Compact & Low Price Inductive Proximity Sensor Amplifier Built-in GL SERIES



Selection Guide

Amplifier Built-in

Amplifierseparated

GX-F/H

GXL

GL

GX

GX-M

GX-U/GX-FU/ GX-N



Wide variety, high performance in surprisingly small body at low cost

VARIETIES

Wide variation

A wide variety of 46 models, front sensing type / top sensing type, normally open type / normally closed type, as well as, different frequency type, etc., is available.

Close mounting

Two sensors can be mounted close together because different frequency type are available.

The **GL-18HL** type can be mounted with a space of 20 mm 0.787 in between the two sensors.

Energy-efficient and wire-saving DC 2-wire type

Its electric current consumption is just 0.8 mA or less and the wiring workload is reduced by about 30 %.

BASIC PERFORMANCE

Long sensing range

GL-18HL type offers a long sensing range of 12 mm 0.472 in.

Small variations in the positions of the sensing objects do not affect detection.

ENVIRONMENTAL RESISTANCE

Protection structure IP67G

GL-18H/18HL type are resistant to oil and have a protection structure IP67G. (**GL-8U** type: IP67)

FUNCTIONS

Operation indicator

The **GL** series incorporates an operation indicator (orange, **GL-18H/18HL** type: red) for operation check.

OTHERS

Low price

The **GL** series satisfies the need for a low price inductive proximity sensor. It is recommended to large volume users for cost reduction.

vire DC 2-wire Downloaded From Oneyac.com

are available in units of ten.

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LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO

PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

PARTICULAR USE SENSORS SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

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ORDER GUIDE

5 m 16.404 ft cable length type

5 m 16.404 ft cable length type (standard: 1m 3.281 ft) is also available for **GL-8U** type (different frequency of normally open type: excluding the type with the model No. having the suffix "**IB**"). When ordering this type, suffix "-**C5**" to the model No.

(e.g.) 5 m 16.404 ft cable length type of GL-8FUB×10 is "GL-8FUB-C5×10".

NOTE: **GL-8U** type are available in units of ten.

OPTIONS

Designation	Model No.	Description	Sensor mounting bracket • MS-GL8×10
Sensor mounting bracket	MS-GL8×10	Sensor mounting bracket for GL-8U type.	
NOTE: Sen	sor mounting brac	ket (MS-GL8×10) is available in units of ten.	1 pc, each of M3 (length

12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

-@@@-

SPECIFICATIONS

GL-8U type

\bigwedge		-		DC 2-w	ire type			
		Iype	Front s	ensing	Top s	ensing		
		Z	GL-8FU×10	GL-8FUB×10	GL-8HU×10	GL-8HUB×10		
Item		Different frequency	GL-8FUI×10	GL-8FUIB×10	GL-8HUI×10	GL-8HUIB×10		
Max. c	operati	on distance (Note 2)		2.5 mm 0.09	98 in ±20 %			
Stable	e sens	ing range (Note 2)		0 to 1.8 mm	0 to 0.071 in			
Stand	lard se	ensing object	Iron sheet 15 × 15 × t 1 mm 0.591 × 0.591 × t 0.039 in					
Hysteresis				20 % or less of operation distance (with standard sensing object)				
Supply voltage		age		12 to 24 V DC ±10 %	Ripple P-P 10 % or less			
Current consumption		sumption		0.8 mA or le	ess (Note 3)			
Output Utilization category Output operation				Non-contact DC 2-wir • Load current: 3 tu • Residual voltage	e type o 70 mA (Note 4) : 3 V or less (Note 5)			
		ion category		DC-12 o	r DC-13			
		operation	Normally open	Normally closed	Normally open	Normally closed		
Short-circuit protection		circuit protection	Incorporated					
Max. ı	respor	nse frequency	1kHz					
Opera	ation ir	ndicator	Orange LED (lights up when the output is ON)					
F	Pollutio	on degree	3 (Industrial environment)					
е Г	Protec	tion	IP67 (IEC)					
A ista	Ambie	nt temperature	–25 to +70 °C –13 to +158 °F, Storage: –30 to +80 °C –22 to +176 °F					
<u>A</u>	Ambie	nt humidity		35 to 95 % RH, Storage: 35 to 95 % RH				
enta	EMC		EN 60947-5-2					
	Voltage	e withstandability	1,000 V AC	for one min. between all supply	terminals connected together ar	d enclosure		
in Ki	nsulat	ion resistance	50 MΩ, or more, wi	50 M Ω , or more, with 250 V DC megger between all supply terminals connected together and enclosure				
튭 [_]	Vibrati	on resistance	10 to 55 Hz fre	10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each				
8	Shock	resistance	1,000 m/s ² acceleration (100 G approx.) in X, Y and Z directions for three times each					
Sensi	ng T	emperature characteristics	Over ambient temperature range –25 to +70 °C –13 to +158 °F: within $^{+10}_{-15}$ % of sensing range at +20 °C +68 °F					
/ariati	ion \	/oltage characteristics		Within ±2 % for ±10 % fluctuation of the supply voltage				
Mater	ial			Enclosure: Polyalylate				
Cable	;			0.15 mm ² 2-core cabtyre cable, 1 m 3.281 ft long				
Cable extension		ision	Extens	Extension up to total 50 m 164.042 ft is possible with 0.3 mm ² , or more, cable.				
Weigh	ht			Net weight : 12 g approx.				

