

# GX-F/H SERIES

Related Information

- General terms and conditions..... F-3
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- Glossary of terms..... P.1576~
- General precautions..... P.1579~



[panasonic.net/id/pidsx/global](http://panasonic.net/id/pidsx/global)



## 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

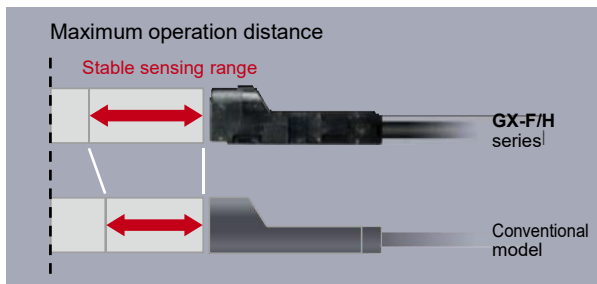
This sensor has the longest stable sensing range among the same level of rectangular inductive proximity sensors in the industry. It is easy to install the sensor.

### Variation at the maximum operation distance is within ±8 %

\* With standard sensing object

### Temperature characteristics vary within ±8 %

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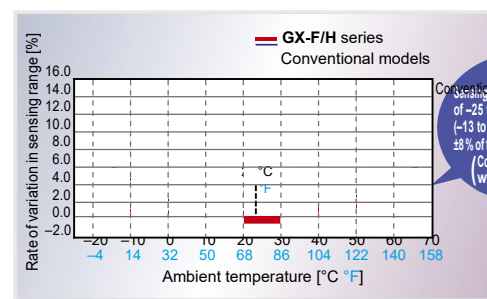
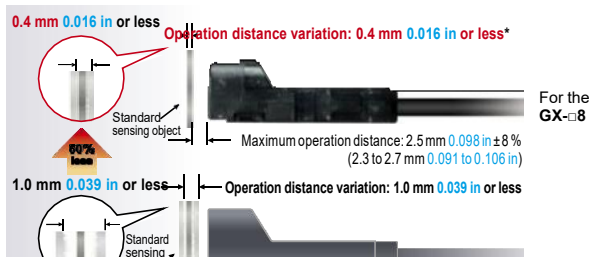


Type	Maximum operation distance	Stable sensing range	
		GX-F/H series	Conventional model
GX-□6	1.6 mm 0.063 in	0 to 1.3 mm 0.051 in	0 to 1.2 mm 0.047 in
GX-□8	2.5 mm 0.098 in	0 to 2.1 mm 0.083 in	0 to 1.8 mm 0.709 in
GX-□12	4.0 mm 0.157 in	0 to 3.3 mm 0.130 in	0 to 3.0 mm 0.118 in
GX-□15	5.0 mm 0.197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

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.

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.

Example: GX-□8



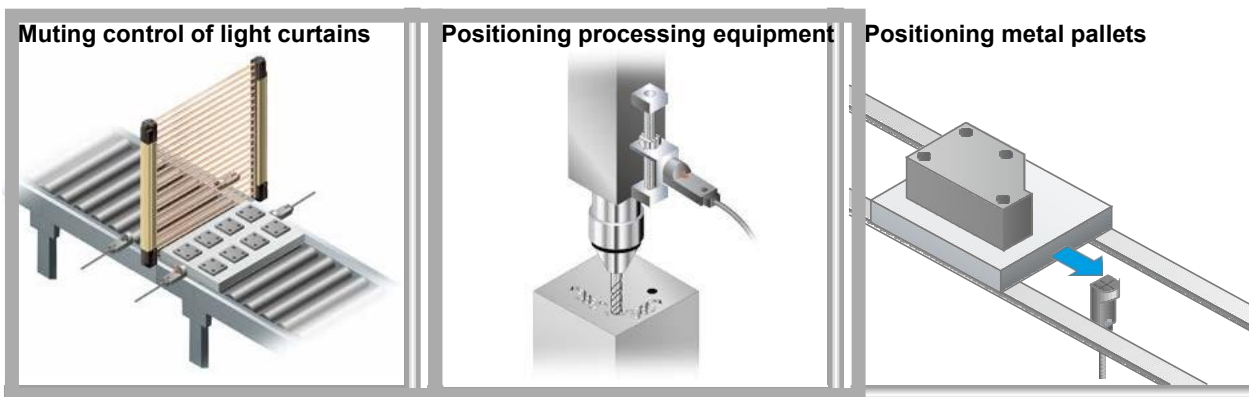
Conventional model temperatures of -25 to +70 °C (-13 to +158 °F) are within ±8% of the range at +23 °C (+73 °F) (Conventional models: within ±8%)

- GX-F/H
- GXL
- GL
- GX-M
- GX-U/GX-FU/
- GX-N
- GX





## APPLICATIONS



## ENVIRONMENTAL RESISTANCE

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

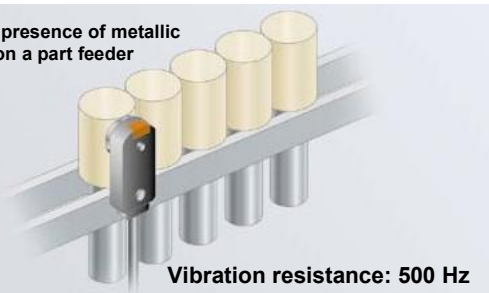
The new integrated construction method used provides shock resistance of 10,000 m/s<sup>2</sup> (approx. 1,000 G in X, Y and Z directions for three times each), and vibration resistance clears durability tests of between 10 and 500 Hz (3 mm 0.118 in double amplitude in X, Y and Z directions for 2 hours 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.790~)".



