Rectangular-shaped Inductive Proximity Sensor Amplifier Built-in

GX-F/H SERIES

FIBER SENSORS Related Information

■ General terms and conditions..... F-3

■ Glossary of terms......P.1576~

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GX

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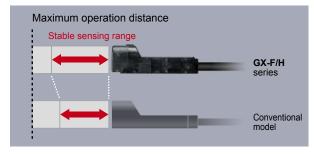


Industry No. 1* in stable sensing

* 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.



	Maximum	Stable sen	sing range	
Туре	operation distance	GX-F/H series	Conventional model	
GX-□6	GX- □ 6 1.6 mm 0.063 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	

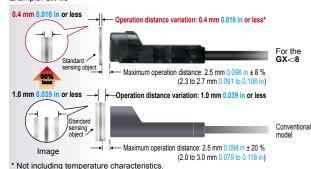
^{*} With standard sensing object

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.

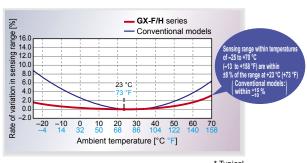
Example: GX
8



Temperature characteristics vary within ±8 %

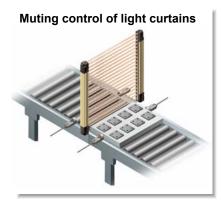
Components such as the sensor coil and core and product design have been totally revised to provide excellent temperature characteristics.

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

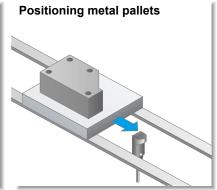


* Typical

APPLICATIONS



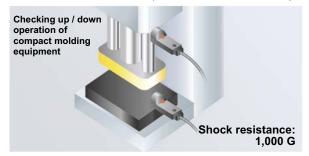




ENVIRONMENTAL RESISTANCE

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.790~)".



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. $_{\rm GX-H^{\tiny \square}}$



MOUNTING

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

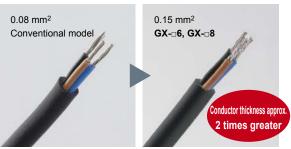
A metal sleeve has been inserted.

It prevents the sensor from being damaged by tightening too much.



Conductor thickness doubled to make wiring much easier! (GX-06 / GX-08 only)

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



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GX-M GX-U/GX-FU/ GX-N

GX

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ORDER GUIDE

GX-6 type

Ту	/pe	Appearance (mm in)	Sensing range (Note 1)	sing range (Note 1) Model No. (Note 2)		Output operation
	ng			GX-F6A		Normally open
	Front sensing			GX-F6AI	NPN open-collector	Normally open
Ħ	ont s	6 0.236		GX-F6B		Normally closed
outpu	표	6 0.236		GX-F6BI		Normally closed
NPN output	g	\sim	GX-H6A transistor	transistor	Normally onen	
	sensing	1	Maximum	GX-H6AI	GX-H6BI	Normally open
	Top se	6 0.236	operation distance 1.6 mm 0.063 in	GX-H6B		Normally closed
	Ĕ	6 0.236 0.984		GX-H6BI		
	βL		(0 to 1.3 mm 0 to 0.051 in)	GX-F6A-P		Normally ones
	ensir			GX-F6AI-P	PNP open-collector transistor	Normally open
±	Front sensing	6 0.236	Stable sensing range	GX-F6B-P		Namelli
PNP output	Fr	6 0.236 0.965		GX-F6BI-P		Normally closed
A P	g	. />		GX-H6A-P		
Δ.	sensing			GX-H6AI-P		Normally open
	Top se	6 0.236		GX-H6B-P		
	=	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) " ${f I}$ " in the model No. indicates a different frequency type.

GX-8 type

	ex e sype								
Ту	/ре	Appearance (mm in)	Sensing range (Note 1) Model No. (Note 2)		Output	Output operation			
	βL			GX-F8A		Normally open			
	ensir	7.4 0.291		GX-F8AI					
=	Front sensing	8 0.315 0.906		GX-F8B]	Normally closed			
NPN output	Ę	0.000		GX-F8BI	NPN open-collector	Normally closed			
PN	ıg	~ 🗸		GX-H8A transistor	Normally open				
Z	sensing		Maximum	GX-H8AI		Normany open			
	Top se	8.2 0.323	operation distance	GX-H8B		Normally closed			
	ř	8 0.315	2.5 mm 0.098 in	GX-H8BI					
	ηg	~~	(0 to 2.1 mm 0 to 0.083 in)	GX-F8A-P		Normally onen			
	sensing	7.4 0.291		GX-F8AI-P	PNP open-collector transistor	Normally open			
+=	Front s	8 0.315 0.906	Stable sensing range	GX-F8B-P		Name allered			
output	Ē	0.000	0.900	GX-F8BI-P		Normally closed			
PNP o	g	. 🔿		GX-H8A-P		Namella			
₾ .	sensing			GX-H8AI-P		Normally open			
	Top se	8.2 0.323		GX-H8B-P		Normally along			
	Ĕ	8 0.315 0.984		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

