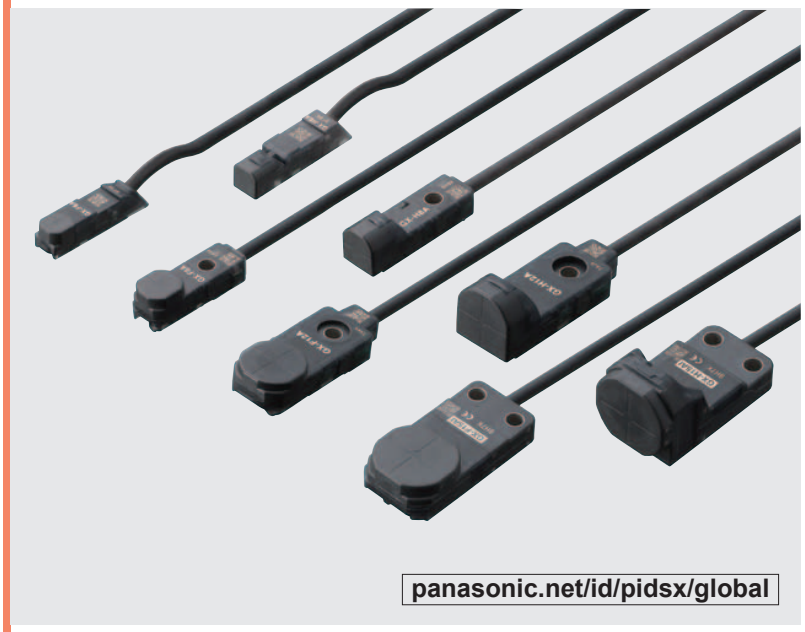
Rectangular-shaped Inductive Proximity Sensor **Amplifier Built-in**

GX-F/H SERIES

Related Information
■ General terms and conditions..... F-7
■ Glossary of terms..... P.1482~
■ Sensor selection guide ..... P.803~
■ General precautions ..... P.1485~



panasonic.net/id/pidsx/global

CE Conforming to EMC Directive

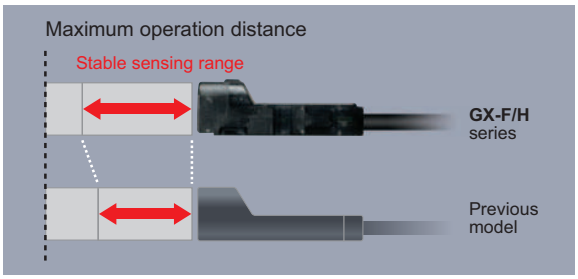
PNP output type available
IP68G Oil resistant
Different freq. type available

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.



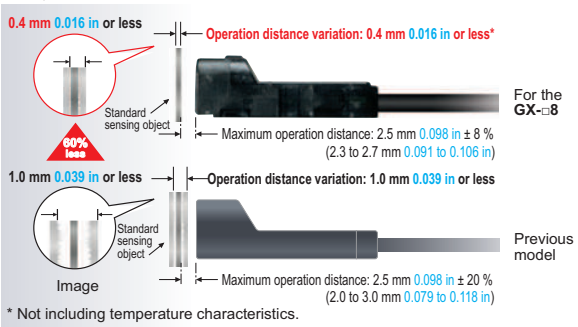
Type	Maximum operation distance	Stable sensing range	
		GX-F/H series	Previous model
GX-□6	1.6 mm 0.063 in	0 to 1.3 mm 0.051 in	0 to 1.2 mm 0.047 in
GX-□8	2.5 mm 0.098 in	0 to 2.1 mm 0.083 in	0 to 1.8 mm 0.709 in
GX-□12	4.0 mm 0.157 in	0 to 3.3 mm 0.130 in	0 to 3.0 mm 0.118 in
GX-□15	5.0 mm 0.197 in	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

* With standard sensing object

Variation at the maximum operation distance is within ±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.

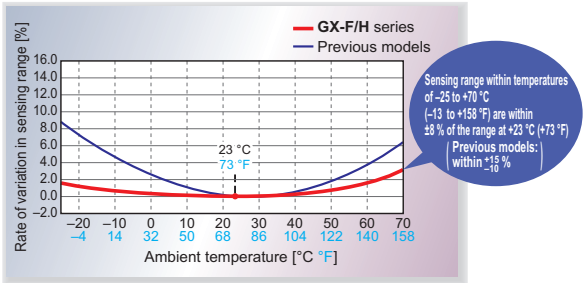
Example: **GX-□8**



* Not including temperature characteristics.

Temperature characteristics vary within ±8 %

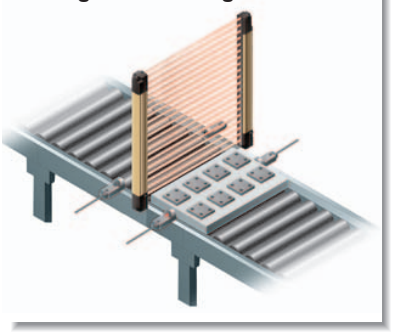
Components such as the sensor coil and core and product design have been totally revised to provide excellent temperature characteristics.
Stable sensing can be obtained regardless of the time of day or the yearly season.



