sensing	GX-F8A(I)	GX-F8B(I)	GX-F8A(I)-P	GX-F8B(I)-P		
Top sensing			GX-H8A(I)	GX-H8B(I)	GX-H8A(I)-P	GX-H8B(I)-P		
CE marking directive compliance			EMC Directive, RoHS Directive					
Max. operation distance (Note 3)			2.5 mm 0.098 in ± 8 %					
Stable sensing range (Note 3)			0 to 2.1 mm 0 to 0.083 in					
Standard sensing object			Iron sheet 15 × 15 × t 1 mm 0.591 × 0.591 × t 0.039 in					
Hysteresis			20 % or less of operation distance (with standard sensing object)					
Repeatability			Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less					
Supply voltage			12 to 24 V DC <sup>+10</sup> / <sub>-15</sub> %    Ripple P-P 10 % or less					
Current consumption			15 mA or less					
Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current)		PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at 100 mA source current)			
			Utilization category				DC-12 or DC-13	
			Output operation		Normally open	Normally closed	Normally open	Normally closed
Max. response frequency			500 Hz					
Operation indicator			Orange LED (lights up when the output is ON)					
Environmental resistance	Pollution degree		3 (Industrial environment)					
	Protection		IP68 (IEC), IP68G (Note 4, 5)					
	Ambient temperature		−25 to +70 °C −13 to +158 °F, Storage: −40 to +85 °C −40 to +185 °F					
	Ambient humidity		35 to 85 % RH, Storage: 35 to 95 % RH					
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure					
	Insulation resistance		50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure					
	Vibration resistance		10 to 500 Hz frequency, 3 mm 0.118 in double amplitude (Max. 20 G) in X, Y and Z directions for two hours each					
Shock resistance		10,000 m/s <sup>2</sup> acceleration (1,000 G approx.) in X, Y and Z directions three times each						
Sensing range variation	Temperature characteristics		Over ambient temperature range −25 to +70 °C −13 to +158 °F: Within ± 8 % of sensing range at +23 °C +73 °F					
	Voltage characteristics		Within ±2 % for <sup>+10</sup> / <sub>-15</sub> % fluctuation of the supply voltage					
Material			Enclosure: PBT, Indicator part: Polyester					
Cable			0.15 mm <sup>2</sup> 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 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.					
Net weight			Front sensing type: 15 g approx., Top sensing type: 20 g approx..					

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73 °F**.

2) "I" in the model No. indicates a different frequency type.

3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

4) Panasonic Industrial Devices SUNX's IP68 test method

① Immerse at 0 m below 0 °C **+32 °F** water surface and leave for 30 min. Then, immerse at 0 m below +70 °C **+158 °F** water surface and leave for 30 min.

② Regard the heat shock test in ① as one cycle and perform 20 cycles.

③ Leave in water at a depth of 1 m **3.281 ft** in water for 500 hours.

④ After tests ① to ③, insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.

5) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil.

Please check the resistivity of the sensor against the cutting oil you are using beforehand.



## SPECIFICATIONS

### GX-12 type

Item	Model No. (Note 2)	Type	NPN output		PNP output	
		Front sensing	GX-F12A(I)	GX-F12B(I)	GX-F12A(I)-P	GX-F12B(I)-P
		Top sensing	GX-H12A(I)	GX-H12B(I)	GX-H12A(I)-P	GX-H12B(I)-P
CE marking directive compliance			EMC Directive, RoHS Directive			
Max. operation distance (Note 3)			4.0 mm 0.157 in ± 8 %			
Stable sensing range (Note 3)			0 to 3.3 mm 0 to 0.130 in			
Standard sensing object			Iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in			
Hysteresis			20 % or less of operation distance (with standard sensing object)			
Repeatability			Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less			
Supply voltage			12 to 24 V DC <sup>+10</sup> <sub>−15</sub> %    Ripple P-P 10 % or less			
Current consumption			15 mA or less			
Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current)		PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at 100 mA source current)	
			Utilization category		DC-12 or DC-13	
			Output operation		Normally open	Normally closed
Max. response frequency			500 Hz			
Operation indicator			Orange LED (lights up when the output is ON)			
Environmental resistance	Pollution degree		3 (Industrial environment)			
	Protection		IP68 (IEC), IP68G (Note 4, 5)			
	Ambient temperature		−25 to +70 °C −13 to +158 °F, Storage: −40 to +85 °C −40 to +185 °F			
	Ambient humidity		35 to 85 % RH, Storage: 35 to 95 % RH			
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance		50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance		10 to 500 Hz frequency, 3 mm 0.118 in double amplitude (Max. 20 G) in X, Y and Z directions for two hours each			
	Shock resistance		10,000 m/s <sup>2</sup> acceleration (1,000 G approx.) in X, Y and Z directions three times each			
Sensing range variation	Temperature characteristics		Over ambient temperature range −25 to +70 °C −13 to +158 °F: Within ±8 % of sensing range at +23 °C +73 °F			
	Voltage characteristics		Within ±2 % for <sup>+10</sup> <sub>−15</sub> % fluctuation of the supply voltage			
Material			Enclosure: PBT, Indicator part: Polyester			
Cable			0.15 mm <sup>2</sup> 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 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.			
Net weight			Front sensing type: 20 g approx., Top sensing type: 20 g approx..			