Тур	ре	Appearance (mm in)	(Note 2)		Output	Output operation
	ing			GX-F12A		Normally open
	sens	7.1 0.280		GX-F12AI	NPN open-collector transistor	
±	Front sensing	27.8		GX-F12B		Normally closed
of pr	ഥ	0.472 1.094		GX-F12BI		Normally closed
NPN output	б	12 0.472 27.4 1.079		GX-H12A		Normally open
2	sensing		Maximum	GX-H12AI		Normally open
	Top se		operation distance	GX-H12B		Normally closed
	ĭ		4.0 mm 0.157 in	GX-H12BI		
	<u>g</u>	7.1 0.280	(0 t0 3.3 11111 0 t0 0.130 111)	GX-F12A-P		No
	Front sensing			GX-F12AI-P	PNP open-collector transistor	Normally open
_	out se		Stable sensing range	GX-F12B-P		
output	F.	12 0.472 27.8 1.094		GX-F12BI-P		Normally closed
PNP o		. ~		GX-H12A-P		
P	sensing	12 0.472		GX-H12AI-P		Normally open
	b se	27.4		GX-H12B-P		
	Тор	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) " ${f I}$ " in the model No. indicates a different frequency type.

GX-15 type

Ту	/ре	Appearance (mm in)	Appearance (mm in) Sensing range (Note 1)		Output	Output operation
	βL			GX-F15A		Namella
	sensing	8 0.315		GX-F15AI		Normally open
=	Front s			GX-F15B	NPN open-collector transistor	Normally closed
outpr	F	15 0.591 1.240		GX-F15BI		
NPN output	6			GX-H15A		Namally
	sensing	16.5 0.650	Maximum	GX-H15AI		Normally open
	Top se	29.5	operation distance	GX-H15B		Normally closed
	Ĕ	15 0.591 1.161	5.0 mm 0.197 in	GX-H15BI		
	βL	(0 to 4.2 mm 0 to 0.165 in)	GX-F15A-P		Normally on on	
	sensing	8 0.315	\ \ \	GX-F15AI-P	PNP open-collector transistor	Normally open
+=	Front s	31.5	Stable sensing range	GX-F15B-P		Namallualaad
PNP output	<u>F</u>	15 0.591 1.240		GX-F15BI-P		Normally closed
AP 0	б	\ @ \?		GX-H15A-P		No
P Sin	sensing	16.5 0.650	3.5 0.650	GX-H15AI-P		Normally open
	Top se	29.5		GX-H15B-P		Namalluslassa
	Ĕ	15 0.591 1.161		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) " $\boldsymbol{\mathsf{I}}$ " in the model No. indicates a different frequency type.

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Other Products

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ORDER GUIDE

GX-15 (Long sensing range) type

Ту	/pe	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
	ng			GX-FL15A		Normally open	
	sensing	8 0.315		GX-FL15AI	NPN open-collector transistor	Normany open	
=	Front s	31.5		GX-FL15B		Normally closed	
outpu	遊	15 0.591 1.240		GX-FL15BI			
NPN output	б	16.5 0.650		GX-HL15A		Namalkaaaa	
Z	sensing		Maximum	GX-HL15AI		Normally open	
	Top se	29.5	8.0 mm 0.315 in	GX-HL15B		Normally closed	
	ř	15 0.591 1.161		GX-HL15BI			
	Б	8 0.315	(0 to 6.7 mm 0 to 0.264 in)	GX-FL15A-P	O to 6.7 mm 0 to 0.264 in)		Namally
	sensing		<u> </u>	GX-FL15AI-P		Normally open	
	Front s	31.5	Stable sensing range	GX-FL15B-P	PNP open-collector transistor		
PNP output	Fre	15 0.591 1.240		GX-FL15BI-P		Normally closed	
N O	Б	`		GX-HL15A-P			
₫.	sensing	16.5 0.650		GX-HL15AI-P		Normally open	
	Top se	29.5		GX-HL15B-P			
	٢	15 0.591 1.161		GX-HL15BI-P		Normally closed	

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

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

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

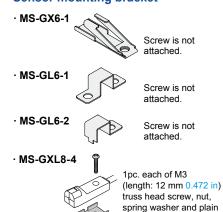
5 m 16.404 ft cable length type (standard: 1 m 3.281 ft) and bending-resistant cable (excluding 5 m 16.404 ft cable length type) are available. However, long sensing range type is not available. When ordering 5 m 16.404 ft cable length type, suffix "-C5" to the model No. When ordering bending-resistant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

