LASER SENSORS PHOTOELECTRIC SENSORS

PHOTOELECTRIC SENSORS AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

PARTICULAR USE SENSORS

MEASUREMENT SENSORS

STATIC ELECTRICITY

LASER MARKERS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

> Amplifierseparated

> > GXL

GL

GX

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

COMPONENTS

PLC

SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS

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

# GX-F/H SERIES

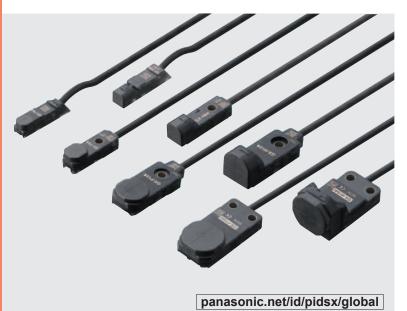
Related Information

General terms and conditions.......F-7

Glossary of terms.......P.1482~

■ Sensor selection guide ...... P.803~

■ General precautions ...... P.1485~





For technical and application support contact Ramco Innovations today!

# Email us at nsales@ramcoi.com





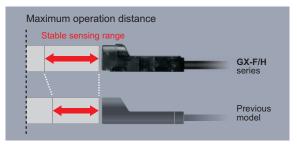




\* Based on research conducted by Panasonic Industrial Devices SUNX as of November 2012 among equivalent rectangular inductive sensors.

#### 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.



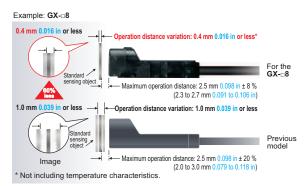
	Maximum	Stable sensing range			
Туре	operation distance	GX-F/H series	Previous model		
GX-□6	1.6 mm 0.063 in	0 to 1.3 mm 0.051 in	0 to 1.2 mm 0.047 in		
GX-□8	2.5 mm 0.098 in	0 to 2.1 mm 0.083 in	0 to 1.8 mm 0.709 in		
GX-□12	4.0 mm 0.157 in	0 to 3.3 mm 0.130 in	0 to 3.0 mm 0.118 in		
GX-□15	5.0 mm 0.197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

<sup>\*</sup> 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.

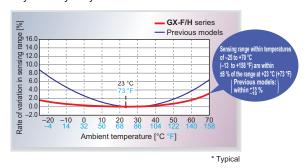
The work of adjusting sensor positions when using multiple sensors and when sensors have been replaced is much easier.



#### Temperature characteristics vary within ±8 %

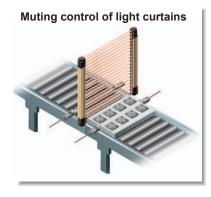
Components such as the sensor coil and core and product design have been totally revised to provide excellent temperature characteristics.

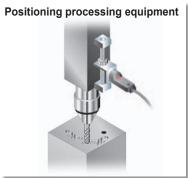
Stable sensing can be obtained regardless of the time of day or the yearly season.

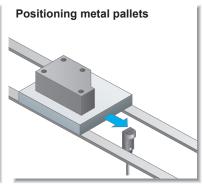


#### Ramco National

#### **APPLICATIONS**







## FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

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LASER MARKERS

PLC

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ENERGY CONSUMPTION

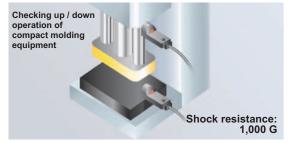
FA COMPONENTS

MACHINE VISION SYSTEMS

#### **ENVIRONMENTAL RESISTANCE**

#### 10 times the durability! (Compared to previous 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 amplitude in X, Y and Z directions for 2 hours each). In addition, resistance to impulse noise is approx. three times greater than for previous models.





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

The new integrated construction method used improves environmental resistance performance.

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

\* For details, refer to the "SPECIFICATIONS (p.812~)".



#### **FUNCTIONS**

Sensing presence of metallic

#### 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.











#### **MOUNTING**

Tightening strength increased with no damage! (excluding GX-06)

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-06/08 only)