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73 °F**.

2) "I" in the model No. indicates a different frequency type.

3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

4) Panasonic Industrial Devices SUNX's IP68 test method

① Immerse at 0 m below 0 °C **+32 °F** water surface and leave for 30 min. Then, immerse at 0 m below +70 °C **+158 °F** water surface and leave for 30 min.

② Regard the heat shock test in ① as one cycle and perform 20 cycles.

③ Leave in water at a depth of 1 m **3.281 ft** in water for 500 hours.

④ After tests ① to ③, insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.

5) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil.

Please check the resistivity of the sensor against the cutting oil you are using beforehand.

## SPECIFICATIONS

### GX-15 type

		Type	NPN output				PNP output					
			Long sensing range				Long sensing range					
Item	Model No. (Note 2)	Front sensing	GX-F15A(I)	GX-F15B(I)	GX-FL15A(I)	GX-FL15B(I)	GX-F15A(I)-P	GX-F15B(I)-P	GX-FL15A(I)-P	GX-FL15B(I)-P		
		Top sensing	GX-H15A(I)	GX-H15B(I)	GX-HL15A(I)	GX-HL15B(I)	GX-H15A(I)-P	GX-H15B(I)-P	GX-HL15A(I)-P	GX-HL15B(I)-P		
CE marking directive compliance			EMC Directive, RoHS Directive									
Max. operation distance (Note 3)			5.0 mm 0.197 in ± 8 %		8.0 mm 0.315 in ± 8 % (Note 4)		5.0 mm 0.197 in ± 8 %		8.0 mm 0.315 in ± 8 % (Note 4)			
Stable sensing range (Note 3)			0 to 4.2 mm 0 to 0.165 in		0 to 6.7 mm 0 to 0.264 in (Note 4)		0 to 4.2 mm 0 to 0.165 in		0 to 6.7 mm 0 to 0.264 in (Note 4)			
Standard sensing object			Iron sheet 20 × 20 × t 1 mm 0.787×0.787 × t 0.039 in		Iron sheet 30 × 30 × t 1 mm 1.181 × 1.181 × t 0.039 in		Iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in		Iron sheet 30 × 30 × t 1 mm 1.181 × 1.181 × t 0.039 in			
Hysteresis			20 % or less of operation distance (with standard sensing object)									
Repeatability			Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less									
Supply voltage			12 to 24 V DC <sup>+10</sup> <sub>-15</sub> %    Ripple P-P 10 % or less									
Current consumption			15 mA or less									
Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current)				PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at 100 mA source current)					
			Utilization category								DC-12 or DC-13	
			Output operation		Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally closed
Max. response frequency			250 Hz		150 Hz (Note 5)		250 Hz		150 Hz (Note 5)			
Operation indicator			Orange LED (lights up when the output is ON)									
Environmental resistance	Pollution degree		3 (Industrial environment)									
	Protection		IP68 (IEC), IP68G (Note 6, 7)									
	Ambient temperature		-25 to +70 °C -13 to +158 °F, Storage: -40 to +85 °C -40 to +185 °F									
	Ambient humidity		35 to 85 % RH, Storage: 35 to 95 % RH									
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure									
	Insulation resistance		50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure									
	Vibration resistance		10 to 500 Hz frequency, 3 mm 0.118 in double amplitude (Max. 20 G) in X, Y and Z directions for two hours each									
	Shock resistance		10,000 m/s <sup>2</sup> acceleration (1,000 G approx.) in X, Y and Z directions three times each									
Sensing range variation	Temperature characteristics		Over ambient temperature range -25 to +70 °C -13 to +158 °F: Within ± 8 % of sensing range at +23 °C +73 °F									
	Voltage characteristics		Within ±2 % for <sup>+10</sup> <sub>-15</sub> % fluctuation of the supply voltage									
Material			Enclosure: PBT, Indicator part: Polyester									
Cable			0.15 mm <sup>2</sup> 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 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.									
Net weight			20 g approx.									

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73 °F**.

2) "I" in the model No. indicates a different frequency type.

3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.

4) This is the numerical value which the sensor mount onto an insulator. When mounted onto a steel or stainless steel plate, insert the optional aluminum sheet between the sensor and the plate.