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) 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.

3) It is the leakage current when the output is in the OFF state.

4) The maximum load current varies depending on the ambient temperature. Refer to "I/O CIRCUIT AND WIRING DIAGRAMS (p.837)" for more details.

5) When the cable is extended, the residual voltage becomes larger according to the resistance of the cable.

SPECIFICATIONS

GL-18H/18HL type

	Type		Standard	1		Long sensing range	e 1
	Type		Different frequency			Different frequency	
Item	Model No.	GL-18H	GL-18HI	GL-18HB	GL-18HL	GL-18HLI	GL-18HLB
Max. ope	ration distance (Note 2)		5 mm 0.197 in ±10 %			12 mm 0.472 in ±10 %	6
Stable se	ensing range (Note 2)		0 to 4 mm 0 to 0.157 i	n	C	to 10 mm 0 to 0.394	in
Standard	sensing object	Iron sheet 25 ×	25 × t 1 mm 0.984 × 0	.984 × t 0.039 in	Iron sheet 40 ×	40 × t 1 mm 1.575 × 1	.575 × t 0.039 in
Hysteres	is		15 % or les	ss of operation distant	ce (with standard sen	sing object)	
Supply voltage		10 to 30 V DC Ripple P-P 10 % or less					
Current o	consumption			10 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: 1.5 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current) 				
Utili	zation category			DC-12 c	or DC-13		
Out	put operation	Norma	Illy open	Normally closed	Norma	lly open	Normally closed
Max. response frequency 1kHz					500Hz		
Operation indicator		Red LED (lights up when the output is ON)					
Pollution degree		3 (Industrial environment)					
Direction		IP67 (IEC), IP67G (Note 3)					
Amt	pient temperature	–25 to +70 °C –13 to +158 °F, Storage: –25 to +70 °C –13 to +158 °F					
Amb	pient humidity	45 to 85 % RH, Storage: 45 to 85 % RH					
EM0	C			EN 609	947-5-2		
Volt	age withstandability		1,000 V AC for one mi	n. between all supply	terminals connected	together and enclosur	e
Insu	lation resistance	tance 50 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure					
Vibr	ation resistance	10	to 55 Hz frequency, 1	.5 mm 0.059 in amplit	ude in X, Y and Z dire	ections for two hours e	each
Sho	ck resistance	1,000 m/s ² acceleration (100 G approx.) in X, Y and Z directions for three times each					
Sensing	Temperature characteristics	Over ambie	Over ambient temperature range –25 to +70 °C –13 to +158 °F: within ±10 % of sensing range at +20 °C +68 °F				
variation	Voltage characteristics		Withir	1 ±2 % for ±10 % fluct	uation of the supply v	oltage	
Material				Enclosure:	Polyalylate		
Cable			0.3 mm ²	3-core oil resistant ca	abtyre cable, 1 m 3.28	31 ft long	
Cable ex	tension		Extension up to to	tal 100 m <u>328.084</u> ft i	s possible with 0.3 m	m ² , or more, cable.	
Weight				Net weight :	45 g approx.		
Accessor	у				MS-GL18HI	L (Sensor mounting br	racket): 1 set

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) 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.

3) 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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I/O CIRCUIT AND WIRING DIAGRAMS

SENSING CHARACTERISTICS (TYPICAL) GX-F/H GXL

GX-U/GX-FU/

GX-N

GX

Sensing field

Standard sensing object Iron sheet 15 × 15 × t 1 mm 8 Front 3 L (mm in) Top sensing 3 -Setting distance L (mm sensing Standard sensing o 2 Sensing range 2 Iron sheet 15×15×t1 mm 1 0 10 5 0.197 5 0.197 0 10 0 0.394 0.3 - Center -- Right Left -Operating point { (mm in)

Correlation between sensing object size and sensing range

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

SENSING CHARACTERISTICS (TYPICAL)

GL-18H type

Correlation between sensing object size and sensing range

Iror

Brass

40

1.575

Correlation between sensing object size and sensing range

Aluminum

子+t 1 mm 1t 0.039

Stainless (SUS304) stee

30

181

L) <u>'</u>

20 0.787

Sensing object side length a (mm in)

10

As the sensing object size becomes smaller than the standard size (iron sheet 25 × 25 × t 1 mm $0.984 \times 0.984 \times t \ 0.039$ in), the sensing range shortens as shown in the left figure.