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





GXL

GL

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

GΧ

LASER MARKERS

HUMAN MACHINE INTERFACES

FA COMPONENTS MACHINE VISION SYSTEMS

CURING SYSTEMS

PLC

## **ORDER GUIDE**

LASER SENSORS **GX-6** type

	- Che type							
PHOTO- ELECTRIC SENSORS MICRO	Ту	ре	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	
MICRO PHOTO- ELECTRIC SENSORS		бг	$\sim /$		GX-F6A		Name	
AREA SENSORS		Front sensing			GX-F6AI		Normally open	
LIGHT	=	ont s	6 0.236		GX-F6B		Normally closed	
CURTAINS / SAFETY COMPONENTS	outpr	Ŗ	6 0.236		GX-F6BI	NPN open-collector	Normany closed	
PRESSURE / FLOW SENSORS	NPN output	gı	~/>		GX-H6A	transistor	Normally open	
	9	sensi	ensii	1	Maximum	GX-H6AI		Tronnany open
INDUCTIVE PROXIMITY SENSORS			6 0.236 6 0.236 0.984	operation distance  1.6 mm 0.063 in	GX-H6B		Normally closed	
PARTICULAR USE SENSORS		_			GX-H6BI			
		Bu ~/		(0 to 1.3 mm 0 to 0.051 in)	GX-F6A-P		Normally open	
SENSOR OPTIONS		Front sensing	6 0.236		GX-F6AI-P		Normany open	
SIMPLE WIRE-SAVING UNITS	Ħ	ont s	24.5	Stable sensing range	GX-F6B-P		Normally closed	
	outp	Ā	6 0.236 💉 0.965		GX-F6BI-P	PNP open-collector		
WIRE-SAVING SYSTEMS	PNP output	бL	$\sim \nearrow$		GX-H6A-P	transistor	Normally open	
MEASURE- MENT SENSORS		sensing	6.0.226		GX-H6AI-P			
STATIC FLECTRICITY		ob se	ob se	25	GX-H6B-P		Normally closed	
PREVENTION DEVICES			6 0.236 0.984		GX-H6BI-P			

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

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

#### GX-8 type

<u> </u>	OX-0 type										
T	ype	Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2) Output		Output operation					
	DC BL			GX-F8A		Normally on an					
	ensii	7.4 0.291		GX-F8AI	NPN open-collector transistor	Normally open					
=	Front sensing	8 0.315 23 0.906		GX-F8B		Normally closed					
NPN output	F			GX-F8BI		Normally closed					
	g	~ \	Maximum	GX-H8A		Normally open					
	ensir	8.2 0.323		GX-H8AI		Troiniany open					
	Top sensing	25	operation distance	GX-H8B		Normally closed					
	Ţ	8 0.315	2.5 mm 0.098 in (0 to 2.1 mm 0 to 0.083 in)	GX-H8BI							
	ng			GX-F8A-P		Name					
	ensi	7.4 0.291	<b>\</b>	GX-F8AI-P	PNP open-collector transistor	Normally open					
¥	Front sensing	8 0.315 0.906	Stable sensing range	GX-F8B-P		Normally closed					
outpr	Ā			GX-F8BI-P		Normally closed					
PNP output	g	~ \		GX-H8A-P		Normally onen					
<u>С</u>	sensing			GX-H8AI-P		Normally open					
	Top se	8.2 0.323		GX-H8B-P		Normally along					
	ř	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

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

#### ORDER GUIDE

#### GX-12 type

Ту	/ре	Appearance (mm in)	Sensing range (Note 1) Model No. (Note 2)		Output	Output operation	
	ng			GX-F12A		Normally open	
	sensing	7.1 0.280		GX-F12AI	_	Normany open	
=	Front s	12 27.8 1.094		GX-F12B		Normally closed	
outpi	뇬	0.472 1.094		GX-F12BI	NPN open-collector	Normally closed	
NPN output	g			GX-H12A	transistor	Normally open	
	sensing	12 0.472	12 0.472	Maximum	GX-H12AI		Normally open
	Top se		operation distance 4.0 mm 0.157 in	GX-H12B		Normally closed	
	Ĭ.			GX-H12BI			
	gu	7.10.280	(0 to 3.3 mm 0 to 0.130 in) GX-F12A-P		Normally open		
	sensing		<b>\</b>	GX-F12AI-P	PNP open-collector	Normally open	
=	Front s	27.8	Stable sensing range	GX-F12B-P		Normally closed	
outpr	뇬	0.472		GX-F12BI-P		Normany closed	
PNP output	g			GX-H12A-P	transistor	Normally open	
PN	ensin	12 0.472		GX-H12AI-P		Normally open	
	Top se	27.4		GX-H12B-P		Normally aloned	
	F	12 0.472 1.079		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

Туре		Appearance (mm in)	Sensing range (Note 1)	Model No. (Note 2)	Output	Output operation	VISUALIZATION COMPONENTS FA COMPONENTS
	ng			GX-F15A		Normally open	MACHINE VISION SYSTEMS
	ensi	8 0.315		GX-F15AI	NPN open-collector	Normany open	
=	Front sensing	31.5		GX-F15B		Normally closed	UV CURING SYSTEMS
outpr	Ē	15 0.591 1.240		GX-F15BI			
NPN output	g	16.5 0.650		GX-H15A	transistor	Normally open	
Z	sensing		Maximum	GX-H15AI		Normany open	
	Top se	29.5 15 0.591 1.161	operation distance 5.0 mm 0.197 in	GX-H15B		Normally closed	
	Ĕ			GX-H15BI			Selection Guide
	βι		(0 to 4.2 mm 0 to 0.165 in)	GX-F15A-P		No II	Amplifier Built-in Amplifier-
	sensing	8 0.315		GX-F15AI-P		Normally open	separated
_	Front s	31.5	Stable sensing range	GX-F15B-P			
outpo	F.	15 0.591 1.240		GX-F15BI-P	PNP open-collector	Normally closed	GX-F/H
PNP output	g			GX-H15A-P	transistor		GXL
Δ.	sensing	16.5 0.650		GX-H15AI-P		Normally open	GX-M
	es do	29.5		GX-H15B-P			GX-U/GX-FU/
F	Тор	15 0.591 1.161		GX-H15BI-P		Normally closed	GX-N GX

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.