## 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

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GXL

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GX-M

GX-U/GX-FU/

GX-N

GX

**ORDER GUIDE**

**GX-6 type**

Type	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
NPN output	Front sensing 	Maximum operation distance 1.6 mm 0.063 in Stable sensing range (0 to 1.3 mm 0 to 0.051 in)	<b>GX-F6A</b>	NPN open-collector transistor	Normally open
			<b>GX-F6AI</b>		Normally closed
			<b>GX-F6B</b>		Normally open
	<b>GX-F6BI</b>		Normally closed		
	Top sensing 		<b>GX-H6A</b>		Normally open
			<b>GX-H6AI</b>		Normally closed
<b>GX-H6B</b>		Normally open			
PNP output	Front sensing 	Maximum operation distance 1.6 mm 0.063 in Stable sensing range (0 to 1.3 mm 0 to 0.051 in)	<b>GX-F6A-P</b>	PNP open-collector transistor	Normally open
			<b>GX-F6AI-P</b>		Normally closed
			<b>GX-F6B-P</b>		Normally open
	<b>GX-F6BI-P</b>		Normally closed		
	Top sensing 		<b>GX-H6A-P</b>		Normally open
			<b>GX-H6AI-P</b>		Normally closed
<b>GX-H6B-P</b>		Normally open			
<b>GX-H6BI-P</b>	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 	Maximum operation distance 2.5 mm 0.098 in Stable sensing range (0 to 2.1 mm 0 to 0.083 in)	<b>GX-F8A</b>	NPN open-collector transistor	Normally open
			<b>GX-F8AI</b>		Normally closed
			<b>GX-F8B</b>		Normally open
	<b>GX-F8BI</b>		Normally closed		
	Top sensing 		<b>GX-H8A</b>		Normally open
			<b>GX-H8AI</b>		Normally closed
<b>GX-H8B</b>		Normally open			
PNP output	Front sensing 	Maximum operation distance 2.5 mm 0.098 in Stable sensing range (0 to 2.1 mm 0 to 0.083 in)	<b>GX-F8A-P</b>	PNP open-collector transistor	Normally open
			<b>GX-F8AI-P</b>		Normally closed
			<b>GX-F8B-P</b>		Normally open
	<b>GX-F8BI-P</b>		Normally closed		
	Top sensing 		<b>GX-H8A-P</b>		Normally open
			<b>GX-H8AI-P</b>		Normally closed
<b>GX-H8B-P</b>		Normally open			
<b>GX-H8BI-P</b>	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.

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- GX-L
- GX

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**GX-12 type**

Type	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation			
NPN output	Front sensing 	<p>Maximum operation distance 4.0 mm 0.157 in</p> <p>Stable sensing range (0 to 3.3 mm 0 to 0.130 in)</p>	<b>GX-F12A</b>	NPN open-collector transistor	Normally open			
			<b>GX-F12AI</b>		Normally closed			
	<b>GX-F12B</b>		Normally open					
	<b>GX-F12BI</b>		Normally closed					
	<b>GX-H12A</b>		Normally open					
	<b>GX-H12AI</b>		Normally closed					
Top sensing 			<b>GX-H12B</b>		Normally open			
			<b>GX-H12BI</b>		Normally closed			
PNP output			Front sensing 			<b>GX-F12A-P</b>	PNP open-collector transistor	Normally open
						<b>GX-F12AI-P</b>		Normally closed
			<b>GX-F12B-P</b>			Normally open		
			<b>GX-F12BI-P</b>			Normally closed		
	<b>GX-H12A-P</b>	Normally open						
	<b>GX-H12AI-P</b>	Normally closed						
Top sensing 			<b>GX-H12B-P</b>		Normally open			
			<b>GX-H12BI-P</b>		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 	<p>Maximum operation distance 5.0 mm 0.197 in</p> <p>Stable sensing range (0 to 4.2 mm 0 to 0.165 in)</p>	<b>GX-F15A</b>	NPN open-collector transistor	Normally open			
			<b>GX-F15AI</b>		Normally closed			
	<b>GX-F15B</b>		Normally open					
	<b>GX-F15BI</b>		Normally closed					
	<b>GX-H15A</b>		Normally open					
	<b>GX-H15AI</b>		Normally closed					
Top sensing 			<b>GX-H15B</b>		Normally open			
			<b>GX-H15BI</b>		Normally closed			
PNP output			Front sensing 			<b>GX-F15A-P</b>	PNP open-collector transistor	Normally open
						<b>GX-F15AI-P</b>		Normally closed
			<b>GX-F15B-P</b>			Normally open		
			<b>GX-F15BI-P</b>			Normally closed		
	<b>GX-H15A-P</b>	Normally open						
	<b>GX-H15AI-P</b>	Normally closed						
Top sensing 			<b>GX-H15B-P</b>		Normally open			
			<b>GX-H15BI-P</b>		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.

