

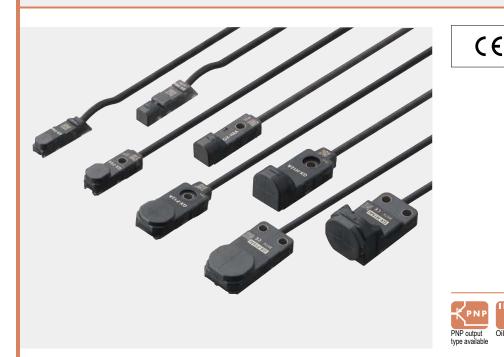
Amplifier-separated Rectangular-shaped Inductive Proximity Sensor

GX-F/H SERIES



Rectangular-shaped Inductive Proximity Sensor Amplifier Built-in

GX-F/H SERIES



Industry No. 1* in stable sensing



as of November 2012 among equivalent rectangular inductive sensors.

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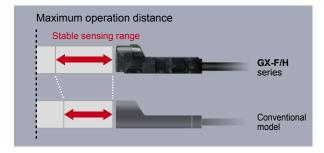
Oil resistant

Different freq type available

-

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 %

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.

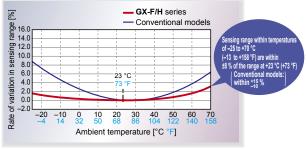


	Maximum	Stable sen	sing range	
Туре	operation distance	GX-F/H series	Conventional model	
GX-⊡6	1.6 mm 0.063 in	0 to 1.3 mm 0.051 in	0 to 1.2 mm 0.047 in	
GX-⊡8	2.5 mm 0.098 in	0 to 2.1 mm 0.083 in	0 to 1.8 mm 0.709 in	
GX-□12	4.0 mm 0.157 in	0 to 3.3 mm 0.130 in	0 to 3.0 mm 0.118 in	
GX-⊡15	5.0 mm 0.197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

* With standard sensing object

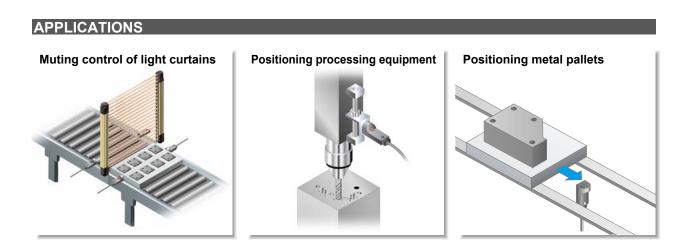
Temperature characteristics vary within ±8 %

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

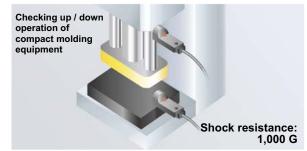
* Not including temperature characteristics.



ENVIRONMENTAL RESISTANCE

10 times the durability! (Compared to conventional models)

The new integrated construction method used provides shock resistance of 10,000 m/s² (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.



Highly resistant to water or oil! IP68G* protective construction

The new integrated construction method used improves environmental resistance performance.

The IP68G prevents damage to the sensor by stopping water and oil getting inside.

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



Sensing presence of metallic objects on a part feeder Vibration resistance: 500 Hz

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**





MOUNTING

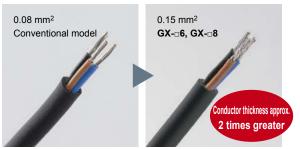
Tightening strength increased with no damage! (excluding GX-D6)

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



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

The conductor's thickness was doubled for the $GX-\Box 6 / GX-\Box 8$. 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

Ту	pe	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
	ng			GX-F6A	-	Normally open	
	ensi			GX-F6AI			
Ŧ	put Front sensing	6 0.236 6 0.236 6 0.236 0.965		GX-F6B		Normally closed	
outpu	Ē			GX-F6BI	NPN open-collector	Normally closed	
NPN output sensing Fro	g	~/7		GX-H6A	transistor	Normally open	
	ensin	6 0.236 6 0.236 0.984	Maximum	GX-H6AI			
	Top se		operation distance	GX-H6B		Nerrelluselesed	
	Ĕ		1.6 mm 0.063 in	GX-H6BI		Normally closed	
	b	~ /7	(0 to 1.3 mm 0 to 0.051 in)	GX-F6A-P		Nerrelle	
	ensir		ĺ`ヽ ĺ	GX-F6AI-P		Normally open	
t	Front sensing	6 0.236	Stable sensing range	GX-F6B-P			
output	Free	6 0.236		GX-F6BI-P	PNP open-collector transistor	Normally closed	
PNP 0	5	/>		GX-H6A-P			
	sensing			GX-H6AI-P		Normally open	
	p se	6 0.236		GX-H6B-P			
	Top	6 0.236 0.984		GX-H6BI-P		Normally closed	