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PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

LASER MARKERS

PLC

<sup>2) &</sup>quot;I" in the model No. indicates a different frequency type.

#### ORDER GUIDE

#### LASER SENSORS GX-15 (Long

## PHOTO-ELECTRIC SENSORS MICRO PHOTO-ELECTRIC SENSORS AREA SENSORS

UIGHT
CURTAINS /
SAFETY
COMPONENTS

PRESSURE /
FLOW
SENSORS

INDUCTIVE
PROXIMITY

PARTICULAR USE SENSORS SENSOR OPTIONS

SIMPLE
WIRE-SAVING
WIRE-SAVING
UNITS

WIRE-SAVING
SYSTEMS

MEASURE-MENT
SENSORS
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PREVENTION
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COMPONENTS

MACHINE VISION SYSTEMS UV CURING SYSTEMS

Selection Guide Amplifier Built-in Amplifierseparated

GX-F/H
GXL
GL
GX-M
GX-IJIGX-FIJI
GX-N
GX

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

T	ype	Appearance (mm in)	Appearance (mm in) Sensing range (Note 1)		Output	Output operation
	ng	8 0.315		GX-FL15A		Normally open
	sensing			GX-FL15AI		Normally open
¥	Front s	31.5		GX-FL15B		Normally closed
outpr	F	15 0.591 1.240		GX-FL15BI	NPN open-collector	Normally closed
NPN output	ıg	16.5 0.650		GX-HL15A	transistor	Normally open
Z	sensing		Maximum	GX-HL15AI		
	Top se	29.5	operation distance	GX-HL15B		Normally closed
	Ţ	15 0.591 1.161	8.0 mm 0.315 in	GX-HL15BI		
	ng	"	(0 to 6.7 mm 0 to 0.264 in)	GX-FL15A-P		Normally open
	sensing	8 0.315		GX-FL15AI-P		Normally open
±	t	31.5	Stable sensing range	GX-FL15B-P		Namelly aloned
PNP output	F	15 0.591 1.240		GX-FL15BI-P	PNP open-collector transistor	Normally closed
NP 0	g			GX-HL15A-P		Namallyanan
₾.	sensing	16.5 0.650		GX-HL15AI-P		Normally open
	Top se	29.5		GX-HL15B-P		Normally aloned
	Ě	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, flexible cable type

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

(e.g.) 5 m 16.404 ft cable length type of GX-F15Al-P is "GX-F15Al-P-C5". Flexible cable type of GX-F15Al-P is "GX-F15Al-P-R".

#### OPTIONS

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

#### Sensor mounting bracket

· MS-GX6-1



· MS-GL6-1



Screw is not attached.





Screw is not attached.

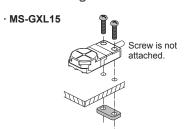


1pc. each of M3 (length: 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

#### **Aluminum sheet**

- · MS-A15F
- · MS-A15H





#### SPECIFICATIONS

#### **GX-6** type

7		Туре	NPN (	output	PNP output		
\	\	Front sensing	GX-F6A(I)	GX-F6B(I)	GX-F6A(I)-P	GX-F6B(I)-P	
Iten	n \	Top sensing	GX-H6A(I)	GX-H6B(I)	GX-H6A(I)-P	GX-H6B(I)-P	
Max. operation distance (Note 3) 1.6 mm 0.063 in ± 8 %							
Stab	ole sen	sing range (Note 3)		0 to 1.3 mm	0 to 0.051 in		
Stan	ndard s	ensing object		Iron sheet 12 × 12 × t 1 mm	1 0.472 × 0.472 × t 0.039 in		
Hyst	teresis		;	20 % or less of operation distance	ce (with standard sensing object)	)	
Rep	eatabil	ity	Along	sensing axis, perpendicular to se	ensing axis: 0.04 mm 0.0016 in	or less	
Sup	ply volt	tage		12 to 24 V DC <sup>+10</sup> <sub>-15</sub> %	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 les	r less (between output and 0 V)	, , , , , , , , , , , , , , , , , , , ,		
	Utiliza	ation category		DC-12 o	or DC-13		
	Outpu	ut operation	Normally closed	Normally closed	Normally closed	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)				
e	Prote	ection	IP68 (IEC), IP68G (Note 4, 5)				
Environmental resistance	Ambi	ent temperature	-25 to +70 °C -13 to +158 °F, Storage: -40 to +85 °C -40 to +185 °F				
resi	Ambi	ent humidity	35 to 85 % RH, Storage: 35 to 95 % RH				
ental	EMC			EN 609	947-5-2		
onm	Volta	ge withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	nd enclosure	
Envir	Insula	ation resistance	50 MΩ, or more, wit	th 500 V DC megger between all	supply terminals connected tog	ether and enclosure	
	Vibra	tion resistance	10 to 500 Hz frequer	ncy, 3 mm 0.118 in amplitude (M	ax. 20 G) in X, Y and Z direction	s for two hours each	
	Shock	k resistance	10,000 m/s <sup>2</sup>	acceleration (1,000 G approx.)	in X, Y and Z directions for three	e times each	
Sens		Temperature characteristics	Over ambient temperatu	ure range –25 to +70 °C –13 to +		range at +23 °C +73 °F	
	ation	Voltage characteristics		Within ±2 % for <sup>+10</sup> <sub>-15</sub> % flucton	uation of the supply voltage		
Mate	erial			Enclosure: PBT, Indi	cator part: Polyester		
Cab	le		0.15 r	mm <sup>2</sup> 3-core oil, heat and cold res	istant cabtyre cable, 1 m 3.281	ft long	
Cab	le exte	nsion	Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable.				
Net	weight			15 g a	pprox.		