5) This is the numerical value which the sensor mount onto an insulator. When mounted onto a metallic plate, max. response frequency will decrease.

6) Panasonic Industrial Devices SUNX's IP68 test method

① Immerse at 0 m below 0 °C **+32 °F** water surface and leave for 30 min. Then, immerse at 0 m below +70 °C **+158 °F** water surface and leave for 30 min.

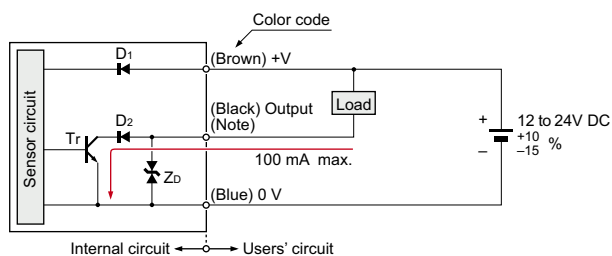
② Regard the heat shock test in ① as one cycle and perform 20 cycles.

③ Leave in water at a depth of 1 m **3.281 ft** in water for 500 hours.

④ After tests ① to ③, insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.

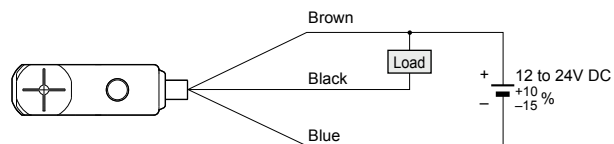
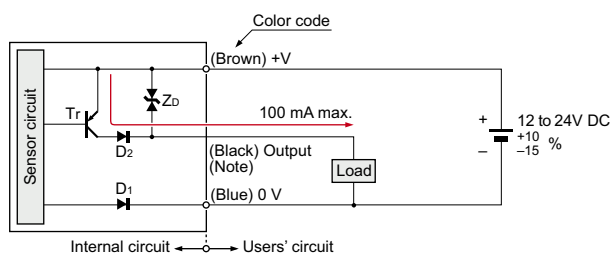
7) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil.

Please check the resistivity of the sensor against the cutting oil you are using beforehand.

**I/O CIRCUIT DIAGRAMS****NPN output type****I/O circuit diagram**

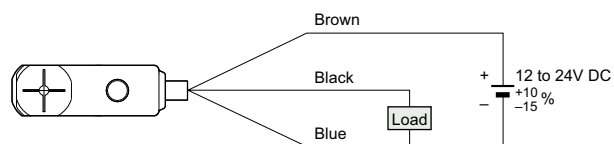
Symbols ... D1: Reverse supply polarity protection diode  
D2: Reverse output polarity protection diode  
Zd: Surge absorption zener diode  
Tr : NPN output transistor

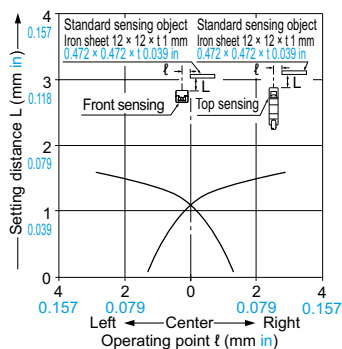
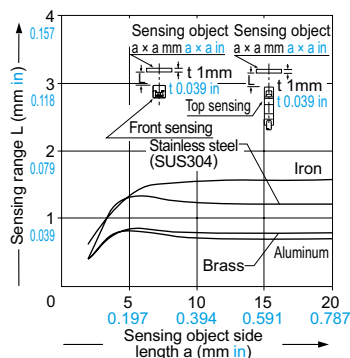
Note: The output does not incorporate a short-circuit protection circuit.  
Do not connect it directly to a power supply or a capacitive load.

**Wiring diagram****PNP output type****I/O circuit diagram**

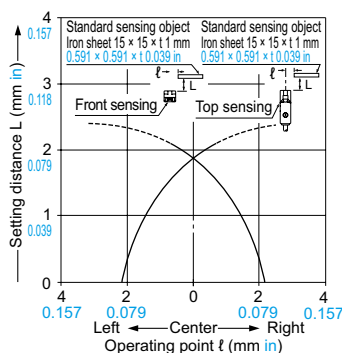
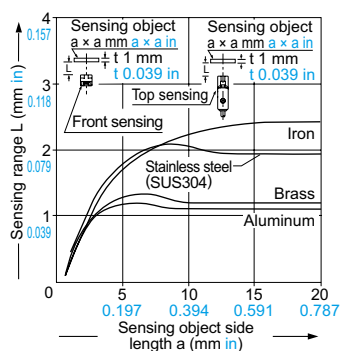
Symbols ... D1: Reverse supply polarity protection diode  
D2: Reverse output polarity protection diode  
Zd: Surge absorption zener diode  
Tr : PNP output transistor

Note: The output does not incorporate a short-circuit protection circuit.  
Do not connect it directly to a power supply or a capacitive load.