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

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

GX-8 type

ту	/pe	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
	bu	\sim		GX-F8A		Normally open	
	sensing	7.4 0.291		GX-F8AI	_		
Ħ	15	8 0.315		GX-F8B		Normally aloogd	
outpr				GX-F8BI	NPN open-collector	Normally closed	
NPN output sensing Fro	ß			GX-H8A	transistor	Namally an an	
	ensin		Maximum	GX-H8AI	-	Normally open	
	Top se	8.2 0.323 25 8 0 315 0.984	operation distance	GX-H8B		Normally closed	
	Ĕ	8 0.315	2.5 mm 0.098 in	GX-H8BI			
	b		GX-F8A-P		Namally an an		
	sensing		ĺ`. ∖	GX-F8AI-P		Normally open	
÷	Front s	8 0.315	Stable sensing range	GX-F8B-P	PNP open-collector transistor		
PNP output	Ę	0.515		GX-F8BI-P		Normally closed	
NP o	6	~		GX-H8A-P			
Pl	sensing			GX-H8AI-P		Normally open	
	p se	8.2 0.323		GX-H8B-P		· · · · ·	
	Top	8 0.315		GX-H8BI-P		Normally closed	

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

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

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

ORDER GUIDE

GX-12 type

Ту	/pe	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
	ß			GX-F12A		Normally open
	ensi	7.1 0.280		GX-F12AI	NPN open-collector transistor	
Ŧ	output Front sensing	12 0.472 27.8 1.094		GX-F12B		Normally closed
outpr				GX-F12BI		Normally closed
NPN output sensing Froi	g			GX-H12A		Normally open
	ensin	12 0.472	Maximum	GX-H12AI		
	Top se	12 0.472 27.4	operation distance	GX-H12B		Normally closed
	Ĕ		4.0 mm 0.157 in	GX-H12BI		
	βĹ	(0 to 3.3 mm 0 to 0.130 in)	GX-F12A-P		Normally anon	
	sensing			GX-F12AI-P	PNP open-collector transistor	Normally open
Ŧ	Front s	12 12 27.8 1.094	Stable sensing range	GX-F12B-P		Nemelly deced
PNP output	ц Ц	0.472		GX-F12BI-P		Normally closed
NP	6			GX-H12A-P		
Ф.	sensing	12 0.472		GX-H12AI-P		Normally open
	Top se	12 0.472 27.4 1.079		GX-H12B-P		Newselly elegend
	μř	12 0.472		GX-H12BI-P		Normally closed

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

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

GX-15 type

Ту	pe	Appearance (mm in)	Appearance (mm in) Sensing range (Note 1) Model No. (Note 2)		Output	Output operation
	Бп	\sim	\sim			Nerrelluserer
	sensing	8 0.315		GX-F15AI		Normally open
¥	NPN output ng Front s	31.5		GX-F15B		Normally closed
outpu		15 0.591		GX-F15BI	NPN open-collector	Normally closed
PN c	Ð			GX-H15A	transistor	Normally open
z	sensing	16.5 0.650	Maximum	GX-H15AI	-	
	Top se	29.5	operation distance	GX-H15B		Normally closed
			5.Ó mm 0.197 in	GX-H15BI		
	٥Ľ		(0 to 4.2 mm 0 to 0.165 in) GX-F15A	GX-F15A-P		Normally on an
	sensing	8 0.315		GX-F15AI-P	PNP open-collector transistor	Normally open
Ŧ	Front s	31.5	Stable sensing range	GX-F15B-P		Nermelluslaad
PNP output	Ъ	15 0.591		GX-F15BI-P		Normally closed
NP	6			GX-H15A-P		NUMBER
с.	sensing	16.5 0.650		GX-H15AI-P		Normally open
	Top se	29.5		GX-H15B-P		Nermelly sleeped
	μĔ	15 0.591		GX-H15BI-P		Normally closed

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

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

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

ORDER GUIDE

GX-15 (Long sensing range) type

Ту	/pe	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation
	bu	\sim		GX-FL15A		Normally open
	sensing	8 0.315		GX-FL15AI		
ŧ	NPN output ing Front s	31.5 15 0.591		GX-FL15B		Normally closed
outpu				GX-FL15BI	NPN open-collector	Normally closed
IPN C			GX-HL15A	transistor	Normally open	
z	sensing	16.5 0.650 29.5 15 0.591 1.161	Maximum	GX-HL15AI	-	Normally open
	Top se		operation distance	GX-HL15B		Normally closed
	Ĕ		8.0 mm 0.315 in	GX-HL15BI		
	Ð			GX-FL15A-P		Namally an an
	sensing			GX-FL15AI-P		Normally open
t	Front s	31.5	Stable sensing range	GX-FL15B-P	PNP open-collector transistor	
PNP output	ШШ	15 0.591		GX-FL15BI-P		Normally closed
NP o	6			GX-HL15A-P		
9	sensing	16.5 0.650	16.5 0.650	GX-HL15AI-P		Normally open
	Top se	29.5		GX-HL15B-P		
	Ĕ	15 0.591		GX-HL15BI-P		Normally closed

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

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

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

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

(e.g.) 5 m 16.404 ft cable length type of GX-F15AI-P is "GX-F15AI-P-C5". Bending-resistant cable type of GX-F15AI-P is "GX-F15AI-P-R".