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

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

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

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

4) Panasonic Industrial Devices SUNX's IP68 test method

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

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

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

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

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

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GX-U/GX-FU/ GX-N

GX

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GXL

GL

GX-M

GX-I/IGX-FU/
GX-N

GX

## GX-8 type

		Туре	NPN (	output	PNP	output		
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Front sensing	GX-F8A(I)	GX-F8B(I)	GX-F8A(I)-P	GX-F8B(I)-P		
Item		Top sensing	GX-H8A(I)	GX-H8B(I)	GX-H8A(I)-P	GX-H8B(I)-P		
Max.	operati	on distance (Note 3)	2.5 mm 0.098 in ± 8 %					
Stab	le sens	ing range (Note 3)		0 to 2.1 mm	0 to 0.083 in			
Stan	dard se	ensing object		Iron sheet 15 × 15 × t 1 mn	1 0.591 × 0.591 × t 0.039 in			
Hyst	eresis			20 % or less of operation distance	ce (with standard sensing object)	)		
Repe	eatabili	У	Along	sensing axis, perpendicular to s	ensing axis: 0.04 mm 0.0016 in o	or less		
Supp	oly volta	age		12 to 24 V DC <sup>+10</sup> <sub>-15</sub> % F	Ripple P-P 10 % or less			
Curr	ent con	sumption		15 mA	or less			
Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 100 mA sink current)		Applied voltage: 30 V DC of	PNP open-collector transistor  • Maximum source current: 100 mA  • Applied voltage: 30 V DC or less (between output and +V)  • Residual voltage: 2 V or less (at 100 mA source current)		
	Utilization category			DC-12 c	r DC-13			
	Outpu	t operation	Normally open	Normally closed	Normally open	Normally closed		
Max	. respoi	nse frequency		500	Hz			
Ope	ration ir	ndicator	Orange LED (lights up when the output is ON)					
	Polluti	on degree	3 (Industrial environment)					
e	Protec	etion	IP68 (IEC), IP68G (Note 4, 5)					
Environmental resistance	Ambie	nt temperature	-2	5 to +70 °C –13 to +158 °F, Stor	age: -40 to +85 °C -40 to +185	5 °F		
resi	Ambie	nt humidity	35 to 85 % RH, Storage: 35 to 95 % RH					
ental	EMC			EN 609	947-5-2			
muo.	Voltag	e withstandability	1,000 V AC	for one min. between all supply	terminals connected together an	nd enclosure		
Envir	Insula	tion resistance	50 MΩ, or more, with	th 500 V DC megger between all	supply terminals connected tog	ether and enclosure		
_	Vibrat	on resistance	10 to 500 Hz frequer	ncy, 3 mm 0.118 in amplitude (M	ax. 20 G) in X, Y and Z direction	s for two hours each		
		resistance		<sup>2</sup> acceleration (1,000 G approx.)				
Sens		Temperature characteristics	Over ambient temperate	ure range –25 to +70 °C –13 to +		range at +23 °C +73 °F		
varia		Voltage characteristics		Within ±2 % for <sup>+10</sup> <sub>-15</sub> % flucti	uation of the supply voltage			
Mate	erial			Enclosure: PBT, Ind	cator part: Polyester			
Cabl	е		0.15 ו	mm <sup>2</sup> 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281 f	ft long		
Cabl	e exter	ision		on up to total 100 m 328.084 ft is	· · · · · · · · · · · · · · · · · · ·	<u> </u>		
Net	weight		l	Front sensing type: 15 g approx.	, Top sensing type: 20 g approx.			