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**GL**

**GX-M**

**GX-U/GX-FU/**

**GX-N**

**GX**

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**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 		<b>GX-FL15A</b>	NPN open-collector transistor	Normally open
			<b>GX-FL15AI</b>		Normally closed
			<b>GX-FL15B</b>		Normally open
	<b>GX-FL15BI</b>		Normally closed		
	Top sensing 		<b>GX-HL15A</b>		Normally open
			<b>GX-HL15AI</b>		Normally closed
<b>GX-HL15B</b>		Normally open			
PNP output	Front sensing 		<b>GX-FL15A-P</b>	PNP open-collector transistor	Normally open
			<b>GX-FL15AI-P</b>		Normally closed
			<b>GX-FL15B-P</b>		Normally open
	Top sensing 		<b>GX-HL15A-P</b>		Normally open
			<b>GX-HL15AI-P</b>		Normally closed
			<b>GX-HL15B-P</b>		Normally open
			<b>GX-HL15BI-P</b>	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**

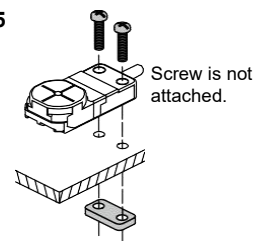
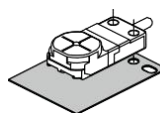
Designation	Model No.	Description
Sensor mounting bracket	<b>MS-GX6-1</b>	Mounting bracket for GX-6 type (recommended). Sensors can be mounted closely together for space-saving.
	<b>MS-GL6-1</b>	Mounting brackets for GX-6 type. Sensor mounting brackets for GL-6 can be used. Interchange is possible.
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

**Sensor mounting bracket**

- **MS-GX6-1** Screw is not attached.
- **MS-GL6-1** Screw is not attached.
- **MS-GL6-2** Screw is not attached.
- **MS-GXL8-4** 1pc. each of M3 (length: 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.
- **MS-GXL15** Screw is not attached.

**Aluminum sheet**

- MS-A15F
- MS-A15H



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GX-8(-P)  
GX-N  
GX



## SPECIFICATIONS

### GX-6 type

Item	Model No. (Note 2)	Type	NPN output		PNP output	
		Front sensing Top sensing	<b>GX-F6A(I)</b> <b>GX-H6A(I)</b>	<b>GX-F6B(I)</b> <b>GX-H6B(I)</b>	<b>GX-F6A(I)-P</b> <b>GX-H6A(I)-P</b>	<b>GX-F6B(I)-P</b> <b>GX-H6B(I)-P</b>
CE marking directive compliance		EMC Directive, RoHS Directive				
Max. operation distance (Note 3)		1.6 mm <b>0.063 in</b> ± 8 %				
Stable sensing range (Note 3)		0 to 1.3 mm <b>0 to 0.051 in</b>				
Standard sensing object		Iron sheet 12 × 12 × t 1 mm <b>0.472 × 0.472 × t 0.039 in</b>				
Hysteresis		20 % or less of operation distance (with standard sensing object)				
Repeatability		Along sensing axis, perpendicular to sensing axis: 0.04 mm <b>0.002 in</b> or less				
Supply voltage		12 to 24 V DC $_{-15}^{+10}$ % Ripple P-P 10 % or less				
Current consumption		15 mA or less				
Output		NPN open-collector transistor			PNP open-collector transistor	
		<ul style="list-style-type: none"> <li>Maximum sink current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>Residual voltage: 2 V or less (at 100 mA sink current)</li> </ul>			<ul style="list-style-type: none"> <li>Maximum source current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and +V)</li> <li>Residual voltage: 2 V or less (at 100 mA source current)</li> </ul>	
		Utilization category				
		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 <b>-13 to +158 °F</b> , Storage: -40 to +85 °C <b>-40 to +185 °F</b>			
	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 <b>0.118 in</b> 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 <b>-13 to +158 °F</b> : Within ± 8 % of sensing range at +23 °C <b>+73 °F</b>			
	Voltage characteristics		Within ±2 % for $_{-15}^{+10}$ % 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 <b>3.281 ft</b> long				
Cable extension		Extension up to total 100 m <b>328.084 ft</b> 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.

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ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY LIGHT  
CURTAINS /  
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SYSTEMSSelection  
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separatedOther  
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## SPECIFICATIONS

### GX-8 type

Item	Type	NPN output		PNP output		
		Front sensing	<b>GX-F8A(I)</b>	<b>GX-F8B(I)</b>	<b>GX-F8A(I)-P</b>	<b>GX-F8B(I)-P</b>
		Top sensing	<b>GX-H8A(I)</b>	<b>GX-H8B(I)</b>	<b>GX-H8A(I)-P</b>	<b>GX-H8B(I)-P</b>
CE marking directive compliance		EMC Directive, RoHS Directive				
Max. operation distance (Note 3)		2.5 mm <b>0.098 in</b> ± 8 %				
Stable sensing range (Note 3)		0 to 2.1 mm <b>0 to 0.083 in</b>				
Standard sensing object		Iron sheet 15 × 15 × t 1 mm <b>0.591 × 0.591 × t 0.039 in</b>				
Hysteresis		20 % or less of operation distance (with standard sensing object)				
Repeatability		Along sensing axis, perpendicular to sensing axis: 0.04 mm <b>0.002 in</b> or less				
Supply voltage		12 to 24 V DC <sub>-15</sub> <sup>+10</sup> Ripple P-P 10 % or less				
Current consumption		15 mA or less				
Output	NPN open-collector transistor		PNP open-collector transistor			
	<ul style="list-style-type: none"> <li>Maximum sink current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>Residual voltage: 2 V or less (at 100 mA sink current)</li> </ul>		<ul style="list-style-type: none"> <li>Maximum source current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and +V)</li> <li>Residual voltage: 2 V or less (at 100 mA source current)</li> </ul>			
Utilization category	DC-12 or DC-13					
Output operation	Normally open	Normally closed	Normally open	Normally closed	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 <b>-13 to +158 °F</b> , Storage: -40 to +85 °C <b>-40 to +185 °F</b>				
	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 <b>0.118 in</b> 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 <b>-13 to +158 °F</b> : Within ± 8 % of sensing range at +23 °C <b>+73 °F</b>				
	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 <b>3.281 ft</b> long				
Cable extension		Extension up to total 100 m <b>328.084 ft</b> 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 test ②, 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.