* Typical

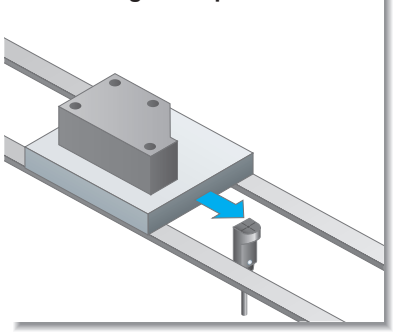
APPLICATIONS

Muting control of light curtains



Positioning processing equipment

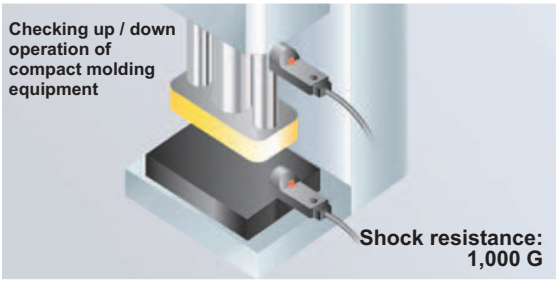
Positioning metal pallets

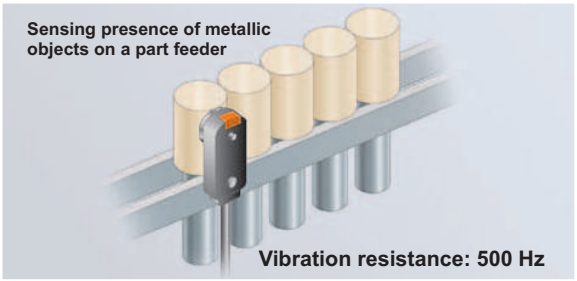


ENVIRONMENTAL RESISTANCE

10 times the durability! (Compared to previous models)

The new integrated construction method used provides shock resistance of 10,000 m/s^2 (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 amplitude in X, Y and Z directions for 2 hours each). In addition, resistance to impulse noise is approx. three times greater than for previous models.





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.812~)".

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□

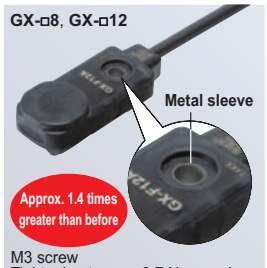
GX-F□

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



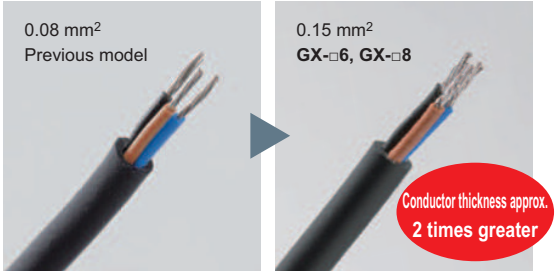
M3 screw
Tightening torque: 0.7 N · m or less

GX-□15

M3 screw
Tightening torque: 1 N · m or less

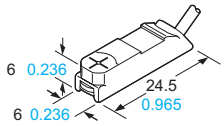
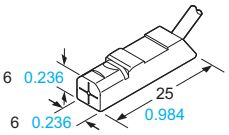
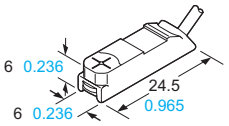
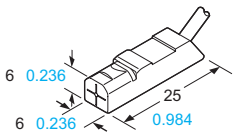
Conductor thickness doubled to make wiring much easier! (GX-□6/□8 only)

The conductor's thickness was doubled for the **GX-□6/□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.



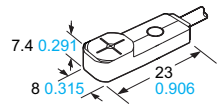
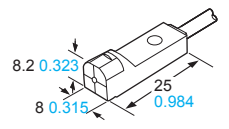
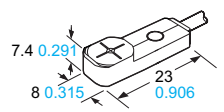
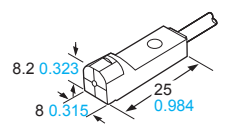
ORDER GUIDE

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 (0 to 1.3 mm 0 to 0.051 in) Stable sensing range	GX-F6A	NPN open-collector transistor	Normally open
				GX-F6AI		
				GX-F6B		Normally closed
				GX-F6BI		
	Top sensing			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
				GX-F6AI-P		
				GX-F6B-P		Normally closed
				GX-F6BI-P		
	Top sensing			GX-H6A-P		Normally open
				GX-H6AI-P		
				GX-H6B-P		Normally closed
				GX-H6BI-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.

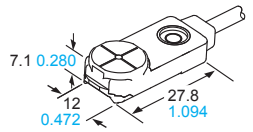
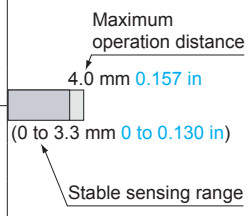
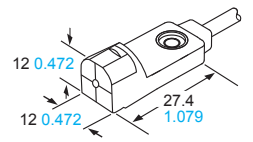
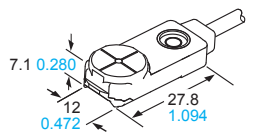
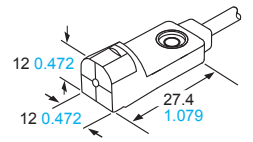
GX-8 type

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 (0 to 2.1 mm 0 to 0.083 in) Stable sensing range	GX-F8A	NPN open-collector transistor	Normally open
				GX-F8AI		
				GX-F8B		Normally closed
				GX-F8BI		
	Top sensing			GX-H8A		Normally open
				GX-H8AI		
				GX-H8B		Normally closed
				GX-H8BI		
PNP output	Front sensing			GX-F8A-P	PNP open-collector transistor	Normally open
				GX-F8AI-P		
				GX-F8B-P		Normally closed
				GX-F8BI-P		
	Top sensing			GX-H8A-P		Normally open
				GX-H8AI-P		
				GX-H8B-P		Normally closed
				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.