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

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

#### SPECIFICATIONS

#### GX-12 type

		Туре	NPN (	output	PNP output			
		Front sensing	GX-F12A(I)	GX-F12B(I)	GX-F12A(I)-P	GX-F12B(I)-P		
Item	1	Top sensing	GX-H12A(I)	GX-H12B(I)	GX-H12A(I)-P	GX-H12B(I)-P		
Max.	opera	tion distance (Note 3)	4.0 mm 0.157 in ± 8 %					
Stabl	e sen	sing range (Note 3)		0 to 3.3 mm	0 to 0.130 in			
Stand	dard s	ensing object		Iron sheet 20 × 20 × t 1 mm	n 0.787 × 0.787 × t 0.039 in			
Hyste	eresis			20 % or less of operation distance	ce (with standard sensing object	)		
Repe	atabil	ity	Along	sensing axis, perpendicular to se		or less		
Supp	ly volt	age		12 to 24 V DC <sup>+10</sup> <sub>-15</sub> % I	Ripple P-P 10 % or less			
Curre	ent coi	nsumption		15 mA	or less			
Output			''	· ·				
	Utiliza	ation category		DC-12 o		r DC-13		
	Outpu	ut operation	Normally open	Normally closed	Normally open	Normally closed		
Max.	respo	nse frequency	500 Hz					
Oper	ation i	ndicator	Orange LED (lights up when the output is ON)					
	Pollut	ion degree	3 (Industrial environment)					
e	Prote	ction	IP68 (IEC), IP68G (Note 4, 5)					
stano	Ambi	ent temperature	-25 to +70 °C -13 to +158 °F, Storage: -40 to +85 °C -40 to +185 °F					
Environmental resistance	Ambi	ent humidity	35 to 85 % RH, Storage: 35 to 95 % RH					
enta	EMC			EN 609	947-5-2			
muo.	Volta	ge withstandability	1,000 V AC	for one min. between all supply	terminals connected together ar	nd enclosure		
Envir	Insula	ation resistance	50 MΩ, or more, with	th 500 V DC megger between all	supply terminals connected tog	ether and enclosure		
	Vibra	tion resistance	10 to 500 Hz frequer	ncy, 3 mm 0.118 in amplitude (M	ax. 20 G) in X, Y and Z direction	ns for two hours each		
	Shoc	k resistance	10,000 m/s <sup>2</sup>	acceleration (1,000 G approx.)	in X, Y and Z directions for three	e times each		
Sens	_	Temperature characteristics	Over ambient temperat	ure range –25 to +70 °C –13 to +		range at +23 °C +73 °F		
variat		Voltage characteristics	Within $\pm 2$ % for $^{+10}_{-15}$ % fluctuation of the supply voltage					
Mate	rial			Enclosure: PBT, Indi	icator part: Polyester			
Cable	Э		0.15 i	mm <sup>2</sup> 3-core oil, heat and cold res	sistant cabtyre cable, 1 m 3.281	ft long		
Cable	e exte	nsion	Extensi	on up to total 100 m 328.084 ft is	s possible with 0.3 mm <sup>2</sup> , or more	e, cable.		
Net weight Front sensing type: 20 g approx., Top sensing type: 20 g approx.								

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

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

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

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

4) Panasonic Industrial Devices SUNX's IP68 test method

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

FIBER SENSORS

LASER SENSORS

ELECTRIC SENSORS MICRO PHOTO-

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

> MEASURE-MENT SENSORS STATIC

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION

CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide Amplifier Built-in Amplifierseparated

GX-F/H

GXL

GL GX-M

GX-U/GX-FU/ GX-N

GX

LASER SENSORS

#### GX-15 type

**SPECIFICATIONS** 

PHOTO-ELECTRIC SENSORS MICRO PHOTO-ELECTRIC SENSORS AREA SENSORS

SENSORS

LIGHT
CURTANS/
SAFETY
COMPONENTS

PRESSURS /
FLOW
SENSORS

INDUCTIVE
PROXIMITY
SENSORS

SENSORS SENSOR OPTIONS

PARTICULAR

SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS STATIC ELECTRICITY PREVENTION