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GXL

GL

GX-M

GX-UGX-FUT

GX-N

GX

**SPECIFICATIONS****GX-12 type**

Item	Model No. (Note 2)	Type	NPN output		PNP output	
		Front sensing Top sensing	<b>GX-F12A(I)</b> <b>GX-H12A(I)</b>	<b>GX-F12B(I)</b> <b>GX-H12B(I)</b>	<b>GX-F12A(I)-P</b> <b>GX-H12A(I)-P</b>	<b>GX-F12B(I)-P</b> <b>GX-H12B(I)-P</b>
CE marking directive compliance		EMC Directive, RoHS Directive				
Max. operation distance (Note 3)		4.0 mm <b>0.157 in</b> ± 8 %				
Stable sensing range (Note 3)		0 to 3.3 mm <b>0 to 0.130 in</b>				
Standard sensing object		Iron sheet 20 × 20 × t 1 mm <b>0.787 × 0.787 × t 0.039 in</b>				
Hysteresis		20 % or less of operation distance (with standard sensing object)				
Repeatability		Along sensing axis, perpendicular to sensing axis: 0.04 mm <b>0.002 in</b> or less				
Supply voltage		12 to 24 V DC $+10_{-15}$ % Ripple P-P 10 % or less				
Current consumption		15 mA or less				
Output		NPN open-collector transistor			PNP open-collector transistor	
		<ul style="list-style-type: none"> <li>Maximum sink current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>Residual voltage: 2 V or less (at 100 mA sink current)</li> </ul>			<ul style="list-style-type: none"> <li>Maximum source current: 100 mA</li> <li>Applied voltage: 30 V DC or less (between output and +V)</li> <li>Residual voltage: 2 V or less (at 100 mA source current)</li> </ul>	
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 <b>-13 to +158 °F</b> , Storage: -40 to +85 °C <b>-40 to +185 °F</b>				
	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 <b>0.118 in</b> 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 <b>-13 to +158 °F</b> : Within ±8 % of sensing range at +23 °C <b>+73 °F</b>				
	Voltage characteristics	Within ±2 % for $+10_{-15}$ % 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 cable, 1 m <b>3.281 ft</b> long				
Cable extension		Extension up to total 100 m <b>328.084 ft</b> 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.

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSSAFETY LIGHT  
CURTAINS /  
SAFETY  
COMPONENTSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRE-SAVING  
UNITSWIRE-SAVING  
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CURING  
SYSTEMSSelection  
GuideAmplifier  
Built-inAmplifier-  
separatedOther  
Products**GX-F/H****GXL****GL****GX-M****GX-U/GX-FU/****GX-N****GX**

## SPECIFICATIONS

### GX-15 type

Item	Model No. (Note 2)	Type	NPN output				PNP output			
			Long sensing range				Long sensing range			
			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
		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 <b>0.197 in</b> ± 8 %		8.0 mm <b>0.315 in</b> ± 8 % (Note 4)		5.0 mm <b>0.197 in</b> ± 8 %		8.0 mm <b>0.315 in</b> ± 8 % (Note 4)	
Stable sensing range (Note 3)			0 to 4.2 mm <b>0 to 0.165 in</b>		0 to 6.7 mm <b>0 to 0.264 in</b> (Note 4)		0 to 4.2 mm <b>0 to 0.165 in</b>		0 to 6.7 mm <b>0 to 0.264 in</b> (Note 4)	
Standard sensing object			Iron sheet 20 × 20 × t 1 mm <b>0.787 × 0.787 × t 0.039 in</b>		Iron sheet 30 × 30 × t 1 mm <b>1.181 × 1.181 × t 0.039 in</b>		Iron sheet 20 × 20 × t 1 mm <b>0.787 × 0.787 × t 0.039 in</b>		Iron sheet 30 × 30 × t 1 mm <b>1.181 × 1.181 × t 0.039 in</b>	
Hysteresis			20 % or less of operation distance (with standard sensing object)							
Repeatability			Along sensing axis, perpendicular to sensing axis: 0.04 mm <b>0.002 in</b> or less							
Supply voltage			12 to 24 V DC $+10$ $-15$ % 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 <b>-13 to +158 °F</b> , Storage: -40 to +85 °C <b>-40 to +185 °F</b>							
	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 <b>0.118 in</b> 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 <b>-13 to +158 °F</b> : Within ± 8 % of sensing range at +23 °C <b>+73 °F</b>							
	Voltage characteristics		Within ± 2 % for $+10$ $-15$ % 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 <b>3.281 ft</b> long							
Cable extension			Extension up to total 100 m <b>328.084 ft</b> 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.