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

OPTIONS

Designation	Model No.	Description				
	MS-GX6-1	Mounting bracket for GX-6 typ Sensors can be mounted close	,			
Sensor	MS-GL6-1		Mounting brackets for GX-6 type Sensor mounting brackets for GL-6 can be used. Interchange is			
mounting bracket	MS-GL6-2	possible.				
	MS-GXL8-4	Mounting bracket for GX-8 type				
	MS-GXL15	Mounting bracket for GX-15 type				
Aluminum	MS-A15F	For GX-FL15 □(- P)	Mounting example when mounted onto a steel or			
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 ir the bracket into the mounting hole of GX-8 type when re 3-wire type GXL-8 series (discontinued model) with GX-				

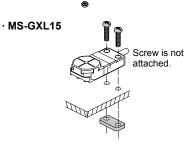
Sensor mounting bracket





- · MS-A15F
- · MS-A15H





washer is attached.

SPECIFICATIONS

GX-6 type

		Туре	NPN (output	PNP (output		
	\	Front sensing	GX-F6A(I)	GX-F6B(I)	GX-F6A(I)-P	GX-F6B(I)-P		
Iten	1 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Top sensing	GX-H6A(I)	GX-H6B(I)	GX-H6A(I)-P	GX-H6B(I)-P		
CE r	narking	directive compliance		EMC Directive, RoHS Directive				
Max	. opera	peration distance (Note 3) 1.6 mm 0.063 in ± 8 %						
Stat	le sen	sing range (Note 3)		0 to 1.3 mm	0 to 0.051 in			
Star	ndard s	ensing object		Iron sheet 12 × 12 × t 1 mr	n 0.472 × 0.472 × t 0.039 in			
Hys	teresis			20 % or less of operation distance	ce (with standard sensing object))		
Rep	eatabil	ity	Along	sensing axis, perpendicular to	sensing axis: 0.04 mm 0.002 in o	or less		
Sup	ply volt	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)	PNP open-collector transistor			
	Utiliza	ation category		DC-12 or DC-13				
	Outpu	ut operation	Normally open	Normally closed	Normally open	Normally closed		
Max	. respo	onse frequency	400 Hz					
Ope	ration i	indicator	Orange LED (lights up when the output is ON)					
	Pollut	tion degree	3 (Industrial environment)					
nce	Prote	ction	IP68 (IEC), IP68G (Note 4, 5)					
Environmental resistance	Ambie	ent temperature	-2	5 to +70 °C –13 to +158 °F, Stor	rage: -40 to +85 °C -40 to +185	°F		
a e	Ambie	ent humidity		35 to 85 % RH, Sto	rage: 35 to 95 % RH			
ment	Voltag	ge withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	d enclosure		
viron	Insula	ation resistance	50 MΩ, or more, wi	th 500 V DC megger between al	I supply terminals connected tog	ether and enclosure		
Ë	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		
	Shock	k resistance	10,000 m/	s ² acceleration (1,000 G approx	.) in X, Y and Z directions three t	imes each		
Sen	U	Temperature characteristics	Over ambient temperate	ure range –25 to +70 °C –13 to	+158 °F: Within ± 8 % of sensing	range at +23 °C +73 °F		
range variation Voltage characteristics		Voltage characteristics	Within ±2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage					
Mate	erial			Enclosure: PBT, Ind	icator part: Polyester			
Cab	le		0.15 ו	mm ² 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281 f	ft long		
Cab	le exte	nsion	Extens	ion up to total 100 m 328.084 ft i	s possible with 0.3 mm ² , or more	e, 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) " \boldsymbol{I} " in the model No. indicates a different frequency type.

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

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

4) Panasonic Industrial Devices SUNX's IP68 test method

- ① Immerse at 0 m below 0 °C +32 °F water surface and leave for 30 min. Then, immerse at 0 m below +70 °C +158 °F water surface and leave for 30 min.
- ② Regard the heat shock test in ① as one cycle and perform 20 cycles.
- (3) Leave in water at a depth of 1 m 3.281 ft in water for 500 hours.
- (4) After tests (1) to (3), insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.
- 5) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil. Please check the resistivity of the sensor against the cutting oil you are using beforehand.