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PLC

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COMPONENTS

MACHINE
VISION
SYSTEMS

UV CURING SYSTEMS

Selection Guide Amplifier Built-in Amplifier-

GX-F/H
GXL
GL
GX-M
GX-IIIGX-FUI
GX-FUI
GX-IIIGX-FUI
GX-FUI

				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	ı \:	Front sensing Top sensing	GX-H15A(I)	GX-H15B(I)	GX-HL15A(I)	GX-HL15B(I)	GX-H15A(I)-P	GX-H15B(I)-P	GX-HL15A(I)-P	GX-HL15B(I)-P
Max.	operat	ion distance (Note 3)	5.0 mm 0.1	97 in ± 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)
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)
Standard sensing object			Iron sheet 20 0.7874 × 0.78	× 20 × t 1 mm 74 × t 0.039 in		× 30 × t 1 mm 1 × t 0.039 in	Iron sheet 20 0.7874 × 0.78	× 20 × t 1 mm 74 × t 0.039 in	Iron sheet 30 1.181 × 1.18	
Hyst	eresis				20 % or less of o	peration distanc	ce (with standard	sensing object)		
Rep	eatabili	ty		Along	sensing axis, pe	erpendicular to s	ensing axis: 0.04	1 mm 0.0016 in o	or less	
Supp	oly volt	age			12 to 24	4 V DC <sup>+10</sup> <sub>-15</sub> %	Ripple P-P 10 %	or less		
Curr	ent cor	nsumption				15 mA	or less			
Output			Maximum s     Applied vol	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  • Maximum source current: 100 mA  • Applied voltage: 30 V DC or less (between output an Residual voltage: 2 V or less (at 100 mA source current)						
	Utiliza	ation category				DC-12 c	or DC-13			
	Outpu	ıt 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 LED (lights up when the output is ON)							
	Pollut	ion degree	3 (Industrial environment)							
ė	Prote	ction	IP68 (IEC), IP68G (Note 6, 7)							
Environmental resistance	Ambie	ent temperature	-25 to +70 °C −13 to +158 °F, Storage: −40 to +85 °C −40 to +185 °F							
resi	Ambie	ent humidity	35 to 85 % RH, Storage: 35 to 95 % RH							
ental	EMC					EN 609	947-5-2			
onm	Voltag	ge withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure							
Envir	Insula	tion resistance	50 $M\Omega$ , or more, with 500 V DC megger between all supply terminals connected together and enclosure							
ш	Vibrat	tion resistance	10 to 500 Hz frequency, 3 mm 0.118 in amplitude (Max. 20 G) in X, Y and Z directions for two hours each							
	Shock	c resistance		10,000 m/s	<sup>2</sup> acceleration (1,	000 G approx.)	in X, Y and Z dir	ections for three	times each	
Sens		Temperature characteristics	Over ar	nbient temperat	ure range –25 to	+70 °C -13 to +	158 °F: Within ±	8 % of sensing	range at +23 °C	+73 °F
varia		Voltage characteristics	Within ±2 % for $^{+10}_{-15}$ % fluctuation of the supply voltage							
Mate	erial				Encl	Enclosure: PBT, Indicator part: Polyester				
Cab	le			0.15	mm <sup>2</sup> 3-core oil, h	eat and cold res	istant cabtyre ca	able, 1 m 3.281 f	t long	
Cab	le exter	nsion		Extens	ion up to total 10	0 m 328.084 ft is	s possible with 0	.3 mm <sup>2</sup> , or more	, cable.	
Net	weight					20 g a	pprox.			

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

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

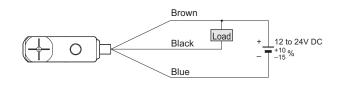
#### I/O CIRCUIT DIAGRAMS

#### **NPN** output type

#### I/O circuit diagram

#### Color code (Brown) +V Sensor circuit Load (Black) Output (Note) 12 to 24V DC +10 % -15 % 100 mA max. ZD (Blue) 0 V Internal circuit -- Users' circuit

#### Wiring diagram



Symbols ... D<sub>1</sub>: Reverse supply polarity protection diode

D2: Reverse output polarity protection diode ZD: Surge absorption zener diode

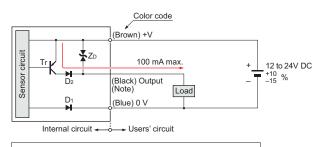
Tr : NPN output transistor

Note: The output does not incorporate a short-circuit protection circuit.

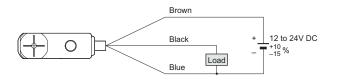
Do not connect it directly to a power supply or a capacitive load.

#### 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.

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LASER SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

PARTICULAR USE SENSORS

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WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

DEVICES

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UV CURING SYSTEMS

Selection Guide

GXL GL

GX-M

GX-U/GX-FU/ GX-N

GΧ

LASER SENSORS PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS AREA SENSORS LIGHT SAFETY COMPONENTS PRESSURE / FLOW SENSORS

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distance L (mm in)

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION VISUALIZATION COMPONENTS

PLC

MACHINE VISION SYSTEMS CURING SYSTEMS

COMPONENTS

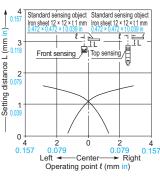
Amplifier-separated

GXL GL GX-M GX-U/GX-FU/ GX-N GΧ

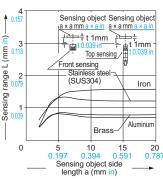
#### SENSING CHARACTERISTICS (TYPICAL)

#### 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

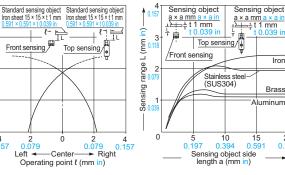
#### Sensing field

Front sensing To



Correlation between sensing object size and sensing range

Iron



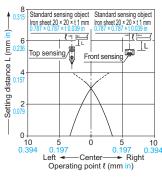
As the sensing object size becomes smaller than the standard size (iron sheet 15 × 15 × t 1 mm  $0.591 \times 0.591 \times t$  0.039 in), the sensing range shortens as shown in the left figure.