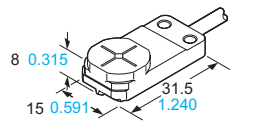
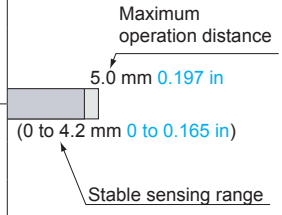
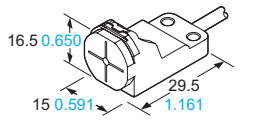
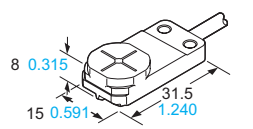
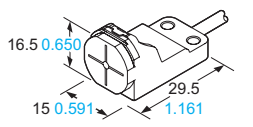
ORDER GUIDE

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		
				GX-F12B		Normally closed
				GX-F12BI		
	Top sensing			**GX-H12A**		Normally open
				GX-H12AI		
				GX-H12B		Normally closed
				GX-H12BI		
PNP output	Front sensing			**GX-F12A-P**	PNP open-collector transistor	Normally open
				GX-F12AI-P		
				GX-F12B-P		Normally closed
				GX-F12BI-P		
	Top sensing			**GX-H12A-P**		Normally open
				GX-H12AI-P		
				GX-H12B-P		Normally closed
				GX-H12BI-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.

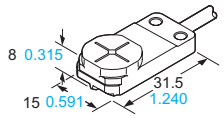
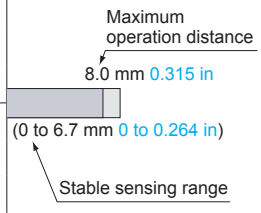
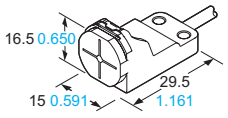
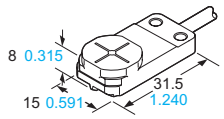
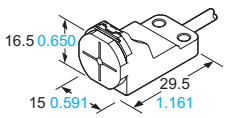
GX-15 type

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
				GX-F15AI		
				GX-F15B		Normally closed
				GX-F15BI		
	Top sensing			**GX-H15A**		Normally open
				GX-H15AI		
				GX-H15B		Normally closed
				GX-H15BI		
PNP output	Front sensing			**GX-F15A-P**	PNP open-collector transistor	Normally open
				GX-F15AI-P		
				GX-F15B-P		Normally closed
				GX-F15BI-P		
	Top sensing			**GX-H15A-P**		Normally open
				GX-H15AI-P		
				GX-H15B-P		Normally closed
				GX-H15BI-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-15 (Long sensing range) type

Type		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
NPN output	Front sensing			GX-FL15A	NPN open-collector transistor	Normally open
				GX-FL15AI		Normally closed
				GX-FL15B		
				GX-FL15BI		
	Top sensing			GX-HL15A		Normally open
				GX-HL15AI		
				GX-HL15B		Normally closed
				GX-HL15BI		
PNP output	Front sensing			GX-FL15A-P	PNP open-collector transistor	Normally open
				GX-FL15AI-P		
				GX-FL15B-P		Normally closed
				GX-FL15BI-P		
	Top sensing			GX-HL15A-P		Normally open
				GX-HL15AI-P		
				GX-HL15B-P		Normally closed
				GX-HL15BI-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.

5 m 16.404 ft cable length type, flexible cable type

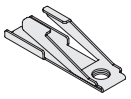
5 m 16.404 ft cable length type (standard: 1 m 3.281 ft) and flexible cable (excluding 5 m 16.404 ft cable length type) are available. However, long sensing range type is not available. When ordering 5 m 16.404 ft cable length type, suffix "**-C5**" to the model No. When ordering flexible cable type,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

OPTIONS

Designation	Model No.	Description	
Sensor mounting bracket	**MS-GX6-1**	Mounting bracket for **GX-6** type (recommended). Sensors can be mounted closely together for space-saving.	
	MS-GL6-1	Mounting brackets for **GX-6** type Sensor mounting brackets for **GL-6** can be used. Interchange is possible.	
	MS-GL6-2		
	MS-GXL8-4	Mounting bracket for **GX-8** type	
	MS-GXL15	Mounting bracket for **GX-15** type	
Aluminum sheet	**MS-A15F**	For **GX-FL15□(-P)**	Mounting example when mounted onto a steel or stainless steel plate
	MS-A15H	For **GX-HL15□(-P)**	
Mounting sleeve	**MS-GX8-1×10** 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.	