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SPECIFICATIONS

GX-8 type

CX-0 ty	Туре	NPN (output	PNP	output			
		GX-F8A(I)	GX-F8B(I)	GX-F8A(I)-P	GX-F8B(I)-P			
Item	Front sensing Top sensing	GX-H8A(I)	GX-H8B(I)	GX-H8A(I)-P	GX-H8B(I)-P			
CE markii	ng directive compliance		EMC Directive, RoHS Directive					
Max. oper	ration distance (Note 3)		2.5 mm 0.0	98 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	n 0.591 × 0.591 × t 0.039 in				
Hysteres	S		20 % or less of operation distance	ce (with standard sensing object)				
Repeatal	pility	Along	sensing axis, perpendicular to	sensing axis: 0.04 mm 0.002 in o	or less			
Supply vo	oltage		12 to 24 V DC ⁺¹⁰ ₋₁₅ % I	Ripple P-P 10 % or less				
Current c	onsumption		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	r less (between output and 0 V)	PNP open-collector transistor				
Utili	zation category		DC-12 c	or DC-13				
Out	put operation	Normally open	Normally closed	Normally open	Normally closed			
Max. resp	oonse frequency	500 Hz						
Operation	nindicator	Orange LED (lights up when the output is ON)						
Poll	ution degree	3 (Industrial environment)						
Pro	tection		IP68 (IEC), IP68G (Note 4, 5)					
Environmental resistance Ami Volti Insu	pient temperature	-2	5 to +70 °C –13 to +158 °F, Stor	age: -40 to +85 °C -40 to +185	°F			
TE Am	pient humidity		35 to 85 % RH, Sto	rage: 35 to 95 % RH				
Volt	age withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	d enclosure			
inst Inst	llation resistance	50 MΩ, or more, wit	th 500 V DC megger between al	supply terminals connected tog	ether and enclosure			
ы Vibi	ation resistance	10 to 500 Hz frequency,	equency, 3 mm 0.118 in double amplitude (Max. 20 G) in X, Y and Z directions for two hours each					
Sho	ck resistance	10,000 m/	s ² acceleration (1,000 G approx) in X, Y and Z directions three t	imes each			
Sensing range	Temperature characteristics	Over ambient temperate	ure range –25 to +70 °C –13 to +	-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					
Material			Enclosure: PBT, Ind	icator part: Polyester				
Cable		0.15 ı	mm ² 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281 f	t long			
Cable ex	ension	Extensi	on up to total 100 m 328.084 ft i	s possible with 0.3 mm ² , or more	, cable.			
Net weigl	nt		Front sensing type: 15 g approx.	, Top sensing type: 20 g approx.				
Notes: 1)	Where measurement of	onditions have not been specifie	d precisely the conditions used	were an ambient temperature of	±23 °C ±73 °E			

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73 °F.
 - 2) " I" in the model No. indicates a different frequency type.
 - 3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object. The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.
 - 4) Panasonic Industrial Devices SUNX's IP68 test method
 - ① Immerse at 0 m below 0 °C +32 °F water surface and leave for 30 min. Then, immerse at 0 m below +70 °C +158 °F water surface and leave for 30 min.
 - ② Regard the heat shock test in ① as one cycle and perform 20 cycles.
 - 3 Leave in water at a depth of 1 m 3.281 ft in water for 500 hours.
 - 4 After tests ① to ③, insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.
 - 5) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil Please check the resistivity of the sensor against the cutting oil you are using beforehand.

SPECIFICATIONS

GX-12 type

Туре		Туре	NPN (output	PNP output				
\	\ 2	Front sensing	GX-F12A(I)	GX-F12B(I)	GX-F12A(I)-P	GX-F12B(I)-P			
Iter	n \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Top sensing	GX-H12A(I)	GX-H12B(I)	GX-H12A(I)-P	GX-H12B(I)-P			
CE marking directive compliance				EMC Directive, RoHS Directive					
Max. operation distance (Note 3) 4.0 mm 0.157 in ± 8 %									
Stable sensing range (Note 3) 0 to 3.3 mm 0 to 0.130 in									
Star	ndard se	nsing object		Iron sheet 20 × 20 × t 1 mn	n 0.787 × 0.787 × t 0.039 in				
Hys	teresis			20 % or less of operation distance	ce (with standard sensing object)			
Rep	eatabilit	у	Along	sensing axis, perpendicular to	sensing axis: 0.04 mm 0.002 in o	or less			
Sup	ply volta	ge		12 to 24 V DC ⁺¹⁰ %	Ripple P-P 10 % or less				
Curi	ent con	sumption		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)	11	100 mA or less (between output and +V) ess (at 100 mA source current)			
Utilization category				DC-12 c	or DC-13				
	Output	operation	Normally open	Normally closed	Normally open	Normally closed			
Max	. respon	se frequency	500 Hz						
Оре	ration in	dicator	Orange LED (lights up when the output is ON)						
	Pollutio	on degree	3 (Industrial environment)						
nce	Protec	tion	IP68 (IEC), IP68G (Note 4, 5)						
Environmental resistance	Ambie	nt temperature	-2	-25 to +70 °C −13 to +158 °F, Storage: −40 to +85 °C −40 to +185 °F					
al re	Ambie	nt humidity		35 to 85 % RH, Storage: 35 to 95 % RH					
men	Voltag	e withstandability	1,000 V AC	for one min. between all supply	terminals connected together ar	nd enclosure			
viron	Insulat	ion resistance	50 M Ω , or more, with 500 V DC megger between all supply terminals connected together and enclosure						
E	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	ctions for two hours each			
	Shock	resistance	10,000 m/	/s² acceleration (1,000 G approx	.) in X, Y and Z directions three t	times each			
Sen		Temperature characteristics	Over ambient temperat	ure range –25 to +70 °C –13 to		range at +23 °C +73 °F			
varia		Voltage characteristics	Within ±2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage						
Mate	erial		Enclosure: PBT, Indicator part: Polyester						
Cab	le		0.15 mm² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long						
Cab	le exten	sion	Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable.						
Net	weight			Front sensing type: 20 g approx.	, Top sensing type: 20 g approx.				