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GXL

GL

GX-M

GX-F/H

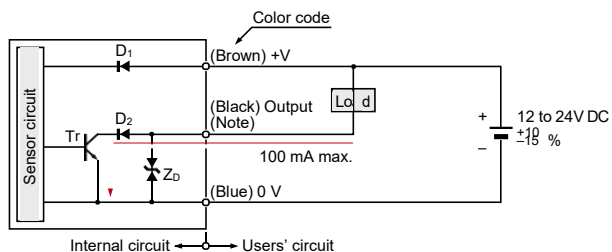
GX-N

GX

**I/O CIRCUIT DIAGRAMS**

**NPN output type**

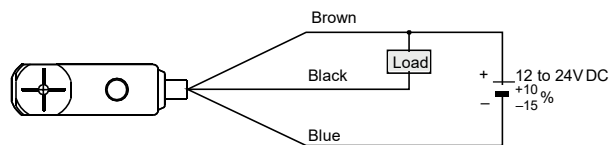
**I/O circuit diagram**



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

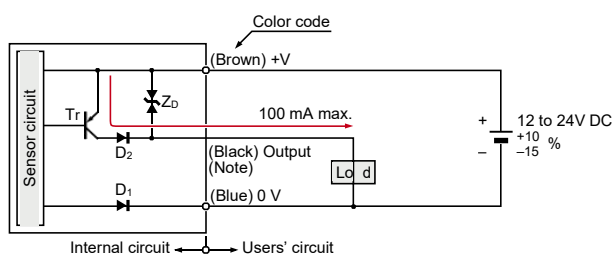
Note: The output does not incorporate a short-circuit protection circuit.  
 Do not connect it directly to a power supply or a capacitive load.

**Wiring diagram**



**PNP output type**

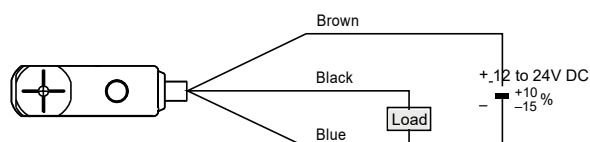
**I/O circuit diagram**



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**



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**GXL**

**GL**

**GX-M**

**GX-U/GX-FU/**

**GX-N**

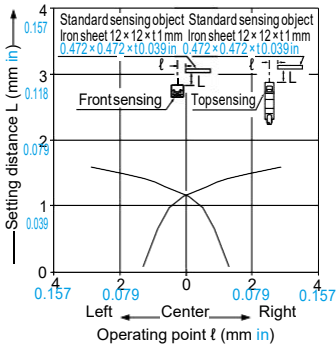
**GX**

**SENSING CHARACTERISTICS (TYPICAL)**

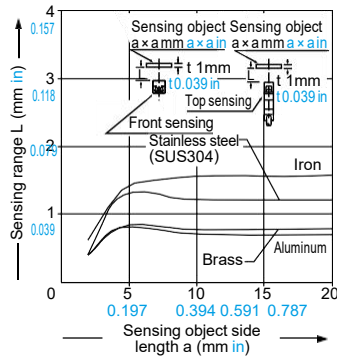
- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- SAFETY LIGHT CURTAINS / SAFETY COMPONENTS
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- GXL
- GL
- GX-M
- GX-U/GX-F/H/GX-L
- GX**

**GX-6 type**

**Sensing field**



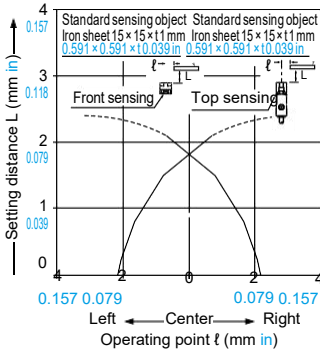
**Correlation between sensing object size and sensing range**



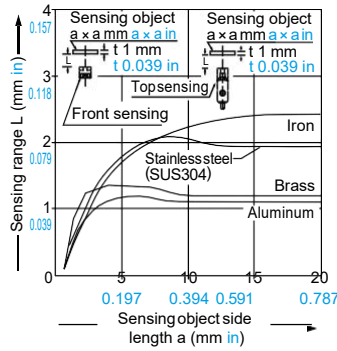
As the sensing object size becomes smaller than the standard size (iron sheet 12 × 12 × t 1 mm  $0.472 \times 0.472 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

**GX-8 type**

**Sensing field**



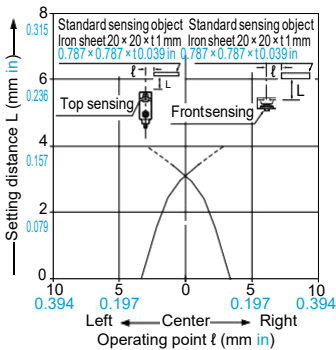
**Correlation between sensing object size and sensing range**