OPTIONS

Designation	Model No.	Desc	· MS-G>	
	MS-GX6-1	Mounting bracket for GX-6 typ Sensors can be mounted clos	e (recommended). ely together for space-saving.	
Sensor	MS-GL6-1	Mounting brackets for GX-6 type Sensor mounting brackets for GL-6 can be used. Interchange is		· MS-GL
mounting bracket	MS-GL6-2	possible.		
	MS-GXL8-4	Mounting bracket for GX-8 typ	· MS-GL	
	MS-GXL15	Mounting bracket for GX-15 ty		
Aluminum	MS-A15F	For GX-FL15 □(- P)	Mounting example when mounted onto a steel or	· MS-GX
sheet	MS-A15H	For GX-HL15 □(- P)	stainless steel plate	
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.			

r mounting bracket X6-1 Screw is not attached. _6 Screw is not attached. _6-2 Screw is not attached.

XL8-4



attached.

· MS-A15F · MS-A15H

Aluminum sheet



GX-6 type

$ \subset $	<u> </u>	Туре	NPN	output	PNP	output			
		Pront sensing	GX-F6A(I)	GX-F6B(I)	GX-F6A(I)-P	GX-F6B(I)-P			
Item	ı	Pi (2) Front sensing Pop (2) Front sensing Pop (2) Top sensing	GX-H6A(I)	GX-H6B(I)	GX-H6A(I)-P	GX-H6B(I)-P			
CEn	narking	directive compliance		EMC Directive, RoHS Directive					
Max.	. opera	tion distance (Note 3)		1.6 mm 0.0	63 in ± 8 %				
Stab	le sen	sing range (Note 3)		0 to 1.3 mm	0 to 0.051 in				
Stan	idard s	sensing object		Iron sheet 12 × 12 × t 1 mm	n 0.472 × 0.472 × t 0.039 in				
Hyst	eresis			20 % or less of operation distant	ce (with standard sensing object)	1			
Rep	eatabi	lity	Along	g sensing axis, perpendicular to s		r less			
Sup	ply vol	tage		12 to 24 V DC ⁺¹⁰ 15 %	Ripple P-P 10 % or less				
Curr	ent co	nsumption		15 mA	or less				
Output			NPN open-collector transistor • Maximum sink current: 100 • Applied voltage: 30 V DC o • Residual voltage: 2 V or le	or less (between output and 0 V)	,				
	Utiliz	ation category	DC-12 or DC-13						
	Outp	ut operation	Normally open	Normally closed	Normally open	Normally closed			
Мах	. respo	onse frequency	400 Hz						
Ope	ration	indicator	Orange LED (lights up when the output is ON)						
	Pollu	tion degree	3 (Industrial environment)						
nce	Prote	ection		IP68 (IEC), IP6	68G (Note 4, 5)				
Environmental resistance	Ambi	ent temperature	-2	5 to +70 °C –13 to +158 °F, Stor	age: -40 to +85 °C -40 to +185	°F			
tal re	Ambi	ent humidity		35 to 85 % RH, Sto	rage: 35 to 95 % RH				
men	Volta	ge withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	d enclosure			
viron	Insul	ation resistance	50 MΩ, or more, wi	th 500 V DC megger between al	supply terminals connected tog	ether and enclosure			
ш	Vibra	tion resistance	10 to 500 Hz frequency	3 mm 0.118 in double amplitude	e (Max. 20 G) in X, Y and Z direc	tions for two hours each			
	Shoc	k resistance	10,000 m/s ² acceleration (1,000 G approx.) in X, Y and Z directions three times each						
	Sensing Temperature characteristics		Over ambient temperature range –25 to +70 °C –13 to +158 °F: Within ± 8 % of sensing range at +23 °C +73 °F						
variation Voltage characteristics		Voltage characteristics	Within ± 2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage						
Mate	erial		Enclosure: PBT, Indicator part: Polyester						
Cab	le		0.15	mm ² 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281 f	t long			
Cab	le exte	nsion	Extens	ion up to total 100 m 328.084 ft i	•	, cable.			
Net weight				15 g a	ipprox.				

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.