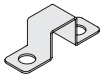
Sensor mounting bracket

· **MS-GX6-1**



Screw is not attached.

· **MS-GL6-1**

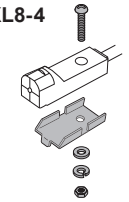


Screw is not attached.

· **MS-GL6-2**

Screw is not attached.

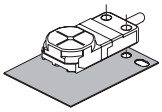
· **MS-GXL8-4**



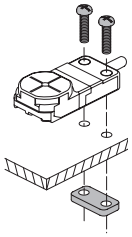
1pc. each of M3 (length: 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

Aluminum sheet

· **MS-A15F**
· **MS-A15H**



· **MS-GXL15**



Screw is not attached.

SPECIFICATIONS

GX-6 type

Item \ Type		NPN output		PNP output	
Model No. (Note 2)	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**
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 0.0016 in 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 closed	Normally closed	Normally closed	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			
	EMC	EN 60947-5-2			
	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 amplitude (Max. 20 G) in X, Y and Z directions for two hours each			
	Shock resistance	10,000 m/s² acceleration (1,000 G approx.) in X, Y and Z directions for 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 $^{+10}_{-15}$ % fluctuation of the supply voltage			
Material		Enclosure: PBT, Indicator part: Polyester			
Cable		0.15 mm² 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 mm², 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 range 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
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 0.0016 in 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
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			
	EMC		EN 60947-5-2			
	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 amplitude (Max. 20 G) in X, Y and Z directions for two hours each			
	Shock resistance		10,000 m/s² acceleration (1,000 G approx.) in X, Y and Z directions for 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 $^{+10}_{-15}$ % fluctuation of the supply voltage			
Material			Enclosure: PBT, Indicator part: Polyester			
Cable			0.15 mm² 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 mm², 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 deteriorate 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)		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-F12B(I)-P**
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 0.0016 in 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
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			
	EMC	EN 60947-5-2			
	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 amplitude (Max. 20 G) in X, Y and Z directions for two hours each			
	Shock resistance	10,000 m/s^2 acceleration (1,000 G approx.) in X, Y and Z directions for 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 $^{+10}_{-15}$ % fluctuation of the supply voltage			
Material		Enclosure: PBT, Indicator part: Polyester			
Cable		0.15 mm^2 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^2, 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 deteriorate 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

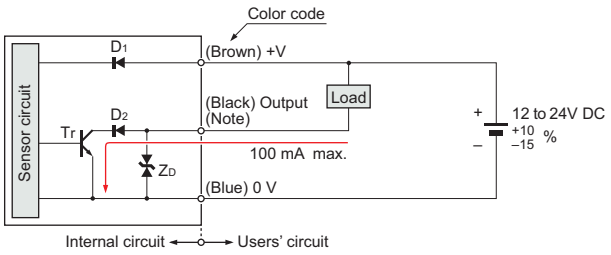
Item	Model No. (Note 2)	NPN output				PNP output			
				Long sensing range				Long sensing range	
	Front sensing	GX-F15A(I)	GX-F15B(I)	GX-FL15A(I)	GX-FL15B(I)	GX-F15A(I)-P	GX-F15B(I)-P	GX-FL15A(I)-P	GX-FL15B(I)-P
	Top sensing	GX-H15A(I)	GX-H15B(I)	GX-HL15A(I)	GX-HL15B(I)	GX-H15A(I)-P	GX-H15B(I)-P	GX-HL15A(I)-P	GX-HL15B(I)-P
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 0.7874 × 0.7874 × 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 0.7874 × 0.7874 × 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 0.0016 in 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)							
Environmental resistance: Protection		IP68 (IEC), IP68G (Note 6, 7)							
Environmental resistance: Ambient temperature		–25 to +70 °C –13 to +158 °F, Storage: –40 to +85 °C –40 to +185 °F							
Environmental resistance: Ambient humidity		35 to 85 % RH, Storage: 35 to 95 % RH							
Environmental resistance: EMC		EN 60947-5-2							
Environmental resistance: Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure							
Environmental resistance: Insulation resistance		50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure							
Environmental resistance: Vibration resistance		10 to 500 Hz frequency, 3 mm 0.118 in amplitude (Max. 20 G) in X, Y and Z directions for two hours each							
Environmental resistance: Shock resistance		10,000 m/s² acceleration (1,000 G approx.) in X, Y and Z directions for 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							
Sensing range variation: Voltage characteristics		Within ±2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage							
Material		Enclosure: PBT, Indicator part: Polyester							
Cable		0.15 mm² 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 mm², 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 insulant plate. 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 insulant plate. 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 range 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.