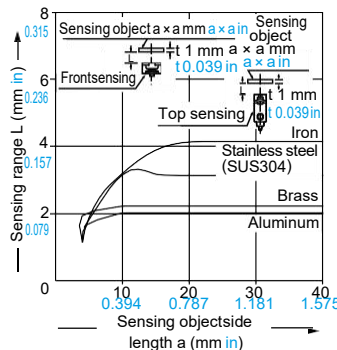
As the sensing object size becomes smaller than the standard size (iron sheet 15 × 15 × t 1 mm  $0.591 \times 0.591 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

**GX-12 type**

**Sensing field**



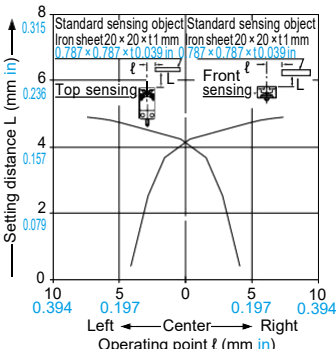
**Correlation between sensing object size and sensing range**



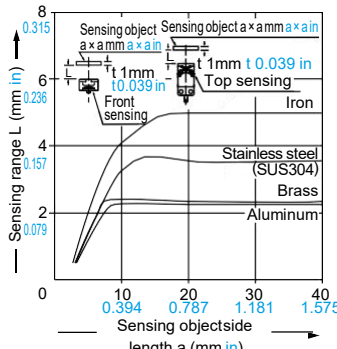
As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm  $0.787 \times 0.787 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

**GX-15 type**

**Sensing field**



**Correlation between sensing object size and sensing range**

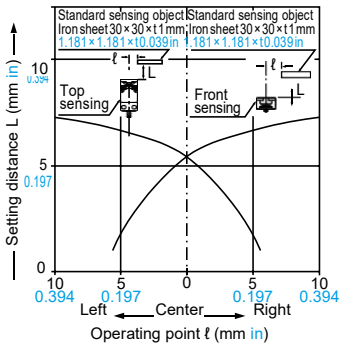


As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm  $0.787 \times 0.787 \times t 0.039$  in), the sensing range shortens as shown in the left figure.

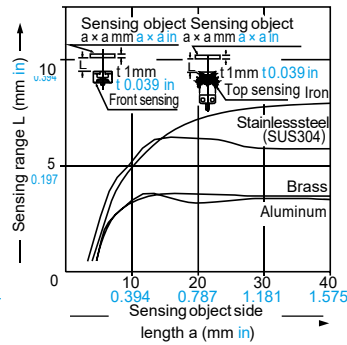
## SENSING CHARACTERISTICS (TYPICAL)

### 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 × 0.039 in), the sensing range shortens as shown in the left figure.

## PRECAUTIONS FOR PROPER USE

Refer to p.1579~ for general precautions.



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

### Mounting

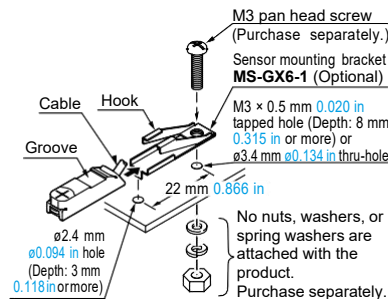
#### GX-6 type

- Use the optional sensor mounting bracket when installing.

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

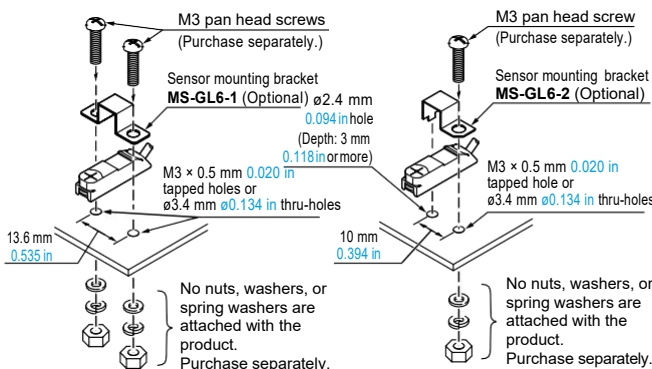
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in.

- 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)>

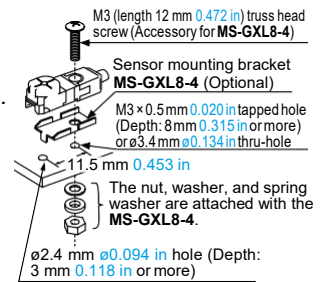
- To mount the sensor with a nut, the mounting hole diameter should be  $\phi 3.4$  mm  $\phi 0.134$  in.



#### GX-8 type

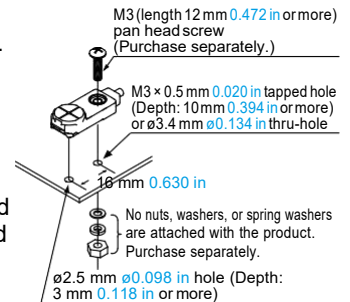
#### <When using MS-GXL8-4 (Optional)>

- 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.)



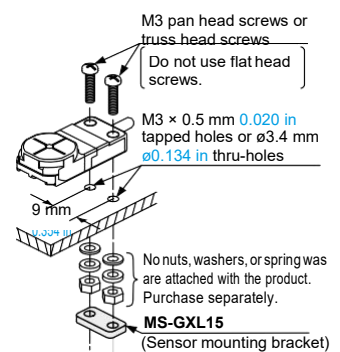
#### GX-12 type

- 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.