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

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

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

4) Panasonic Industrial Devices SUNX's IP68 test method

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

② Regard the heat shock test in ① as one cycle and perform 20 cycles.
③ Leave in water at a depth of 1 m 3.281 ft in water for 500 hours.

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

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

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FA COMPONENTS

MACHINE VISION SYSTEMS

Amplifier-separated

GXL GL

GX-M

GX-U/GX-FU/ GX-N GΧ

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GX-F/H
GXL
GL
GX-M
GX-I/I/GX-FI//
GX-N
GX

SPECIFICATIONS

GX-15 type

		_		NPN (output			PNP	output	
		Туре			Long sens	sing range			Long sens	sing 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
Item	\ .	Top sensing	GX-H15A(I)	GX-H15B(I)	GX-HL15A(I)	GX-HL15B(I)	GX-H15A(I)-P	GX-H15B(I)-P	GX-HL15A(I)-P	GX-HL15B(I)-P
CE r	narking	directive compliance				EMC Directive,	RoHS Directive			
Max	operat	ion distance (Note 3)	5.0 mm 0.1	97 in ± 8 %	8.0 mm 0.315 ir	± 8 % (Note 4)	5.0 mm 0.1	97 in ± 8 %	8.0 mm 0.315 ir	± 8 % (Note 4)
Stab	le sens	sing 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)
Stan	dard se	ensing object		× 20 × t 1 mm 7 × t 0.039 in	Iron sheet 30 1.181 × 1.18			× 20 × t 1 mm 7 × t 0.039 in	Iron sheet 30 1.181 × 1.18	
Hyst	eresis				20 % or less of o	operation distanc	ce (with standard	sensing object)	
Rep	eatabili	ty		Along	sensing axis, p	erpendicular to s	sensing axis: 0.0	4 mm 0.002 in c	or less	
Sup	oly volta	age			12 to 24	4 V DC ⁺¹⁰ %	Ripple P-P 10 %	or less		
Curr	ent cor	nsumption				15 mA	or less			
Output			Maximum Applied vo	N 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 0 V) • Residual voltage: 2 V or less (at 100 mA source current)						
	Utiliza	ition category				DC-12 c	or DC-13			
	Outpu	it operation	Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally closed	Normally open	Normally closed
Max	. respo	nse frequency	250) Hz	150 Hz	(Note 5)	250) Hz	150 Hz	(Note 5)
Ope	ration i	ndicator			Orange	e LED (lights up	when the output	is ON)		
	Pollut	ion degree				3 (Industrial	environment)			
nce	Protec	ction				IP68 (IEC), IP6	68G (Note 6, 7)	,		
Environmental resistance	Ambie	ent temperature		-2	5 to +70 °C –13	to +158 °F, Stor	rage: -40 to +85	°C -40 to +185	i °F	
tal re	Ambie	ent humidity			35 t	o 85 % RH, Sto	rage: 35 to 95 %	RH		
men	Voltag	ge withstandability		1,000 V AC	for one min. bet	ween all supply	terminals conne	cted together ar	nd enclosure	
viron	Insula	tion resistance	50	MΩ, or more, wi	th 500 V DC meg	gger between all	l supply terminal	s connected tog	ether and enclos	ure
Ē	Vibrat	ion resistance	10 to 50	0 Hz frequency,	3 mm 0.118 in c	louble amplitude	e (Max. 20 G) in	X, Y and Z direc	ctions for two hou	urs each
	Shock	resistance		10,000 m/	's2 acceleration (1,000 G approx.	.) in X, Y and Z o	directions three t	imes each	
Sens		Temperature characteristics	Over a	mbient temperati					range at +23 °C	+73 °F
varia		Voltage characteristics			Within ±2 %	% for ⁺¹⁰ / ₋₁₅ % fluctor	uation of the sup	ply voltage		
Mate	erial				Encl	losure: PBT, Ind	icator part: Polye	ester		
Cab	e			0.15 ו	mm² 3-core oil, h	neat and cold res	sistant cabtyre ca	able, 1 m 3.281	ft long	
Cab	e exter	nsion		Extensi	on up to total 10	00 m 328.084 ft i	s possible with 0	0.3 mm ² , or more	e, cable.	
Net	weight					20 g a	approx.			

