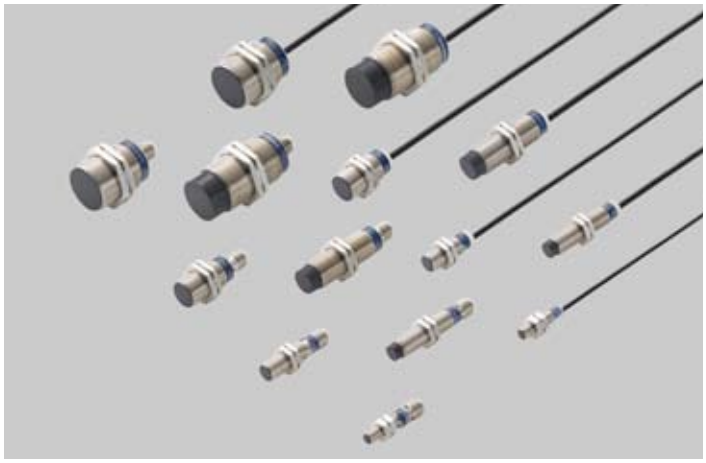
Cylindrical Inductive Proximity Sensor

GX-M SERIES

CE Conforming to EMC Directive

UL Listing (2 m cable length type only)

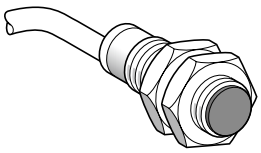
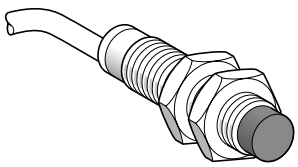


Features

- **Wide product range**
  - **Types: DC 3-wire shielded type**
    DC 3-wire non-shielded type
    DC 2-wire standard type
    DC 2-wire long range type
  - **Size: M8, M12, M18, M30**
  - **Connector: 2 m cable length type**
    M12 plug-in connector type
    M12 pigtaild type (DC 2-wire M8 type only)
- **Strong resistance IP68 (GX-M8□: IP67)**

ORDER GUIDE

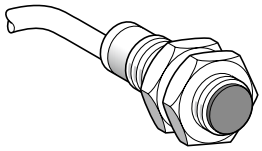
DC 3-wire type (2 m cable length type)

Type		Appearance	Sensing range (Note 1,2)	Model No.		Output operation
				NPN output	PNP output	
Shielded	M8	 Ex.) **GX-M12□**	Max. operation distance: 1.5 mm 0.06 in (Stable sensing range 0 to 1.2 mm 0.05 in)	**GX-M8A**	**GX-M8A-P**	Normally open
				GX-M8B	**GX-M8B-P**	Normally closed
	M12		Max. operation distance: 2 mm 0.08 in (Stable sensing range 0 to 1.6 mm 0.06 in)	**GX-M12A**	**GX-M12A-P**	Normally open
				GX-M12B	**GX-M12B-P**	Normally closed
	M18		Max. operation distance: 5 mm 0.20 in (Stable sensing range 0 to 4 mm 0.16 in)	**GX-M18A**	**GX-M18A-P**	Normally open
				GX-M18B	**GX-M18B-P**	Normally closed
	M30		Max. operation distance: 10 mm 0.39 in (Stable sensing range 0 to 8 mm 0.32 in)	**GX-M30A**	**GX-M30A-P**	Normally open
				GX-M30B	**GX-M30B-P**	Normally closed
Non-shielded	M12	 Ex.) **GX-MK12□**	Max. operation distance: 7 mm 0.28 in (Stable sensing range 0 to 5.6 mm 0.22 in)	**GX-MK12A**	**GX-MK12A-P**	Normally open
				GX-MK12B	**GX-MK12B-P**	Normally closed
	M18		Max. operation distance: 12 mm 0.47 in (Stable sensing range 0 to 9.6 mm 0.38 in)	**GX-MK18A**	**GX-MK18A-P**	Normally open
				GX-MK18B	**GX-MK18B-P**	Normally closed
	M30		Max. operation distance: 22 mm 0.87 in (Stable sensing range 0 to 17.6 mm 0.69 in)	**GX-MK30A**	**GX-MK30A-P**	Normally open
				GX-MK30B	**GX-MK30B-P**	Normally closed

Notes: 1) It is the value in state where the circumference of a detection side has a metal object.
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.

ORDER GUIDE

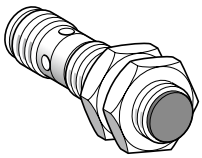
DC 2-wire type (2 m cable length type)

Type		Appearance	Sensing range (Note 1,2)	Model No.	Output operation
Standard	M8	 Ex.) **GX-M12□-U**	Max. operation distance: 1.5 mm 0.06 in (Stable sensing range 0 to 1.2 mm 0.05 in)	**GX-M8A-U**	Normally open
				GX-M8B-U	Normally closed
	M12		Max. operation distance: 2 mm 0.08 in (Stable sensing range 0 to 1.6 mm 0.06 in)	**GX-M12A-U**	Normally open
				GX-M12B-U	Normally closed
	M18		Max. operation distance: 5 mm 0.20 in (Stable sensing range 0 to 4 mm 0.16 in)	**GX-M18A-U**	Normally open
				GX-M18B-U	Normally closed
	M30		Max. operation distance: 10 mm 0.39 in (Stable sensing range 0 to 8 mm 0.32 in)	**GX-M30A-U**	Normally open
				GX-M30B-U	Normally closed
Long range	M8		Max. operation distance: 2.5 mm 0.10 in (Stable sensing range 0 to 2 mm 0.08 in)	**GX-ML8A-U**	Normally open
				GX-ML8B-U	Normally closed
	M12		Max. operation distance: 4 mm 0.16 in (Stable sensing range 0 to 3.2 mm 0.13 in)	**GX-ML12A-U**	Normally open
				GX-ML12B-U	Normally closed
	M18		Max. operation distance: 8 mm 0.32 in (Stable sensing range 0 to 6.4 mm 0.25 in)	**GX-ML18A-U**	Normally open
				GX-ML18B-U	Normally closed
	M30		Max. operation distance: 15 mm 0.59 in (Stable sensing range 0 to 12 mm 0.47 in)	**GX-ML30A-U**	Normally open
				GX-ML30B-U	Normally closed

Notes: 1) It is the value in state where the circumference of a detection side has a metal object.
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.