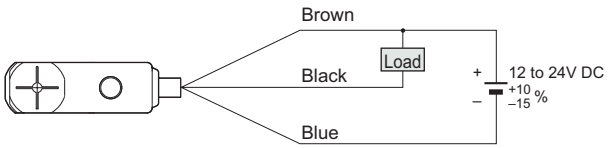
I/O CIRCUIT DIAGRAMS

NPN output type

I /O circuit diagram



Wiring diagram

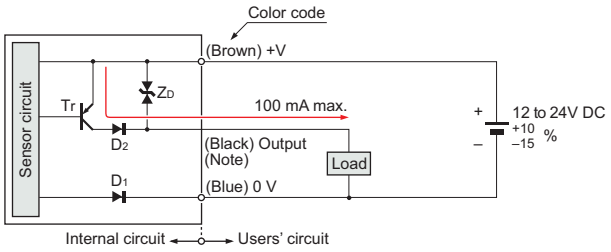


Symbols … D_1: Reverse supply polarity protection diode
D_2: Reverse output polarity protection diode
Z_D: Surge absorption zener diode
Tr : NPN output transistor

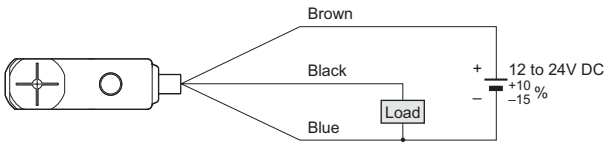
Note: The output does not incorporate a short-circuit protection circuit.
Do not connect it directly to a power supply or a capacitive load.

PNP output type

I/O circuit diagram



Wiring diagram



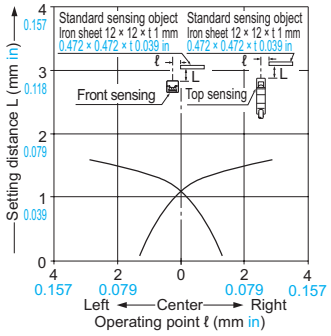
Symbols … D_1: Reverse supply polarity protection diode
D_2: Reverse output polarity protection diode
Z_D: Surge absorption zener diode
Tr : PNP output transistor

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

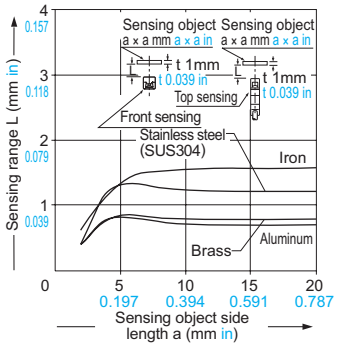
SENSING CHARACTERISTICS (TYPICAL)

GX-6 type

Sensing field



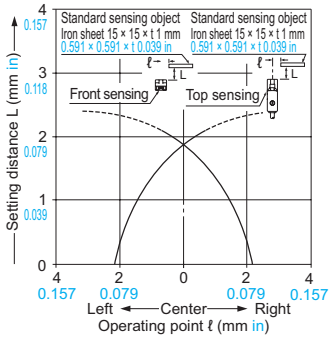
Correlation between sensing object size and sensing range



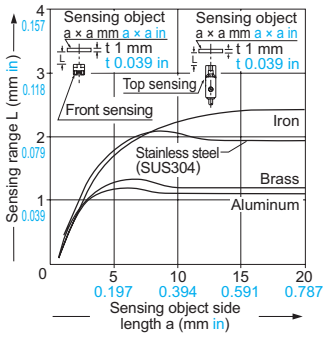
As the sensing object size becomes smaller than the standard size (iron sheet 12 × 12 × t 1 mm 0.472 × 0.472 × t 0.039 in), the sensing range shortens as shown in the left figure.

GX-8 type

Sensing field



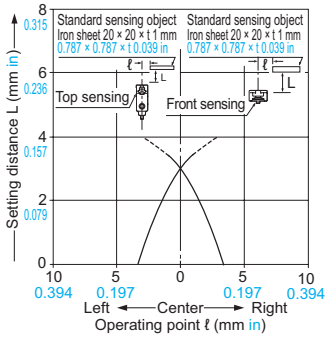
Correlation between sensing object size and sensing range



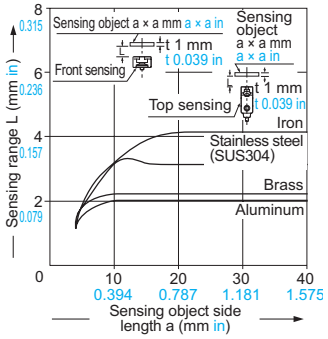
As the sensing object size becomes smaller than the standard size (iron sheet 15 × 15 × t 1 mm 0.591 × 0.591 × t 0.039 in), the sensing range shortens as shown in the left figure.

GX-12 type

Sensing field



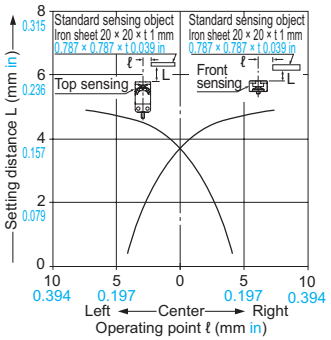
Correlation between sensing object size and sensing range



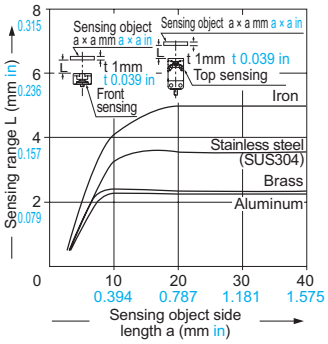
As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in), the sensing range shortens as shown in the left figure.