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73 °F.
 - 2) "I" in the model No. indicates a different frequency type.
 - 3) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.

 The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.
 - 4) This is the numerical value which the sensor mount onto an insulator. When mounted onto a steel or stainless steel plate, insert the optional aluminum sheet between the sensor and the plate.
 - 5) This is the numerical value which the sensor mount onto an insulator. When mounted onto a metallic plate, max. response frequency will decrease.
 - 6) Panasonic Industrial Devices SUNX's IP68 test method
 - ① Immerse at 0 m below 0 °C +32 °F water surface and leave for 30 min. Then, immerse at 0 m below +70 °C +158 °F water surface and leave for 30 min.
 - 2 Regard the heat shock test in 1 as one cycle and perform 20 cycles.
 - 3 Leave in water at a depth of 1 m 3.281 ft in water for 500 hours.
 - 4) After tests 1) to 3), insulation resistance, voltage withstandability, current consumption, and sensing ranges must meet the standard values.
 - 7) If using the sensor in an environment where cutting oil droplets splatter, the sensor may be deteriorated due to added substances in the oil. Please check the resistivity of the sensor against the cutting oil you are using beforehand.

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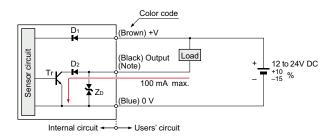
MACHINE VISION SYSTEMS UV CURING SYSTEMS

PLC

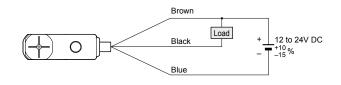
I/O CIRCUIT DIAGRAMS

NPN output type

I/O circuit diagram



Wiring diagram



Symbols ... D1: Reverse supply polarity protection diode D2: Reverse output polarity protection diode

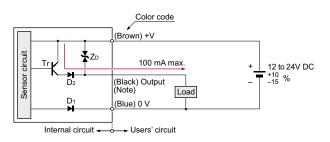
ZD: Surge absorption zener diode

Tr : NPN output transistor

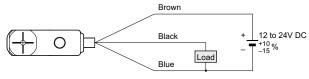
Note: The output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

PNP output type

I/O circuit diagram



Wiring diagram



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

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

Amplifier-separate

GXL GL

GX-M

GX-U/GX-FU/ GX-N GΧ

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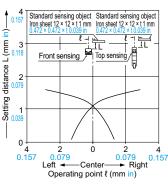
GX-F/H
GXL
GL
GX-M
GX-U/GX-FU/
GX-N
GX-N

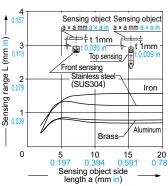
SENSING CHARACTERISTICS (TYPICAL)

GX-6 type

Sensing field

Correlation between sensing object size and sensing range



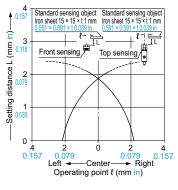


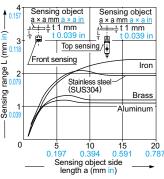
As the sensing object size becomes smaller than the standard size (iron sheet $12 \times 12 \times t$ 1 mm $0.472 \times 0.472 \times t$ 0.039 in), the sensing range shortens as shown in the left figure.

GX-8 type

Sensing field

Correlation between sensing object size and sensing range



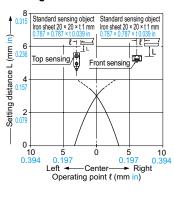


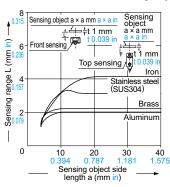
As the sensing object size becomes smaller than the standard size (iron sheet 15 × 15 × t 1 mm $0.591 \times 0.591 \times t \cdot 0.039$ in), the sensing range shortens as shown in the left figure.

GX-12 type

Sensing field

Correlation between sensing object size and sensing range



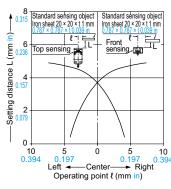


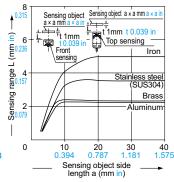
As the sensing object size becomes smaller than the standard size (iron sheet $20 \times 20 \times t$ 1 mm $0.787 \times 0.787 \times t$ 0.039 in), the sensing range shortens as shown in the left figure.

GX-15 type

Sensing field

Correlation between sensing object size and sensing range





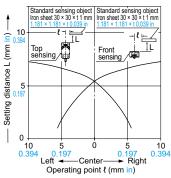
As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm $0.787\times0.787\times t~0.039$ in), the sensing range shortens as shown in the left figure.

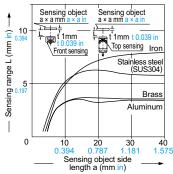
SENSING CHARACTERISTICS (TYPICAL)

GX-15 (Long sensing range) type

Sensing field

Correlation between sensing object size and sensing range





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

PRECAUTIONS FOR PROPER USE

Refer to p.1579~ for general precautions.