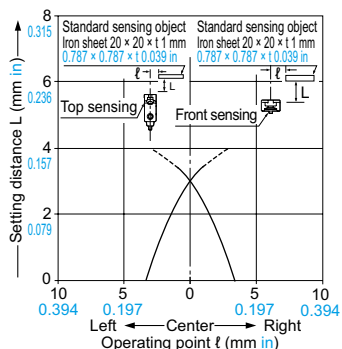
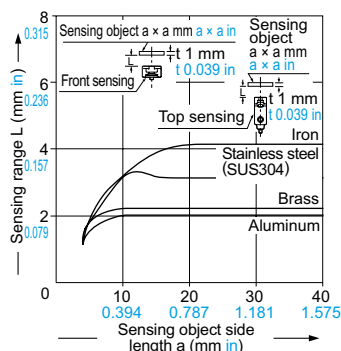
**Wiring diagram**

**SENSING CHARACTERISTICS (TYPICAL)****GX-6 type****Sensing field****Correlation between sensing object size and sensing range**

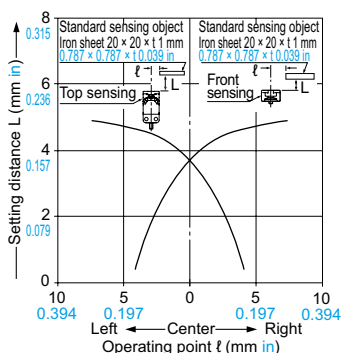
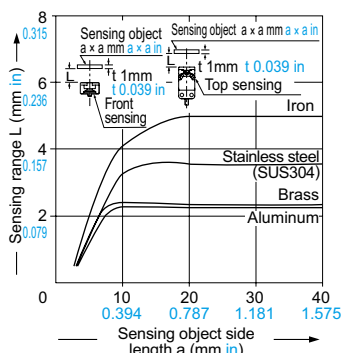
As the sensing object size becomes smaller than the standard size (iron sheet  $12 \times 12 \times t 1$  mm  $0.472 \times 0.472 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

**GX-8 type****Sensing field****Correlation between sensing object size and sensing range**

As the sensing object size becomes smaller than the standard size (iron sheet  $15 \times 15 \times t 1$  mm  $0.591 \times 0.591 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

**GX-12 type****Sensing field****Correlation between sensing object size and sensing range**

As the sensing object size becomes smaller than the standard size (iron sheet  $20 \times 20 \times t 1$  mm  $0.787 \times 0.787 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

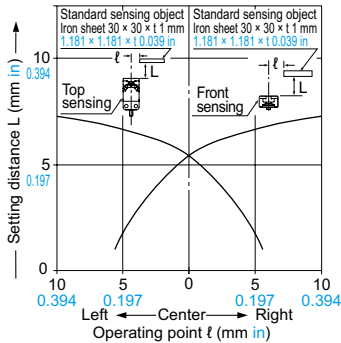
**GX-15 type****Sensing field****Correlation between sensing object size and sensing range**

As the sensing object size becomes smaller than the standard size (iron sheet  $20 \times 20 \times t 1$  mm  $0.787 \times 0.787 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

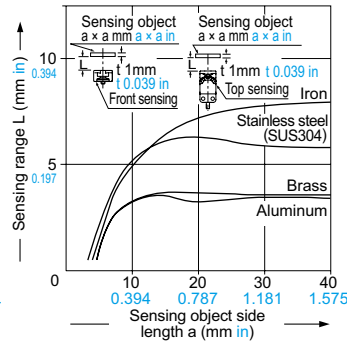
## SENSING CHARACTERISTICS (TYPICAL)

### GX-15 (Long sensing range) type

#### Sensing field



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



As the sensing object size becomes smaller than the standard size (iron sheet 30 × 30 × t 1 mm 1.181 × 1.181 × t 0.039 in), the sensing range shortens as shown in the left figure.

## PRECAUTIONS FOR PROPER USE



- 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

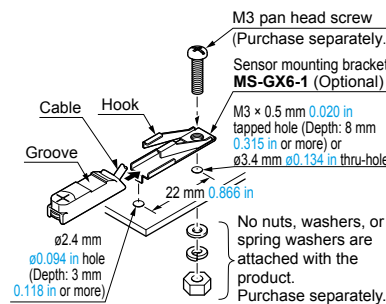
#### GX-6 type

- Use the optional sensor mounting bracket when installing.