GX-8 type

8

\frown		Туре	NPN	output	PNP	output			
	NO.	Front sensing	GX-F8A(I)	GX-F8B(I)	GX-F8A(I)-P	GX-F8B(I)-P			
Item	Model	Top sensing	GX-H8A(I)	GX-H8B(I)	GX-H8A(I)-P	GX-H8B(I)-P			
CE m	narking dir	ective compliance		EMC Directive, RoHS Directive					
Max.	operation	distance (Note 3)		2.5 mm 0.0	98 in ± 8 %				
Stabl	le sensing	g range (Note 3)		0 to 2.1 mm	0 to 0.083 in				
Stan	dard sens	sing object		Iron sheet 15 × 15 × t 1 mr	n 0.591 × 0.591 × t 0.039 in				
Hyste	eresis			20 % or less of operation distant	ce (with standard sensing object))			
Repe	eatability		Alon	g sensing axis, perpendicular to	sensing axis: 0.04 mm 0.002 in o	orless			
Supp	oly voltage	9		12 to 24 V DC ⁺¹⁰ ₋₁₅ %	Ripple P-P 10 % or less				
Curre	ent consu	mption		15 mA	or less				
Output				0 mA or less (between output and 0 V) ess (at 100 mA sink current)					
[Utilizatio	n category		DC-12 0	or DC-13				
	Output o	peration	Normally open	Normally closed	Normally open	Normally closed			
Max.	response	e frequency	500 Hz						
Oper	ration indi	cator	Orange LED (lights up when the output is ON)						
	Pollution	degree	3 (Industrial environment)						
nce	Protectio	n	IP68 (IEC), IP68G (Note 4, 5)						
sista	Ambient	temperature	-2	25 to +70 °C -13 to +158 °F, Stor	rage: -40 to +85 °C -40 to +185	°F			
tal re	Ambient	humidity		35 to 85 % RH, Sto	rage: 35 to 95 % RH				
Environmental resistance	Voltage	withstandability	1,000 V AC	c for one min. between all supply	terminals connected together an	d enclosure			
viron	Insulatio	n resistance	50 MΩ, or more, w	ith 500 V DC megger between al	I supply terminals connected tog	ether and enclosure			
ш	Vibration	resistance	10 to 500 Hz frequency	, 3 mm 0.118 in double amplitude	e (Max. 20 G) in X, Y and Z direc	tions for two hours each			
	Shock re	sistance	10,000 m	/s ² acceleration (1,000 G approx	.) in X, Y and Z directions three t	imes each			
Sens	0 1.0	nperature characteristics	Over ambient temperat	ture range -25 to +70 °C -13 to -		range at +23 °C +73 °F			
variation Voltage characteristics			Within ± 2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage						
Material			Enclosure: PBT, Indicator part: Polyester						
Cable	е		0.15 mm ² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long						
Cable	e extensio	on	Extens	sion up to total 100 m 328.084 ft i	s possible with 0.3 mm ² , or more	e, cable.			
Net v	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.

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 4) Panasonic Industrial Devices SUNX's IP68 test method

 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.

 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.

GX-12 type

$ \subset $		Туре	NPN	output	PNP	output			
		Front sensing	GX-F12A(I)	GX-F12B(I)	GX-F12A(I)-P	GX-F12B(I)-P			
Iter	n de	Top sensing	GX-H12A(I)	GX-H12B(I)	GX-H12A(I)-P	GX-H12B(I)-P			
CE n	narking o	directive compliance		EMC Directive, RoHS Directive					
Max.	operatio	on distance (Note 3)		4.0 mm 0.1	57 in ± 8 %				
Stab	le sensi	ing range (Note 3)		0 to 3.3 mm	0 to 0.130 in				
Stan	dard se	nsing object		Iron sheet 20 × 20 × t 1 mr	n 0.787 × 0.787 × t 0.039 in				
Hyst	eresis			20 % or less of operation distant	ce (with standard sensing object))			
Rep	eatabilit	у	Along		sensing axis: 0.04 mm 0.002 in c	r less			
Sup	oly volta	ige		12 to 24 V DC ⁺¹⁰ 15 %	Ripple P-P 10 % or less				
Curr	ent cons	sumption		15 mA	or less				
Output				· · · ·		or less (between output and +V)			
	Utilizat	ion category		DC-12 c	or DC-13				
	Output	operation	Normally open	Normally closed	Normally open	Normally closed			
Max	. respon	ise frequency	500 Hz						
Ope	ration in	dicator	Orange LED (lights up when the output is ON)						
	Pollutio	on degree	3 (Industrial environment)						
ince	Protec	tion		IP68 (IEC), IP68G (Note 4, 5)					
Environmental resistance	Ambie	nt temperature	-2	5 to +70 °C –13 to +158 °F, Stor	rage: -40 to +85 °C -40 to +185	°F			
tal re	Ambie	nt humidity		35 to 85 % RH, Sto	rage: 35 to 95 % RH				
men	Voltage	e withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	d enclosure			
wiror	Insulat	ion resistance	50 MΩ, or more, wit	th 500 V DC megger between al	I supply terminals connected tog	ether and enclosure			
ш	Vibrati	on resistance	10 to 500 Hz frequency,	3 mm 0.118 in double amplitude	e (Max. 20 G) in X, Y and Z direc	tions for two hours each			
		resistance	10,000 m/	s ² acceleration (1,000 G approx	.) in X, Y and Z directions three t	imes each			
	Sensing Temperature characteristics		Over ambient temperat	-	+158 °F: Within ±8 % of sensing	range at +23 °C +73 °F			
variation Voltage characteristics			Within ± 2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage						
Mate	erial		Enclosure: PBT, Indicator part: Polyester						
Cabl	е		0.15 г	mm ² 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281	it long			
Cab	e exten	sion	Extensi	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. (a) 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.