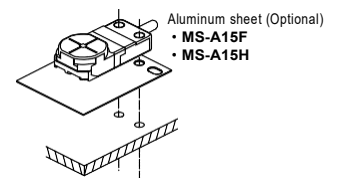


#### GX-15 type

- 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.



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AK/A SENSORS

SAFETY LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

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FA COMPONENTS

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UV CURING SYSTEMS

Selection Guide

Amplifier Built-in

Amplifier-separated

Other Products

**GX-F/H**

**GXL**

**GL**

**GX-M**

**GX/J/GX-FU/**

**GX-N**



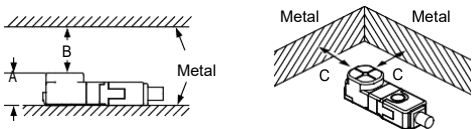
## PRECAUTIONS FOR PROPER USE

Refer to p.1579~ for general precautions.

### Influence of surrounding metal

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

#### Front sensing type

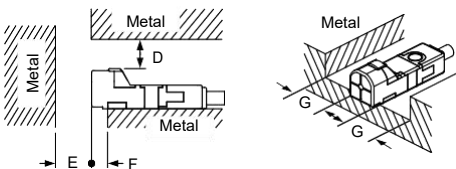


	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
A	6mm <b>0.236 in</b> (Note 1)	7.4mm <b>0.291 in</b>	7.1mm <b>0.280 in</b>	8mm <b>0.315 in</b>	8mm <b>0.315 in</b> (Note 2)
B	8mm <b>0.315 in</b>	8mm <b>0.315 in</b>	20mm <b>0.787 in</b>	20mm <b>0.787 in</b>	30mm <b>1.181 in</b>
C	3mm <b>0.118 in</b>	3mm <b>0.118 in</b>	7mm <b>0.276 in</b>	7mm <b>0.276 in</b>	10mm <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	3mm <b>0.118 in</b>	4mm <b>0.157 in</b>	7mm <b>0.276 in</b>	6mm <b>0.236 in</b>	12mm <b>0.472 in</b>
E	10mm <b>0.394 in</b>	10mm <b>0.394 in</b>	20mm <b>0.787 in</b>	20mm <b>0.787 in</b>	30mm <b>1.181 in</b>
F	2mm <b>0.079 in</b>	3mm <b>0.118 in</b>	3mm <b>0.118 in</b>	0mm <b>0 in</b>	10mm <b>0.394 in</b> (Note)
G	2mm <b>0.079 in</b>	3mm <b>0.118 in</b>	3mm <b>0.118 in</b>	3mm <b>0.118 in</b>	10mm <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 0 mm (Note2) <b>0.591 in</b>	15 mm <b>0.591 in</b>
	Between two "I" types or two non "I" types 13 mm <b>0.512 in</b>	25 mm <b>0.984 in</b>
<b>GX-F8</b> <b>GX-H8</b> type	Between "I" type and non "I" type 0 mm (Note2) <b>0.591 in</b>	15 mm <b>0.591 in</b>
	Between two "I" types or two non "I" types 20 mm <b>0.787 in</b>	35 mm <b>1.378 in</b>
<b>GX-F12</b> <b>GX-H12</b> type	Between "I" type and non "I" type 0 mm (Note2) <b>0.984 in</b>	25 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types 25 mm <b>0.984 in</b>	50 mm <b>1.969 in</b>
<b>GX-F15</b> <b>GX-H15</b> type	Between "I" type and non "I" type 0 mm (Note2) <b>0.984 in</b>	25 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types 45 mm <b>1.772 in</b>	70 mm <b>2.756 in</b>
<b>GX-FL15</b> <b>GX-HL15</b> type	Between "I" type and non "I" type 0 mm (Note2) <b>0.984 in</b>	25 mm <b>0.984 in</b>
	Between two "I" types or two non "I" types 110 mm <b>3.059 in</b>	170 mm <b>6.693 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**

### 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.

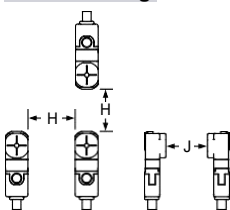
### Wiring

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

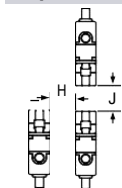
### Others

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

#### Front sensing



#### Top sensing

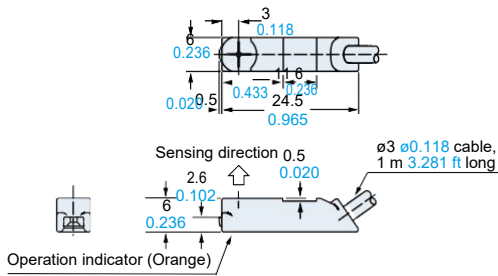




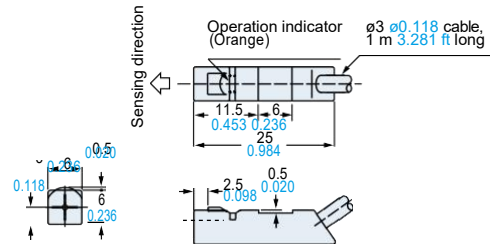
**DIMENSIONS (Unit: mm in)**

The CAD data can be downloaded from our website.