#### <When using MS-GX6-1 (Optional / recommended)>

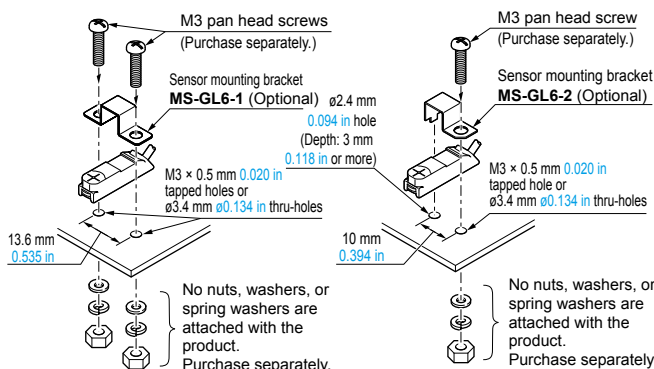
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in.

- ① Insert the sensor into the bracket as shown on the right.
- ② Push the sensor until the bracket hook is lodged in the groove on the upper portion of the sensor.
- ③ Fix the bracket in place with M3 pan head screw.



#### <When using MS-GL6-1 (Optional) / MS-GL6-2 (Optional)>

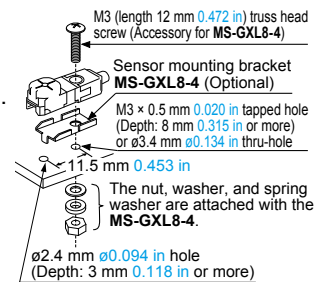
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in.



#### GX-8 type

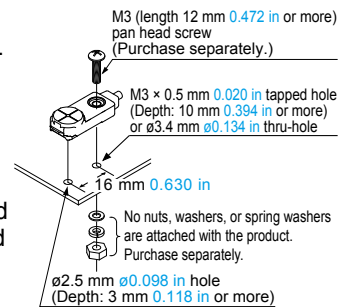
##### <When using MS-GXL8-4 (Optional)>

- Make sure to use a M3 (length: 12 mm 0.472 in or more) truss head screw (accessory for MS-GXL8-4). The tightening torque should be 0.7 N·m or less. (Do not use a flat head screw or a pan head screw.)



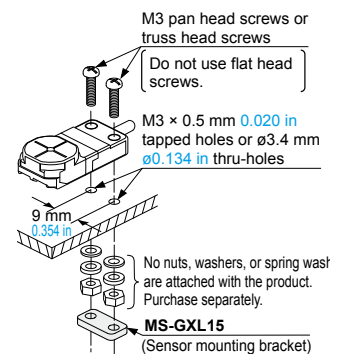
#### GX-12 type

- The tightening torque should be 0.7 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in. Further, the hole in which the boss is inserted should be  $\phi 2.5$  mm  $\phi 0.098$  in and 3 mm 0.118 in, or more, deep.

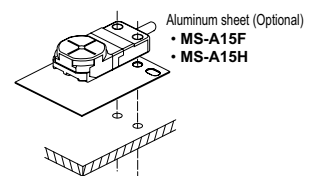


#### GX-15 type

- The tightening torque should be 1 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in.



- When installing the long sensing range type on iron or stainless steel plate, put the optional aluminum sheet in between the sensor and the plate.

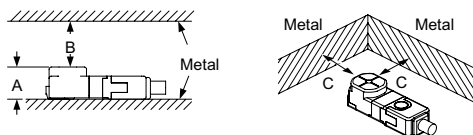


## PRECAUTIONS FOR PROPER USE

### Influence of surrounding metal

- When there is a metal near the sensor, keep the minimum separation distance specified below.

#### Front sensing type

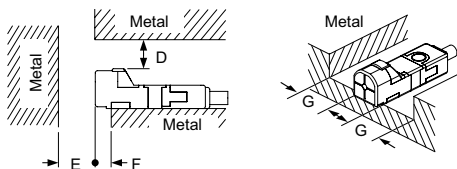


	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
A	6 mm <b>0.236 in</b> (Note 1)	7.4 mm <b>0.291 in</b>	7.1 mm <b>0.280 in</b>	8 mm <b>0.315 in</b>	8 mm <b>0.315 in</b> (Note 2)
B	8 mm <b>0.315 in</b>	8 mm <b>0.315 in</b>	20 mm <b>0.787 in</b>	20 mm <b>0.787 in</b>	30 mm <b>1.181 in</b>
C	3 mm <b>0.118 in</b>	3 mm <b>0.118 in</b>	7 mm <b>0.276 in</b>	7 mm <b>0.276 in</b>	10 mm <b>0.394 in</b>

Notes: 1) When using **MS-GX6-1** (recommended mounting bracket, optional), the distance "A" including the thickness of mounting bracket will be 6.4 mm **0.252 in**.