GX-15 type

Sensing field



Correlation between sensing object size and sensing range

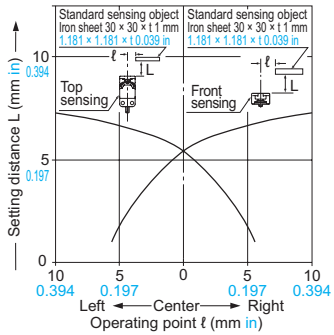


As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in), the sensing range shortens as shown in the left figure.

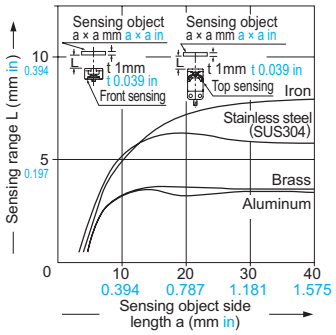
SENSING CHARACTERISTICS (TYPICAL)

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

Refer to p.1485~ 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

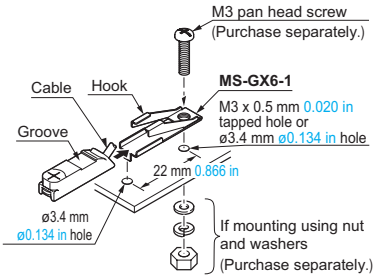
GX-6 type

- Use the optional sensor mounting bracket when installing.

<When using MS-GX6-1 (recommended)>

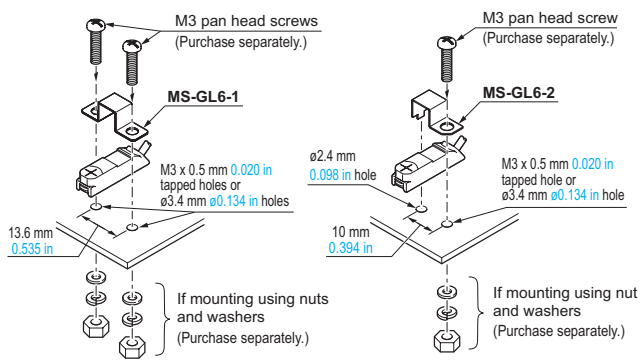
- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in.

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.



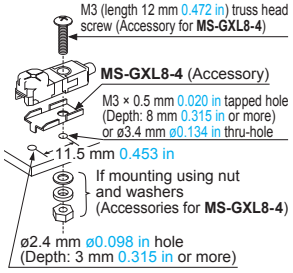
<When using MS-GL6-1 / MS-GL6-2>

- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in.



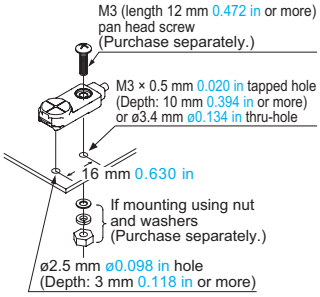
GX-8 type

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



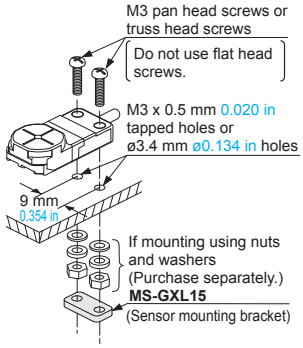
GX-12 type

- The tightening torque should be 0.7 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in. Further, the hole in which the boss is inserted should be ø2.5 mm ø0.098 in and 3 mm 0.118 in, or more, deep.

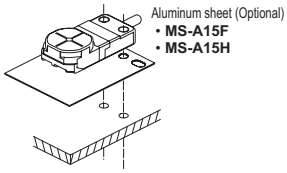


GX-15 type

- The tightening torque should be 1 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 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.



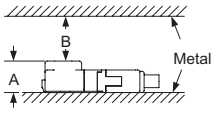
PRECAUTIONS FOR PROPER USE

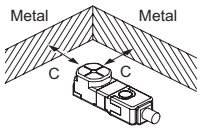
Refer to p.1485~ for general precautions.

Influence of surrounding metal

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

Front sensing type

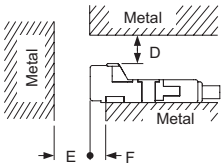


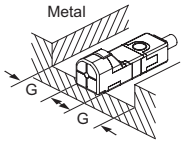


	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
A	6 mm 0.236 in (Note 1)	7.4 mm 0.291 in	7.1 mm 0.280 in	8 mm 0.315 in	8 mm 0.315 in (Note 2)
B	8 mm 0.315 in	8 mm 0.315 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
C	3 mm 0.118 in	3 mm 0.118 in	7 mm 0.276 in	7 mm 0.276 in	10 mm 0.394 in

Notes: 1) When using **MS-GX6-1** (recommended mounting bracket), 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 0.118 in	4 mm 0.157 in	7 mm 0.276 in	6 mm 0.236 in	12 mm 0.472 in
E	10 mm 0.394 in	10 mm 0.394 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
F	2 mm 0.079 in	3 mm 0.118 in	3 mm 0.118 in	0 mm 0 in	10 mm 0.394 in (Note)
G	2 mm 0.079 in	3 mm 0.118 in	3 mm 0.118 in	3 mm 0.118 in	10 mm 0.394 in

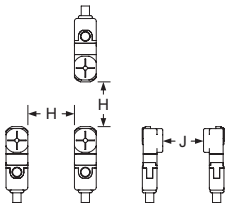
Note: When **GX-HL15** type is mounted on an insulator or seated on the enclosed aluminum sheet, the distance "F" can be zero.