#### GX-12 type

Left ◄

0

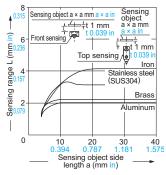
#### Sensing field



-Center-

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

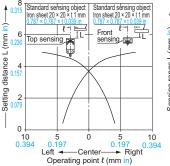
20 0.787



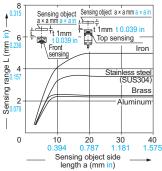
As the sensing object size becomes smaller than the standard size (iron sheet 20 × 20 × t 1 mm  $0.787 \times 0.787 \times t \ 0.039$  in), the sensing range shortens as shown in the left figure.

#### GX-15 type

#### Sensing field



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



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

#### SENSING CHARACTERISTICS (TYPICAL)

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

Operating point & (mm in)

#### Sensing field

#### Standard sensing object on sheet 30 × 30 × t 1 mm Standard sensing object fron sheet 30 × 30 × t 1 mn Sensing object a x a mm a x a in Sensing object t 1mm t 0.039 in 10 10 Setting distance L (mm in) (mm in) t 1mm Top sensing Iron Front sensing Sensing range Brass Aluminum 0 0 10 10 Center Right Sensing object side length a (mm in)

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

#### PRECAUTIONS FOR PROPER USE

Refer to p.1485~ for general precautions.

M3 (length 12 mm (

0r Ø3.4 mm v 11.5 mm 0.453 in

ø2.4 mm ø0.098 in hole (Depth: 3 mm 0.315 in or more)

٦

screw (Accessory for MS-GXL8-4)

MS-GXL8-4 (Accessory)

(Depth: 8 mm 0.315 in or more) or ø3.4 mm ø0.134 in thru-hole

and washers
(Accessories for MS-GXL8-4)

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

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

If mounting using nut

M3 × 0.5 mm 0.020 in tapped hole

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

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

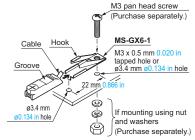
#### Mounting

#### GX-6 type

· Use the optional sensor mounting bracket when installing.

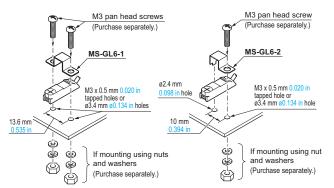
#### <When using MS-GX6-1 (recommended)>

- · To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm ø0.134 in.
- 1 Insert the sensor into the bracket as shown on the right.
- ② Push the sensor until the bracket hook is lodged in the groove on the upper portion of the sensor.
- ③ Fix the bracket in place with M3 pan head screw.



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

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



#### GX-8 type

Correlation between sensing object size and sensing range

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

#### GX-12 type

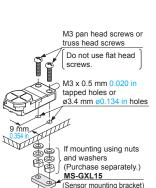
- The tightening torque should be 0.7 N·m or less.
- To mount the sensor with a nut, the mounting hole diameter should be ø3.4 mm Ø0.134 in. Further, the hole in which the boss is inserted should be ø2.5 mm Ø0.098 in and 3 mm 0.118 in, or more, deep.

#### 16 mm 0.630 in If mounting using nut and washers (Purchase separately.) ø2.5 mm ø0.098 in hole (Depth: 3 mm 0.118 in or more)

#### 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.



GXL

GL

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

GX

MICRO PHOTO ELECTRIC SENSORS

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PARTICULAR USE SENSORS

SENSOR

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

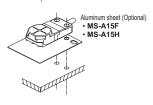
STATIC DEVICES

PLC

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CURING SYSTEMS



## PRECAUTIONS FOR PROPER USE

Refer to p.1485~ for general precautions.

LASER SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS CURTAIN COMPONENTS PRESSURE / FLOW SENSORS

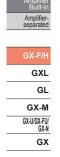
PARTICUI AR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS MEASURE-MENT SENSORS STATIC ELECTRICITY PREVENTION DEVICES LASER MARKERS

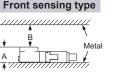
PLC COMPONENTS

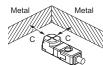
MACHINE VISION SYSTEMS UV CURING SYSTEMS



#### Influence of surrounding metal

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



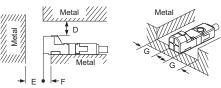


	GX-F6 type	GX-F8 type	GX-F12 type	GX-F15 type	GX-FL15 type
Α	6 mm 0.236 in (Note 1)	7.4 mm 0.291 in	7.1 mm 0.280 in	8 mm 0.315 in	8 mm 0.315 in (Note 2)
В	8 mm 0.315 in	8 mm 0.315 in	20 mm 0.787 in	20 mm 0.787 in	30 mm 1.181 in
С	3 mm 0.118 in	3 mm 0.118 in	7 mm 0.276 in	7 mm 0.276 in	10 mm 0.394 in

Notes: 1) When using MS-GX6-1 (recommended mounting bracket), the distance "A" including the thickness of mounting bracket will be 6 4 mm 0 25

> 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.