GX-15 type

Type हेंदर हुन्दू हिront sensing								
$\frac{\dot{2}}{\alpha}$ Front sensing			Long sens	sing range			Long sens	sing range
	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)-
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)-F
king directive compliance				EMC Directive,	RoHS Directive			
eration distance (Note 3)	5.0 mm <mark>0.1</mark>	<mark>97 in ±</mark> 8 %	8.0 mm 0.315 ir	1 ± 8 % (Note 4)	5.0 mm 0.1	97 in ± 8 %	8.0 mm 0.315 ir	± 8 % (Note 4)
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)
rd sensing object								
sis			20 % or less of o	operation distand	ce (with standard	sensing object)	
ability		Along	sensing axis, p	erpendicular to	sensing axis: 0.0	4 mm 0.002 in c	r less	
voltage			12 to 24	4 V DC ⁺¹⁰ 15 %	Ripple P-P 10 %	or less		
consumption				15 mA	or less			
	NPN open-collector transistor PNP open-collector transistor • Maximum sink current: 100 mA • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Applied voltage: 2 V or less (at 100 mA sink current) • Residual voltage: 2 V or less (at 100 mA sink current) • Residual voltage: 2 V or less (at 100 mA source of the sink current)			•				
ilization category	DC-12 or DC-13							
utput operation	Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally close
sponse frequency	250	Hz	150 Hz	(Note 5)	250) Hz	150 Hz	(Note 5)
on indicator	Orange LED (lights up when the output is ON)							
ollution degree			3 (Industrial environment)					
otection			IP68 (IEC), IP68G (Note 6, 7)					
nbient temperature		-2	5 to +70 °C –13	to +158 °F, Stor	age: -40 to +85	°C -40 to +185	°F	
nbient humidity			35 t	o 85 % RH, Sto	rage: 35 to 95 %	RH		
oltage withstandability		1,000 V AC	for one min. bet	ween all supply	terminals conne	cted together an	d enclosure	
sulation resistance	50	MΩ, or more, wi	th 500 V DC me	gger between al	I supply terminal	s connected tog	ether and enclos	ure
bration resistance	10 to 50	0 Hz frequency,	3 mm 0.118 in c	louble amplitude	e (Max. 20 G) in	X, Y and Z direct	tions for two hou	irs each
nock resistance		10,000 m/	s ² acceleration (1,000 G approx	.) in X, Y and Z c	lirections three t	imes each	
Temperature characteristics	Over a	nbient temperati			r158 °F: Within ± 8 % of sensing range at +23 °C +73 °F			
range variation Voltage characteristics			Within ± 2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage					
1			Encl	losure: PBT, Ind	icator part: Polye	ester		
	0.15 mm ² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long							
extension		Extensi	ion up to total 10	0 m 328.084 ft i	s possible with 0	.3 mm ² , or more	, cable.	
ght				20 g a	approx.			
	sis ability voltage consumption ilization category utput operation sponse frequency on indicator on indicator otection nbient temperature on resistance oration resistance on indicator oration resistance oration resistance otectristics n Voltage characteristics indicator otection oration resistance voltage characteristics indicator oration resistance	d sensing object 0.787× 0.783 sis 0.787× 0.783 sis ability voltage 0.787× 0.783 ability voltage consumption VPN open-colle ·Maximum ·Applied vo ·Maximum ·Applied vo ·Applied vo ·Residual v utput operation Normally open sponse frequency 2500 on indicator 0.00000000000000000000000000000000000	sis 0.787×0.787×10.039 in sisis ability ability Along voltage	a sensing object 0.787× 0.787 × t 0.039 in 1.181 × 1.18 sis 20 % or less of q ability Along sensing axis, p voltage 12 to 2 consumption 12 to 2 voltage 12 to 2 consumption NPN open-collector transistor Maximum sink current: 100 mA Applied voltage: 30 V DC or less (between e Residual voltage: 2 V or less (at 100 mA si ilization category 250 Hz 150 Hz on indicator Orrange otection Orange nbient temperature -25 to +70 °C -13 nbient humidity 35 to 10,000 V AC for one min. bet sulation resistance 10 to 500 Hz frequency, 3 mm 0.118 in or otock resistance 10,000 m/s² acceleration or indicator Over ambient temperature range -25 to 10,000 m/s² acceleration or otock resistance Over ambient temperature range -25 to 10,000 m/s² acceleration or indicator Within ±2 9 indicator Usinge characteristics	a sensing object 0.787× 0.787 × t 0.039 in 1.181 × 1.181 × t 0.039 in sis 20 % or less of operation distant ability Along sensing axis, perpendicular to a 12 to 24 V DC _{15}^{-16} % consumption solidage 12 to 24 V DC _{15}^{-16} % consumption 15 mA 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) ilization category DC-12 c utput operation Normally open Normally open Normally closed sponse frequency 250 Hz on indicator Orange LED (lights up otection IP68 (IEC), IP4 nbient temperature -25 to +70 °C -13 to +158 °F, Stor nbient humidity 35 to 85 % RH, Sto sulation resistance 10 MQ, or more, with 500 V DC megger between all supply sulation resistance 10 to 500 Hz frequency, 3 mm 0.118 in double amplitude nor dispertension 10 to 500 Hz frequency, 3 mm 0.118 in double amplitude oteck resistance 10,000 m/s² acceleration (1,000 G approx n Voltage characteristics Over ambient temperature range -25 to +70 °C -13 to -15 % for -15 % for -15	d sensing object 0.787 × 0.787 × 10.039 in 1.181 × 1.181 × 10.039 in 0.787 × 0.787 Sis 20 % or less of operation distance (with standard ability Along sensing axis, perpendicular to sensing axis: 0.0 woltage 12 to 24 ∨ DC ⁺¹⁰ / ₋₁₅ % Ripple P-P 10 % consumption 15 mA or less NPN open-collector transistor Maximum sink current: 100 mA Applied voltage: 2 V or less (at 100 mA sink current) NPN open-collector transistor Maximum Sink current: 100 mA Applied voltage: 2 V or less (at 100 mA sink current) Normally open Normally closed Normally open Normally closed Normally open sponse frequency 250 Hz 150 Hz (Note 5) 250 n indicator Normally open Voltage 3 (Industrial environment) Notection PP68 (IEC), IP68G (Note 6, 7) PP1 P968 (IEC), IP	d sensing object 0.787×0.787×t0.039 in 1.181×1.181×1.039 in 0.787×0.787×t0.039 in sis 20 % or less of operation distance (with standard sensing object) ability Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in o voltage 12 to 24 V DC _116 % Ripple P-P 10 % or less consumption 15 mA or less 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 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 • Residual voltage: 2 V or less (at 100 mA sink current) • DC-12 or DC-13 • Maximum source current: • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current) • Normally closed Normally closed	d sensing object 0.787 × 10.39 in 1.181 × 1.181 × 1.039 in 0.787 × 0.787 × 10.39 in 1.181 × 1