Mutual interference prevention

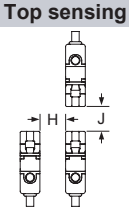
• When two or more sensors are installed in parallel or face to face, keep the minimum separation distance specified below to avoid mutual interference.

		H	J
GX-F6 GX-H6 type	Between "**I**" type and non "**I**" type	0 mm (Note 2)	15 mm 0.591 in
	Between two "**I**" types or two non "**I**" types	13 mm 0.512 in	25 mm 0.984 in
GX-F8 GX-H8 type	Between "**I**" type and non "**I**" type	0 mm (Note 2)	15 mm 0.591 in
	Between two "**I**" types or two non "**I**" types	20 mm 0.787 in	35 mm 1.378 in
GX-F12 GX-H12 type	Between "**I**" type and non "**I**" type	0 mm (Note 2)	25 mm 0.984 in
	Between two "**I**" types or two non "**I**" types	25 mm 0.984 in	50 mm 1.969 in
GX-F15 GX-H15 type	Between "**I**" type and non "**I**" type	0 mm (Note 2)	25 mm 0.984 in
	Between two "**I**" types or two non "**I**" types	45 mm 1.772 in	70 mm 2.756 in
GX-FL15 GX-HL15 type	Between "**I**" type and non "**I**" type	0 mm (Note 2)	25 mm 0.984 in
	Between two "**I**" types or two non "**I**" types	110 mm 3.059 in	170 mm 6.693 in

Front sensing



Top sensing



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: 3.5mm 0.138 in
GX-F8 / H8 type: 6mm 0.236 in
GX-F12 / H12 type: 6.5mm 0.256 in
GX-F15 / H15 type: 15mm 0.591 in
GX-FL15 / HL15 type: 47.5mm 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. / Metal	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
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.

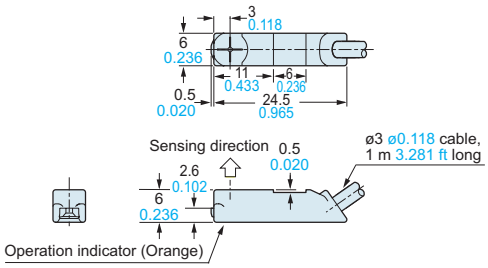
Others

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

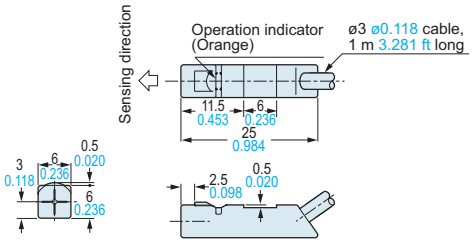
DIMENSIONS (Unit: mm in)