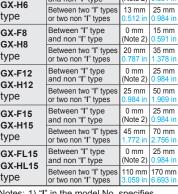
> Front sensing O  $\odot$

Top sensing

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		Н	J
GX-F6	Between "I" type and non "I" type	0 mm (Note 2)	15 mm 0.591 in
GX-H6 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	



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

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

**GX-F6 / H6** type: 3.5mm 0.138 **GX-F8 / H8** type: 6mm 0.236 in GX-F12 / H12 type: 6.5mm 0.256 in GX-F15 / H15 type: 15mm 0.591 in GX-FL15 / HL15 type: 47.5mm 1.870 in

#### Sensing range

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

#### Correction coefficient

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

#### Wiring

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

#### **Others**

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

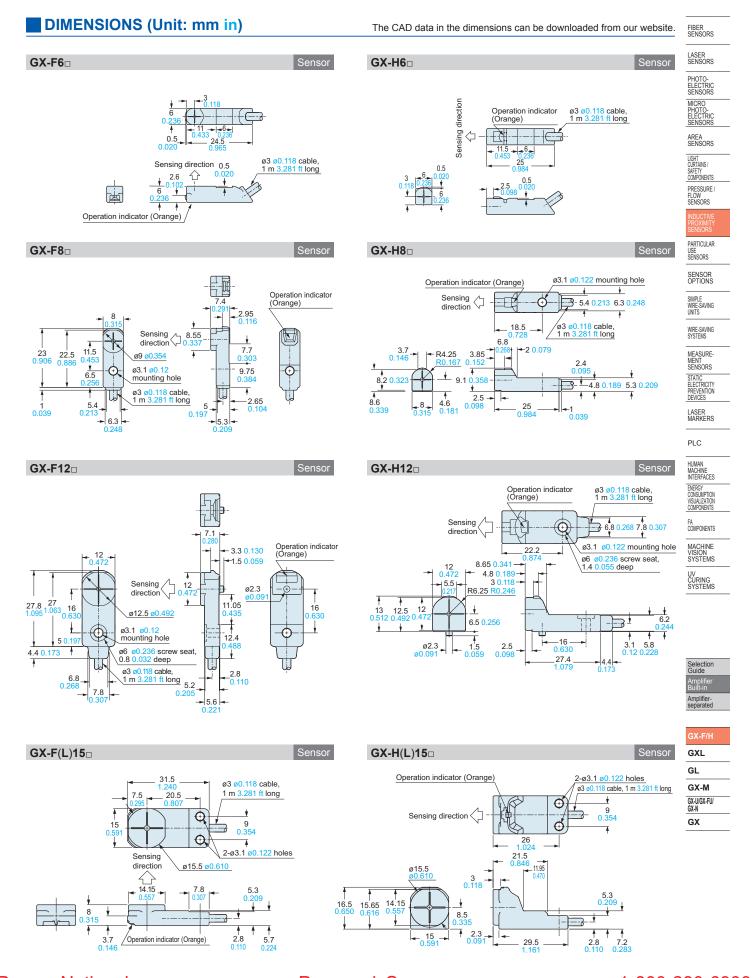


PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

AREA
SENSORS

LIGHT
CURTAINS;
SAFETY
COMPONENTS

PRESSURE /
FLOW
SENSORS

INDUCTIVE

PARTICULAR USE SENSORS
SENSOR OPTIONS
SIMPLE WIRE-SAVING UNITS

WIRE-SAVING
SYSTEMS

MEASUREMENT
SENSORS
STATIC
ELECTRICON
DEVICES

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VISUALIZATION
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FA
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MACHINE VISION SYSTEMS UV CURING SYSTEMS

Selection Guide Amplifier Built-in Amplifierseparated

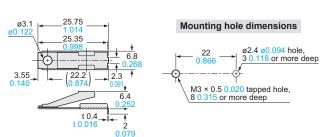
GX-F/H
GXL
GL
GX-M
GX-I/GX-FU/
GX-N
GX

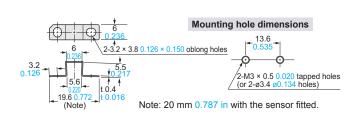
#### DIMENSIONS (Unit: mm in)

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

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

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



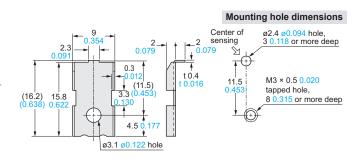


#### MS-GL6-2 Sensor mounting bracket for GX-6 type (Optional)

# Mounting hole dimensions 10 0.236 3.2 × 3.8 0.126 × 0.150 oblong hole 10.394 15.3 209 15.5 209 10.4 10.4 10.236 10.094 10.094 10.236 10.094 1

Note: 13.4 mm 0.528 in with the sensor fitted.

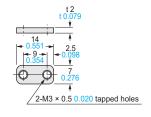
#### MS-GXL8-4 Sensor mounting bracket for GX-8 type (Optional)



Material: Stainless steel (SUS304)

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

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



Material: SPCC