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

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

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

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

5) This is the numerical value which the sensor mount onto an insulator. When mounted onto a metallic plate, max. response frequency will decrease. 6) Panasonic Industrial Devices SUNX's IP68 test method

① Immerse at 0 m below 0 °C +32 °F water surface and leave for 30 min. Then, immerse at 0 m below +70 °C +158 °F water surface and leave for 30 min. ② Regard the heat shock test in ① as one cycle and perform 20 cycles.

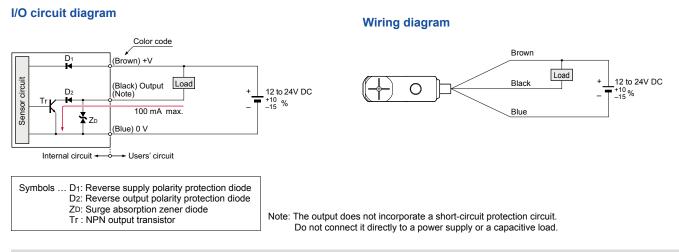
③ Leave in water at a depth of 1 m 3.281 ft in water for 500 hours.

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

7) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil. Please check the resistivity of the sensor against the cutting oil you are using beforehand.

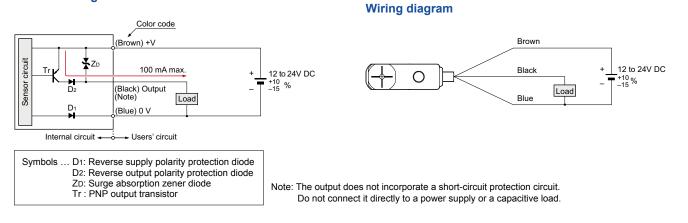
I/O CIRCUIT DIAGRAMS

NPN output type



PNP output type

I/O circuit diagram



SENSING CHARACTERISTICS (TYPICAL)

GX-6 type

Correlation between sensing object size and sensing range

20

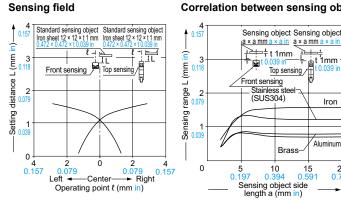
0.78

Correlation between sensing object size and sensing range

Correlation between sensing object size and sensing range

Iron

Brass



Standard sensing object Iron sheet 15 × 15 × 11 mm 0.591 × 0.591 × 10.039 in

Top sensing

2 0.079

4

0.157 Right

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

Standard sensing object Iron sheet 15 × 15 × t 1 mm

2

Left

79

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-Center Operating point *l* (mm in)

Front se

8-+ Ħ

nsing 🚰

4 0.157

3 118

2

1

0

4

0.157

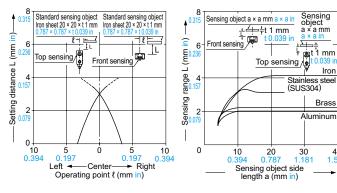
Setting distance L (mm in)-

Sensing object <u>a × a mm a × a in</u> <u>+</u> t 1 mm t 0 039 in Sensing object a × a mm a × a → + t 1 mm Sensing range L (mm in) ġ Top sensing 3 /Front sensing Iron 2 Stainless steel (SUS304) Brass Aluminum 0 10 0.394 15 0.591 20 0.787 5 0.197 Sensing object side length a (mm in)

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

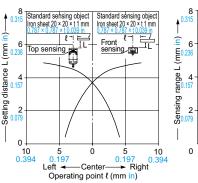
Sensing field



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

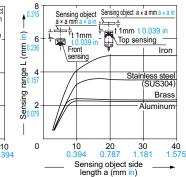
Sensing field



Correlation between sensing object size and sensing range

40

1.575



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.