GL-18HL type

Sensing field

Setting distance L (mm in) -

10

0+ 20

0.787

10

0.394

l eft 🚽

Ó

Center

Operating point { (mm in)

As the sensing object size becomes smaller than the standard size (iron sheet 40 × 40 × t 1 mm $1.575 \times 1.575 \times t 0.039$ in), the sensing range shortens as shown in the left figure.

PRECAUTIONS FOR PROPER USE

-|{ ⊨

10

- Right

0.3

· 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

GL-8U type

· Make sure to mount with an M3 (length 12 mm 0.472 in or more) truss head screw with a tightening torque of 0.5 N·m or less.

Do not use a flat head \screw or a pan head screw.

GL-18H/18HL type

- The tightening torque should be 0.5 N·m or less.
- · To mount the sensor with a nut, the thru-hole diameter should be ø3.4 mm ø0.134 in.
- · Screws, nuts or washers are not supplied. Please arrange them separately. 10.5 mm

M3 (length 12 mm 0.472 in) truss head scre (Accessory for MS-GL8×10) MS-GL8×10 (Optional) M3 × 0.5 mm 0.020 in tapped hole (Depth: 8 mm 0.315 in or more) or ø3.4 mm ø0.134 in thru-hole 11.5 mm

One set of two washers and

Influence of surrounding metal

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

Front sensing type

\backslash	GL-8HU□×10	GL-18H□	GL-18HLD
D	3 mm 0.118 in	5 mm 0.197 in	25 mm 0.984 in
Е	10 mm 0.394 in	20 mm 0.787 in	60 mm 2.362 in
F	3 mm 0.118 in	0 mm 0 in	20 mm 0.787 in (Note)
G	3 mm 0.118 in	5 mm 0.197 in	30 mm 1.181 in

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MACHINE INTERFACES ENERGY CONSUMPTIO VISUALIZATIO COMPONENTS Refer to p.1485~ for general precautions. FA COMPONENTS

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eparated

GX-F/H GXL

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

PRECAUTIONS FOR PROPER USE

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
	Between "I" type and non "I" type.	0 mm (Note 2) <mark>0 in</mark>	15 mm 0.591 in
GE-OFULATU	Between two "I" types or two non "I" types.	20 mm 0.787 in	40 mm 1.575 in
	Between "I" type and non "I" type.	0 mm (Note 2) <mark>0 in</mark>	15 mm 0.591 in
GE-6HULA IV	Between two "I" types or two non "I" types.	25 mm 0.984 in	40 mm 1.575 in
	Between "I" type and non "I" type.	0 mm (Note 2) <mark>0 in</mark>	20 mm 0.787 in
GE-TOH type	Between two "I" types or two non "I" types.	40 mm 1.575 in	70 mm 2.756 in
	Between "I" type and non "I" type.	20 mm 0.787 in	40 mm 1.575 in
GE-TOPE type	Between two "I" types or two non "I" types.	130 mm 5.118 in	200 mm 7.874 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.

GL-8FU \square ×10: 6 mm 0.236 in

GL-8HU = ×10: 8.5 mm 0.335 in

GL-18H type: 11 mm 0.433 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

	GL-8U type	GL-18H type	GL-18HL type
Iron	1	1	1
Stainless steel (SUS304)	0.80 approx.	0.68 approx.	0.65 approx.
Brass	0.54 approx.	0.45 approx.	0.42 approx.
Aluminum	0.52 approx.	0.43 approx.	0.41 approx.

Wiring

- Please carry out the wiring carefully since protection circuit against reverse power supply connection is not incorporated. (Excluding GL-8U type)
- The output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load. (Excluding GL-8U type)
- Make sure that the power supply is off while wiring.
- · Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.

Others

- Do not use during the initial transient time (50ms) after the power supply is switched on.
- Take care that the sensor does not come in direct contact with oil, grease, or organic solvents, such as, thinner, etc.
- Make sure that the sensing end is not covered with metal dust, scrap or spatter. It will result in malfunction.

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DIMENSIONS (Unit: mm in)

GL-18HD GL-18HLD

Sensor

MS-GL18HL Sensor mounting bracket for GL-18HL type (Accessory)

Material: Aluminum

Two M3 (length 25 mm 0.984 in) pan head screws are attached.

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

MS-GL8×10 Sensor mounting bracket for **GL-8U** type (Optional)

Mounting hole dimensions

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.

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Amplifier Built-in
Amplifier- separated

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

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