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

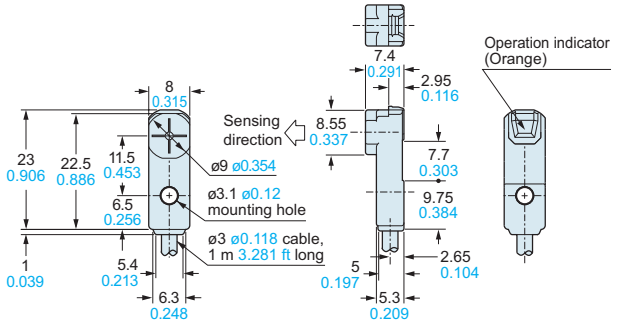
GX-F6□ Sensor



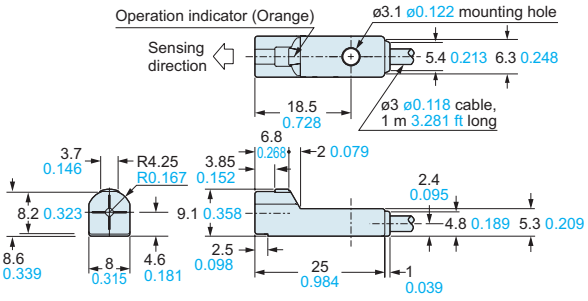
GX-H6□ Sensor



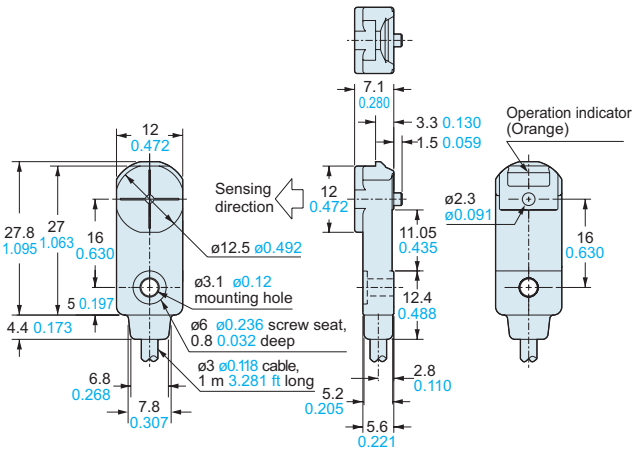
GX-F8□ Sensor



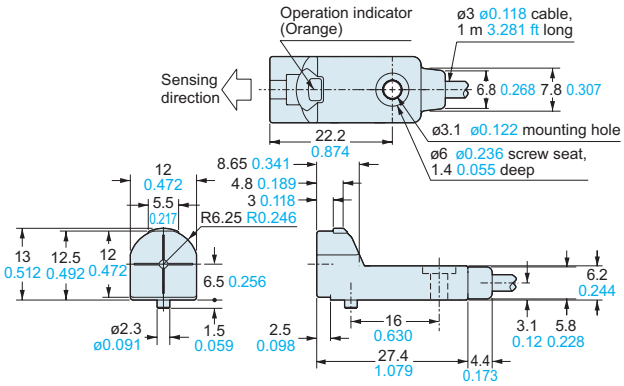
GX-H8□ Sensor



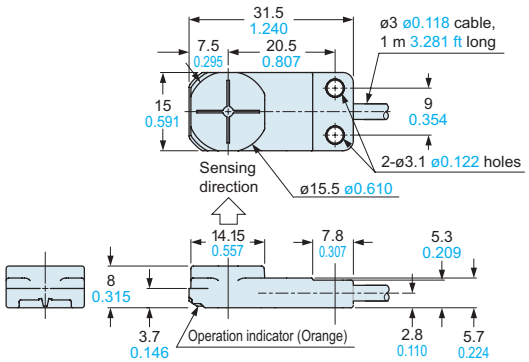
GX-F12□ Sensor



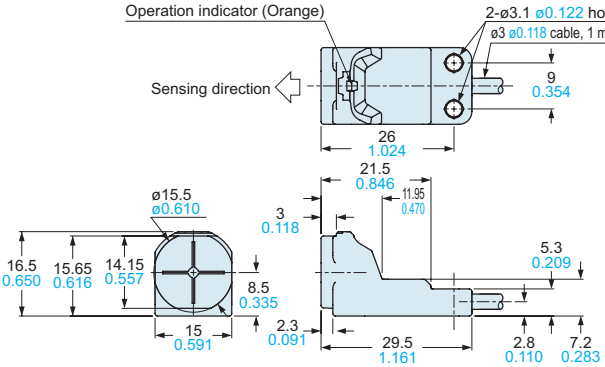
GX-H12□ Sensor



GX-F(L)15□ Sensor



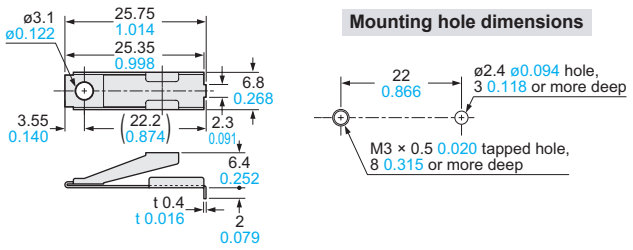
GX-H(L)15□ Sensor



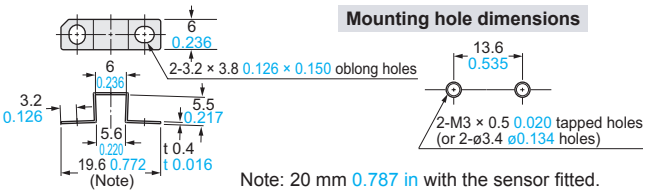
DIMENSIONS (Unit: mm in)

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

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

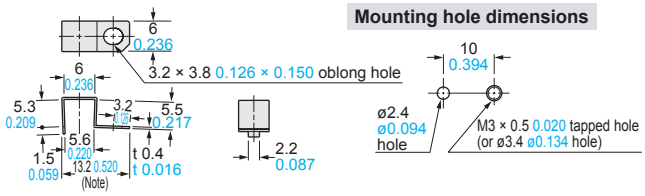


MS-GL6-1 Sensor mounting bracket for **GX-6** type (Optional)



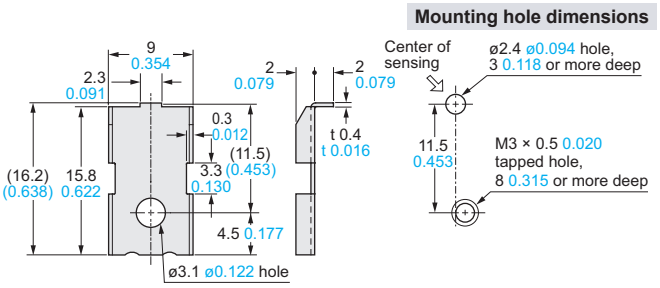
Note: 20 mm 0.787 in with the sensor fitted.

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



Note: 13.4 mm 0.528 in with the sensor fitted.

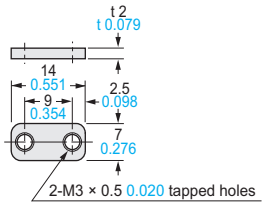
MS-GXL8-4 Sensor mounting bracket for **GX-8** type (Optional)



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: SPCC

MS-A15F MS-A15H Aluminum sheet (Optional)