As the sensing object size becomes smaller than

the standard size (iron sheet 30 × 30 × t 1 mm

 $1.181 \times 1.181 \times t \ 0.039$ in), the sensing range

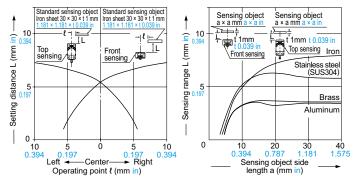
shortens as shown in the left figure.

SENSING CHARACTERISTICS (TYPICAL)

GX-15 (Long sensing range) type

Sensing field

Correlation between sensing object size and sensing range



PRECAUTIONS FOR PROPER USE



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

Cable Hoo

Groove

É

ø2.4 mm

0.094 in hole

(Depth: 3 mm

0.118 in or more)

Mounting

GX-6 type

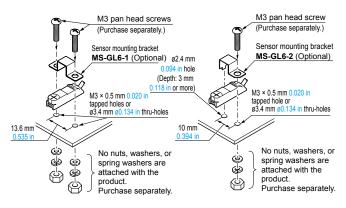
• Use the optional sensor mounting bracket when installing.

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

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

M3 pan head screw

(Purchase separately.)

Sensor mounting bracket **MS-GX6-1** (Optional)

M3 × 0.5 mm 0.020 in tapped hole (Depth: 8 mm 0.315 in or more) or ø3.4 mm ø0.134 in thru-hole

No nuts, washers, or

spring washers are

product. Purchase separately.

attached with the

22 mm 0.866 ir

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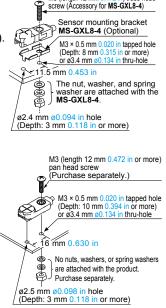
٢

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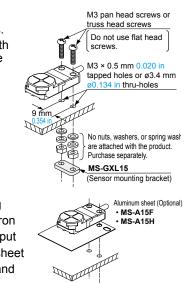
- The tightening torque should be 0.7 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in. Further, the hole in which the boss is inserted should be ø2.5 mm ø0.098 in and 3 mm 0.118 in, or more, deep.

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.



M3 (length 12 mm 0.472 in) truss head

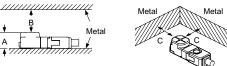


PRECAUTIONS FOR PROPER USE

Influence of surrounding metal

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

Front sensing type

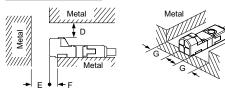




\geq	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
А	6 mm 0.236 in (Note 1)	7.4 mm 0.291 in	7.1 mm 0.280 in	8 mm 0.315 in	8 mm 0.315 in (Note 2)
В	8 mm 0.315 in	8 mm 0.315 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
С	3 mm 0.118 in	3 mm 0.118 in	7 mm 0.276 in	7 mm 0.276 in	10 mm 0.394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

- Notes: 1) When using MS-GX6-1 (recommended mounting bracket, 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



\geq	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

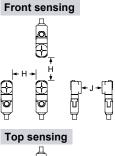
D	3 mm 0.118 in	4 mm 0.157 in	7 mm 0.276 in	6 mm 0.236 in	12 mm 0.472 in
Е	10 mm 0.394 in	10 mm 0.394 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
F	2 mm 0.079 in	3 mm 0.118 in	3 mm 0.118 in	0 mm 0 in	10 mm 0.394 in (Note)
G	2 mm 0.079 in	3 mm 0.118 in	3 mm 0.118 in	3 mm 0.118 in	10 mm 0.394 in

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.

		Н	J	Front	
GX-F6	Between "I" type	0 mm	15 mm		
GX-H6	and non "I" type	(Note 2)	0.591 in		
type	Between two "I" types or two non "I" types	13 mm 0.512 in	25 mm 0.984 in		
GX-F8	Between "I" type	0 mm	15 mm	- + H -	
GX-H8	and non "I" type	(Note 2)	0.591 in		
type	Between two "I" types or two non "I" types	20 mm 0.787 in	35 mm 1.378 in	Ð	
GX-F12	Between "I" type	0 mm	25 mm	Ĩ	
GX-H12	and non "I" type	(Note 2)	0.984 in		
type	Between two "I" types or two non "I" types	25 mm 0.984 in	50 mm 1.969 in	Top s	
GX-F15	Between "I" type	0 mm	25 mm		
GX-H15	and non "I" type	(Note 2)	0.984 in		
type	Between two "I" types or two non "I" types	45 mm 1.772 in	70 mm 2.756 in		
GX-FL15	Between "I" type	0 mm	25 mm	.≁	
GX-HL15	and non "I" type	(Note 2)	0.984 in	⊡	
type	Between two "I" types	110 mm	170 mm	e	
	or two non "I" types	3.059 in	6.693 in	H	
Notes: 1) "I" in the model No. specifies					