2) The **GXL-FL15** type should be mounted on an insulator. To mount it on an iron or stainless steel, use the enclosed aluminum sheet.

#### Top sensing type



	GX-H6 type	GX-H8 type	GX-H12 type	GX-H15 type	GX-HL15 type
D	3 mm <b>0.118 in</b>	4 mm <b>0.157 in</b>	7 mm <b>0.276 in</b>	6 mm <b>0.236 in</b>	12 mm <b>0.472 in</b>
E	10 mm <b>0.394 in</b>	10 mm <b>0.394 in</b>	20 mm <b>0.787 in</b>	20 mm <b>0.787 in</b>	30 mm <b>1.181 in</b>
F	2 mm <b>0.079 in</b>	3 mm <b>0.118 in</b>	3 mm <b>0.118 in</b>	0 mm <b>0 in</b>	10 mm <b>0.394 in</b> (Note)
G	2 mm <b>0.079 in</b>	3 mm <b>0.118 in</b>	3 mm <b>0.118 in</b>	3 mm <b>0.118 in</b>	10 mm <b>0.394 in</b>

Note: When **GX-HL15** type is mounted on an insulator or seated on the enclosed aluminum sheet, the distance "F" can be zero.

### Mutual interference prevention

- When two or more sensors are installed in parallel or face to face, keep the minimum separation distance specified below to avoid mutual interference.

	H	J
<b>GX-F6</b> <b>GX-H6</b> type	Between "I" type and non "I" type (Note 2)	0 mm <b>0.591 in</b>
	Between two "I" types or two non "I" types	13 mm <b>0.512 in</b>
<b>GX-F8</b> <b>GX-H8</b> type	Between "I" type and non "I" type (Note 2)	0 mm <b>0.591 in</b>
	Between two "I" types or two non "I" types	20 mm <b>0.787 in</b>
<b>GX-F12</b> <b>GX-H12</b> type	Between "I" type and non "I" type (Note 2)	0 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types	25 mm <b>0.984 in</b>
<b>GX-F15</b> <b>GX-H15</b> type	Between "I" type and non "I" type (Note 2)	0 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types	45 mm <b>1.772 in</b>
<b>GX-FL15</b> <b>GX-HL15</b> type	Between "I" type and non "I" type (Note 2)	0 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types	110 mm <b>3.059 in</b>

Notes: 1) "I" in the model No. specifies the different frequency type.

2) Close mounting is possible for up to two sensors. When mounting three sensors or more at an equal spacing, align the model with "I" and the model without "I" alternately. The minimum value of dimension "H" should be as given below.

**GX-F6/H6** type: 3.5 mm **0.138 in**

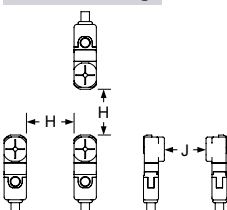
**GX-F8/H8** type: 6 mm **0.236 in**

**GX-F12/H12** type: 6.5 mm **0.256 in**

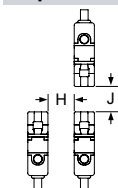
**GX-F15/H15** type: 15 mm **0.591 in**

**GX-FL15/HL15** type: 47.5 mm **1.870 in**

#### Front sensing



#### Top sensing



### Sensing range

- The sensing range is specified for the standard sensing object. With a non-ferrous metal, the sensing range is obtained by multiplying with the correction coefficient specified below. Further, the sensing range also changes if the sensing object is smaller than the standard sensing object or if the sensing object is plated.

#### Correction coefficient

Model No.	GX-F6 GX-H6 type	GX-F8 GX-H8 type	GX-F12 GX-H12 type	GX-F15 GX-H15 type	GX-FL15 type	GX-HL15 type
Metal						
Iron	1	1	1	1	1	1
Stainless steel (SUS304)	0.76 approx.	0.76 approx.	0.79 approx.	0.68 approx.	0.70 approx.	0.76 approx.
Brass	0.50 approx.	0.50 approx.	0.56 approx.	0.47 approx.	0.45 approx.	0.50 approx.
Aluminum	0.48 approx.	0.48 approx.	0.53 approx.	0.45 approx.	0.43 approx.	0.48 approx.