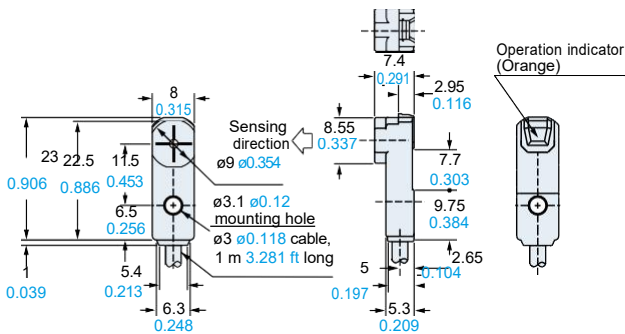
**GX-F6** □ Sensor



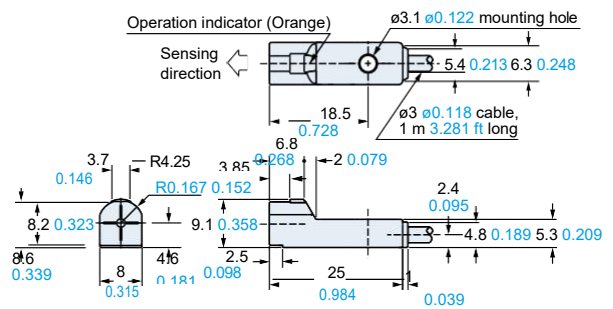
**GX-H6** □ Sensor



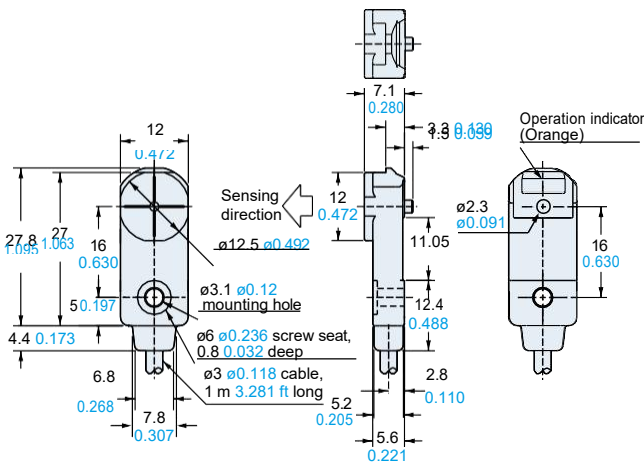
**GX-F8** □ Sensor



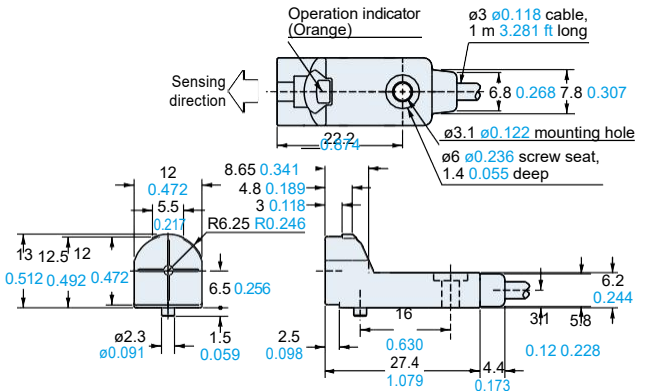
**GX-H8** □ Sensor



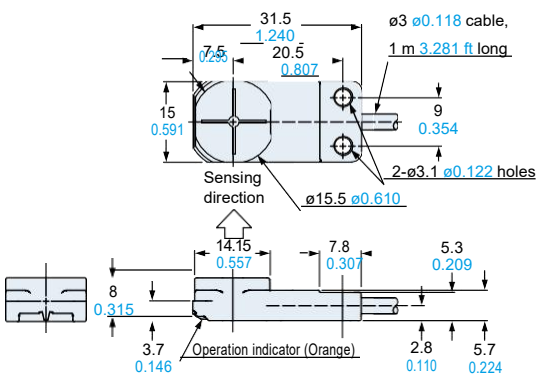
**GX-F12** □ Sensor



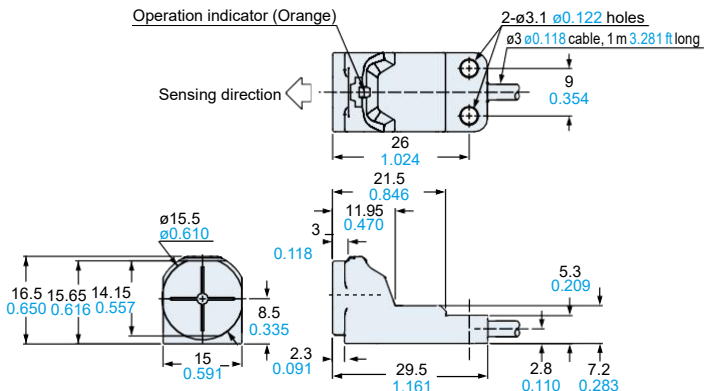
**GX-H12** □ Sensor



**GX-F(L)15** □ Sensor



**GX-H(L)15** □ Sensor



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- GXL**
- GL**
- GX-M**
- GX-U/GX-EU**
- GX-N**
- GX**



## MEMO