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

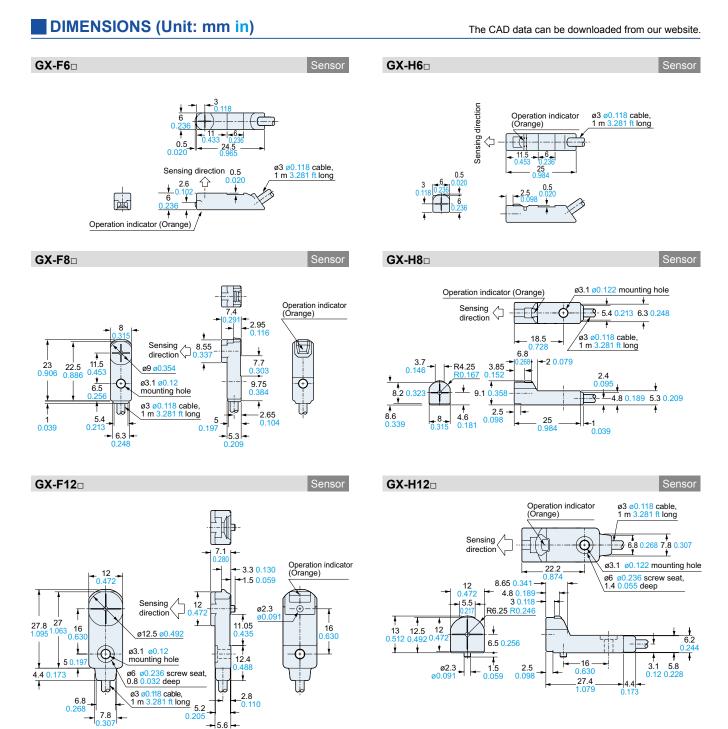
Model No. Metal	GX-F6 GX-H6 type	GX-F8 GX-H8 type	GX-F12 GX-H12 type	GX-F15 GX-H15 type	GX-FL15 type	GX-HL15 type
Iron	1	1	1	1	1	1
Stainless steel (SUS304)	0.76 approx.	0.76 approx.	0.79 approx.	0.68 approx.	0.70 approx.	0.76 approx.
Brass	0.50 approx.	0.50 approx.	0.56 approx.	0.47 approx.	0.45 approx.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

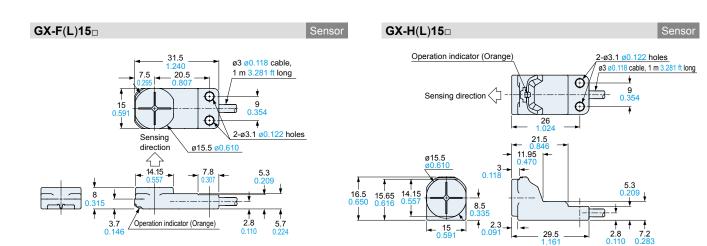
Wiring

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

Others

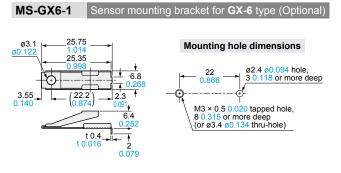
• Do not use during the initial transient time (50 ms) after the power supply is switched on.





0.221

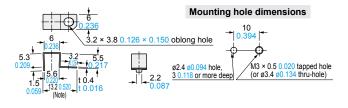
DIMENSIONS (Unit: mm in)



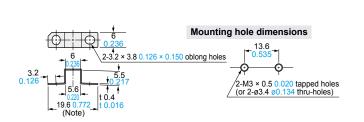
Material: Stainless steel (SUS304)

6

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



Material: Stainless steel (SUS301) Note: 13.4 mm 0.528 in with the sensor fitted.



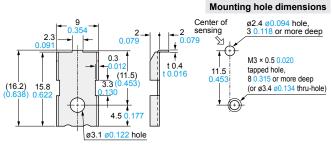
The CAD data can be downloaded from our website.

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

Material: Stainless steel (SUS301) Note: 20 mm 0.787 in with the sensor fitted.

MS-GL6-1

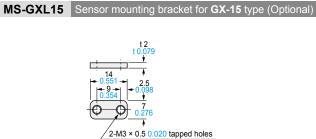
MS-GXL8-4 Sensor mounting bracket for **GX-8** type (Optional)



Material: Stainless steel (SUS304)

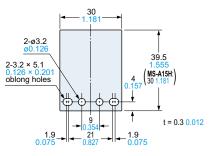
1 pc. each of M3 (length 12 mm 0.472 in) truss head screw,

nut, spring washer and plain washer is attached.



Material: Cold rolled carbon steel (SPCC)





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