### Wiring

- The output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

### Others

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

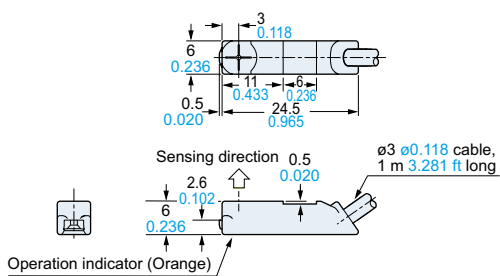


## DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

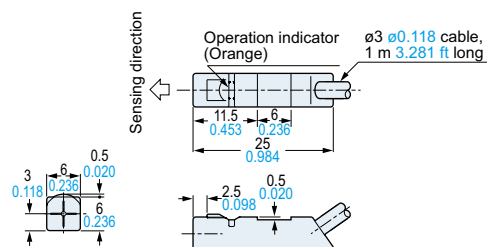
GX-F6□

Sensor



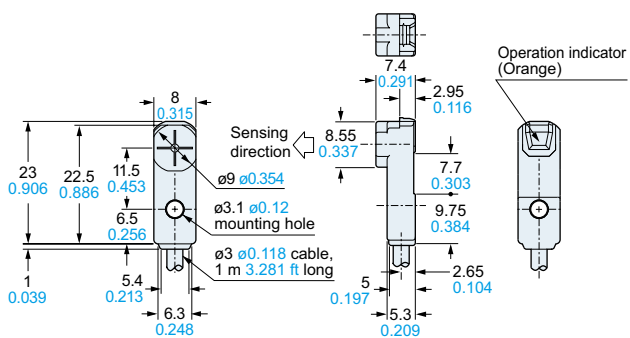
GX-H6□

Sensor



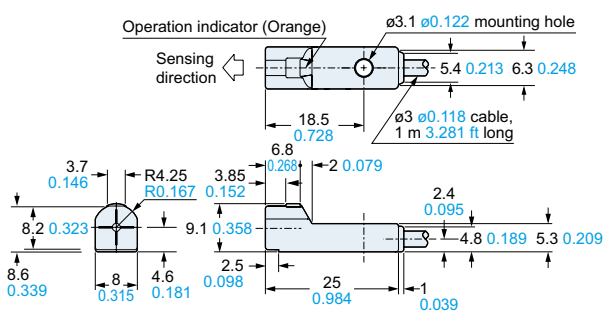
GX-F8□

Sensor



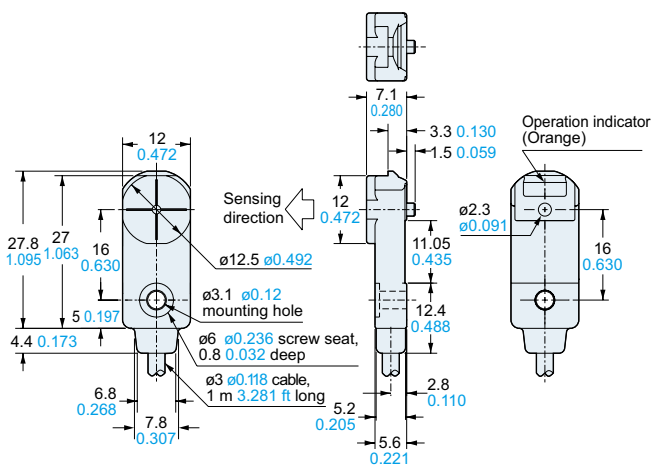
GX-H8□

Sensor



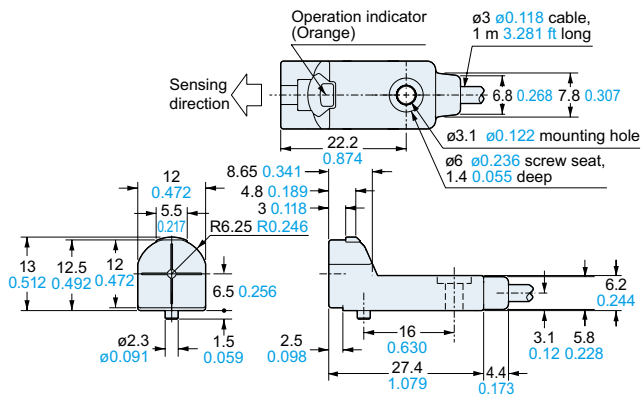
GX-F12□

Sensor



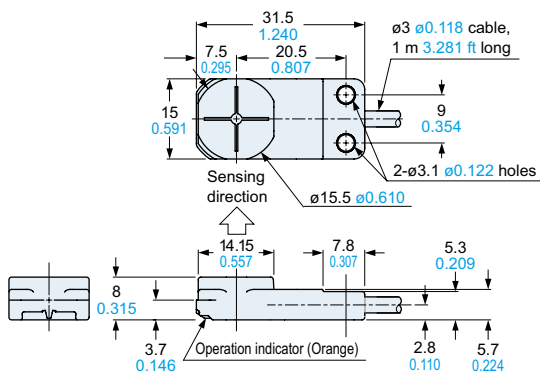
GX-H12□

Sensor



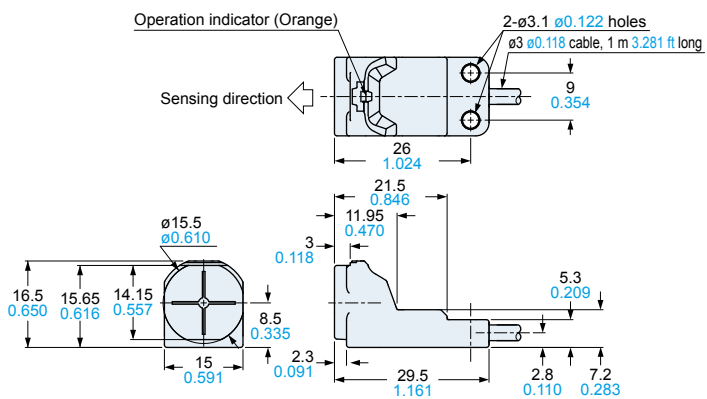
**GX-F(L)15** 

Sensor



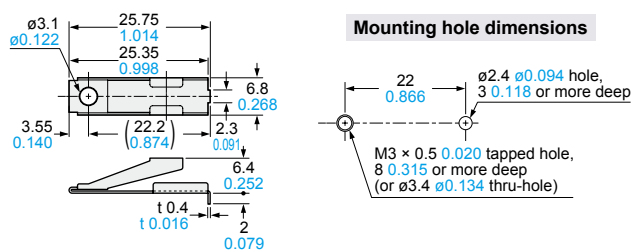
**GX-H(L)15□**

Sensor

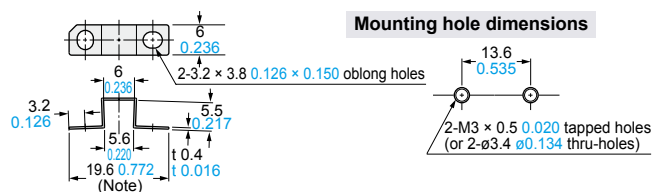


**DIMENSIONS (Unit: mm in)**

The CAD data can be downloaded from our website.

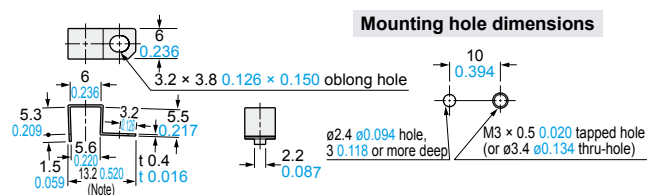