· Never use this product as a sensing device for personnel protection.

· In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

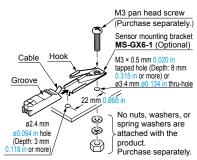
Mounting

GX-6 type

· Use the optional sensor mounting bracket when installing.

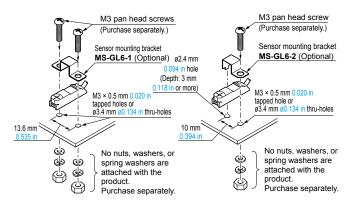
<When using MS-GX6-1 (Optional / recommended)>

- · To mount the sensor with a nut, the mounting hole diameter should be 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 (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.

M3 (length 12 mm 0.472 in) truss head screw (Accessory for MS-GXL8-4) Sensor mounting bracket MS-GXL8-4 (Optional) M3 × 0.5 mm 0.020 n tapped hole (Depth: 8 mm 0.315 in or more) or ø3.4 mm ø0.134 in thru-hole < 11.5 mm 0.453 inThe nut, washer, and spring washer are attached with the MS-GXL8-4. g2 4 mm g0 094 in hole (Depth: 3 mm 0.118 in or more)

M3 (length 12 mm 0.472 in or more) pan head screw

M3 × 0.5 mm 0.020 in tapped hole (Depth: 10 mm 0.394 in or more)

or ø3.4 mm ø0.134 in thru-hole

No nuts, washers, or spring washers

are attached with the product. Purchase separately.

pan head screw (Purchase separately.)

16 mm 0.630 in

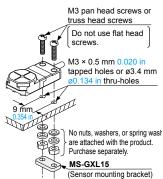
ø2.5 mm ø0.098 in hole (Depth: 3 mm 0.118 in or more)

GX-12 type

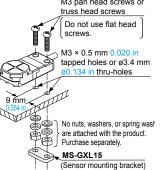
- The tightening torque should be 0.7 N·m or less.
- · To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in. Further, the hole in which the boss is inserted should be ø2.5 mm ø0.098 in and 3 mm 0.118 in, or more, deep.

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.



Aluminum sheet (Optional) MS-A15F

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UV CURING SYSTEMS

Amplifi Built-in Amplifier

GXL

GL GX-M

GX-U/GX-FU

GX

PARTICULAR SENSORS

CURING SYSTEMS

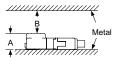
PRECAUTIONS FOR PROPER USE

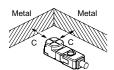
Refer to p.1579~ for general precautions.

Influence of surrounding metal

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

Front sensing type



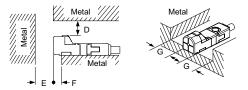


\sum	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
Α	6 mm 0.236 in (Note 1)	7.4 mm 0.291 in	7.1 mm 0.280 in	8 mm 0.315 in	8 mm 0.315 in (Note 2)
В	8 mm 0.315 in	8 mm 0.315 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
С	3 mm 0.118 in	3 mm 0.118 in	7 mm 0.276 in	7 mm 0.276 in	10 mm 0.394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

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

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



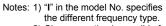
	GX-H6 type	GX-H8 type	GX-H12 type	GX-H15 type	GX-HL15 type
D	3 mm 0.118 in	4 mm 0.157 in	7 mm 0.276 in	6 mm 0.236 in	12 mm 0.472 in
Е	10 mm 0.394 in	10 mm 0.394 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
F	2 mm 0.079 in	3 mm 0.118 in	3 mm 0.118 in	0 mm 0 in	10 mm 0.394 in (Note)
G	2 mm 0.079 in	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
GX-F6 GX-H6	Between "I" type and non "I" type	0 mm (Note 2)	15 mm 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 GX-H8	Between "I" type and non "I" type	0 mm (Note 2)	15 mm 0.591 in
type	Between two "I" types or two non "I" types	20 mm 0.787 in	35 mm 1.378 in
GX-F12 GX-H12	Between "I" type and non "I" type	0 mm (Note 2)	25 mm 0.984 in
type	Between two "I" types or two non "I" types	25 mm 0.984 in	50 mm 1.969 in
GX-F15 GX-H15	Between "I" type and non "I" type	0 mm (Note 2)	25 mm 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 GX-HL15	Between "I" type and non "I" type	0 mm (Note 2)	25 mm 0.984 in
type	Between two "I" types or two non "I" types	110 mm 3.059 in	170 mm 6.693 in



Top sensing

Front sensing

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.

GX-H6□

GX-H8□

GX-H12□

Sensing

direction

45.5 ₩

Operation indicator (Orange)

Sensing direction <

ø15.5 ø0.610

15 0.59

12

GX-H(L)15□

Sensor

DIMENSIONS (Unit: mm in)

GX-F6□

GX-F12□

The CAD data can be downloaded from our website.

LASER SENSORS

PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY LIGHT CURTAINS / SAFETY COMPONENTS PRESSURE / FLOW SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ø3 ø0.118 cable, 1 m 3.281 ft long

ø3.1 ø0.122 mounting hole

3.1 5.8 0.12 0.228

Sensor

2-ø3.1 ø0.122 holes

2.8 7.2 0.110 0.283

ø3 ø0.118 cable, 1 m 3.281 ft long

ø6 ø0.236 screw seat, 1.4 0.055 deep

FA COMPONENTS

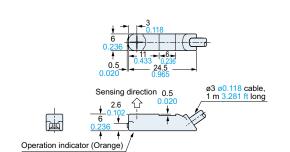
MACHINE VISION SYSTEMS

Amplifier-separate

GXL

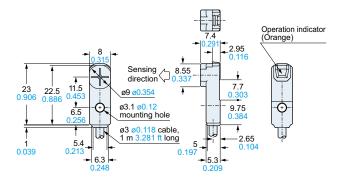
GL GX-M GX-U/GX-FU/ GX-N

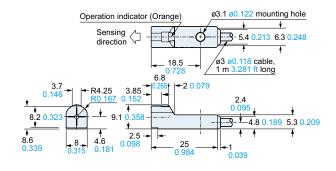
GΧ



Sensing direction ø3 ø0.118 cable, 1 m 3.281 ft long Operation indicator (Orange) 25

GX-F8□





Operation indicator (Orange)

22.2

—16 – 0.630

27.4

₫

₫

26 1.024

29.5 1.161

21.5 0.846

11.95

0.118

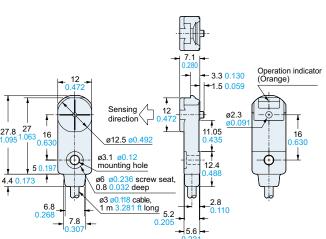
8.65 0.341-4.8 0.189 - 3 0.118 -

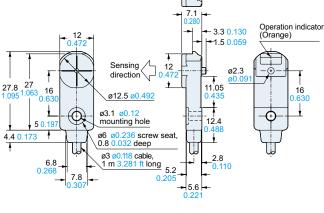
R6.25 R0.246

6.5 0.256

2.5 0.098

1.5 0.059





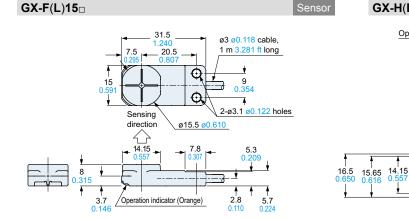


PHOTO-ELECTRIC SENSORS MICRO

SENSORS

AREA
SENSORS

SAFETYLIGHT
CURTAINS /
SAFETY
COMPONENTS

PRESSURE /
FLOW
SENSORS

INDUCTIVE PROXIMITY SENSORS PARTICULAR USE SENSORS

> SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS STATIC CONTROL DEVICES

DEVICES LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

FA COMPONENTS

MACHINE VISION SYSTEMS

CURING SYSTEMS

Selection Guide Amplifier Built-in Amplifierseparated Other Products

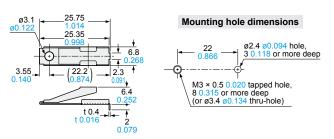
GXL GL GX-M

GX

DIMENSIONS (Unit: mm in)

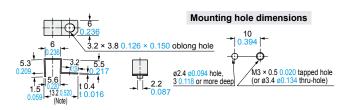
The CAD data can be downloaded from our website.

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



Material: Stainless steel (SUS304)

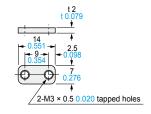
MS-GL6-2 Sensor mounting bracket for GX-6 type (Optional)



Material: Stainless steel (SUS301)

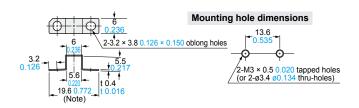
Note: 13.4 mm 0.528 in with the sensor fitted.

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



Material: Cold rolled carbon steel (SPCC)

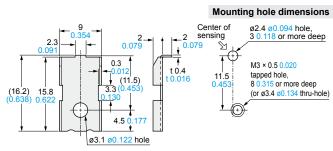
MS-GL6-1 Sensor mounting bracket for GX-6 type (Optional)



Material: Stainless steel (SUS301)

Note: 20 mm 0.787 in with the sensor fitted.

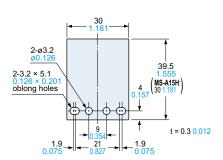
MS-GXL8-4 Sensor mounting bracket for GX-8 type (Optional)



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-A15F MS-A15H Aluminum sheet (Optional)



MEMO