**MS-GX6-1** Sensor mounting bracket for GX-6 type (Optional)

Material: Stainless steel (SUS304)

**MS-GL6-1** Sensor mounting bracket for GX-6 type (Optional)

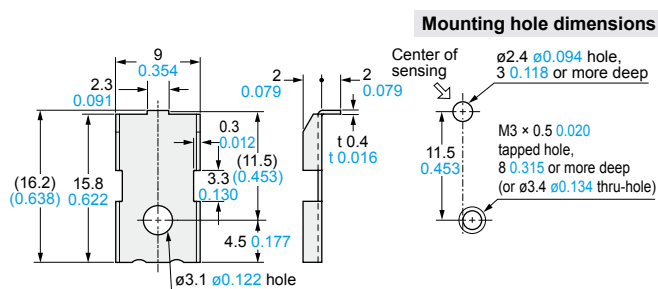
Material: Stainless steel (SUS301)

Note: 20 mm 0.787 in with the sensor fitted.

**MS-GL6-2** Sensor mounting bracket for GX-6 type (Optional)

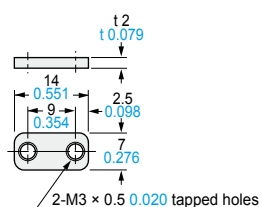
Material: Stainless steel (SUS301)

Note: 13.4 mm 0.528 in with the sensor fitted.

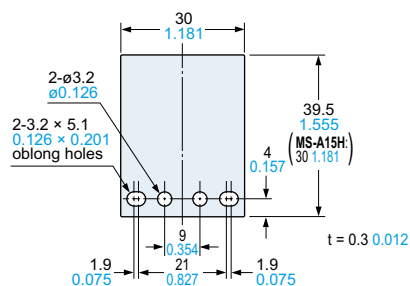
**MS-GXL8-4** Sensor mounting bracket for GX-8 type (Optional)

Material: Stainless steel (SUS304)

1 pc. each of M3 (length 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

**MS-GXL15** Sensor mounting bracket for GX-15 type (Optional)

Material: Cold rolled carbon steel (SPCC)

**MS-A15F MS-A15H** Aluminum sheet (Optional)

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