M12 plug-in connector type (except for GX-M8□-U and GX-ML8□-U)

M12 plug-in connector type is also available.
When ordering this type, "**-Z**" for the M12 plug-in connector type to the model No.
(e.g.) M12 plug-in connector type of **GX-M8A-P** is "**GX-M8A-P-Z**".



M12 pigtailed type (for GX-M8□-U and GX-ML8□-U only)

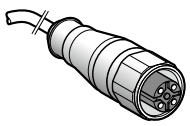
M12 pigtailed type is also available.
When ordering this type, "**-J**" for the M12 pigtailed type to the model No.
(e.g.) M12 pigtailed type of **GX-M8A-U** is "**GX-M8A-U-J**".

Mating cable (2 cables are required for the thru-beam type.)

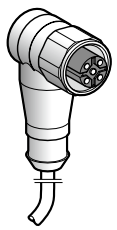
Type		Model No.	Description	
For M12 plug-in connector type	Straight	**CN-24C-C2**	Length: 2 m 6.56 ft	Clamping ring : ø14mm 0.55 in Cable outer : ø5.3mm 0.21 in
		CN-24C-C5	Length: 5 m 16.40 ft	
	Elbow	**CN-24CL-C2**	Length: 2 m 6.56 ft	
		CN-24CL-C5	Length: 5 m 16.40 ft	

Mating cable

• **Straight type**



• **Elbow type**



SPECIFICATIONS

DC 3-wire type

Item \ Type		Shielded type				Non-shielded type		
Model No.	Normally open	**GX-M8A□**	**GX-M12A□**	**GX-18A□**	**GX-M30A□**	**GX-MK12A□**	**GX-MK18A□**	**GX-MK30A□**
	Normally closed	**GX-M8B□**	**GX-M12B□**	**GX-18B□**	**GX-M30B□**	**GX-MK12B□**	**GX-MK18B□**	**GX-MK30B□**
Max. operation distance (Note 2,3)		1.5 mm 0.06 in ±10 %	2 mm 0.08 in ±10 %	5 mm 0.20 in ±10 %	10 mm 0.39 in ±10 %	7 mm 0.28 in ±10 %	12 mm 0.47 in ±10 %	22 mm 0.87 in ±10 %
Stable sensing range (Note 2,3)		0 to 1.2 mm 0 to 0.05 in	0 to 1.6 mm 0 to 0.06 in	0 to 4 mm 0 to 0.16 in	0 to 8 mm 0 to 0.32 in	0 to 5.6 mm 0 to 0.22 in	0 to 9.6 mm 0 to 0.38 in	0 to 17.6 mm 0 to 0.69 in
Standard sensing object		Iron sheet 8 × 8 × t 1 mm 0.32 × 0.32 × t 0.04 in	Iron sheet 12 × 12 × t 1 mm 0.47 × 0.47 × t 0.04 in	Iron sheet 18 × 18 × t 1mm 0.71 × 0.71 × t 0.04 in	Iron sheet 30 × 30 × t 1 mm 1.18 × 1.18 × t 0.04 in	Iron sheet 24 × 24 × t 1 mm 0.94 × 0.94 × t 0.04 in	Iron sheet 24 × 24 × t 1 mm 0.94 ×0.94 × t 0.04 in	Iron sheet 45 × 45 × t 1 mm 1.77 × 1.77 × t 0.04 in
Hysteresis (Note 2)		15 % or less of operation distance (with standard sensing object)						
Repeatability (Note 2)		Along sensing axis: 5 % or less of operation distance						
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less						
Current consumption (Note 4)		10 mA or less						
Output		<NPN output type> NPN open-collector transistor • Maximum sink current 200 mA • Applied voltage: 24 V DC or less (between output and 0 V) • Residual voltage 2 V or less				<PNP output type> PNP open-collector transistor • Maximum source current 200 mA • Applied voltage: 24 V DC or less (between output and + V) • Residual voltage 2 V or less		
	Utilization category	DC-12 or DC-13						
	Short-circuit protection	Incorporated						
Max. response frequency		5 kHz	5 kHz	2 kHz	1 kHz	2.5 kHz	1 kHz	0.5 kHz
Operation indicator		Yellow LED (lights up when the output is ON)						
Environmental resistance	Pollution degree	3 (industrial enviroment)						
	Protection	IP67 (IEC)	IP69K (DIN), IP68 (IEC) (2 m cable length type only) , IP67 (IEC) (M12 plug-in connector type only)					
	Ambient temperature	–25 to +70 °C –13 to +158 °F, Storage: –40 to +85 °C –40 to +185 °F						
	Ambient humidity	50 % RH or less (at +70 °C +158 °F)						
	EMC	EN 60947-5-2						
	Voltage withstandability	500 V AC for one min. between all supply terminals connected together and enclosure						
	Vibration resistance	10 to 55 Hz frequency, 0.5 mm 0.02 in amplitude in X, Y and Z directions for 1.5 hours each						
	Shock resistance	294 m/s² acceleration (30 G approx.) in X, Y and Z directions for three times each						
Sensing range variation (Note 2)		Within ±10 % fluctuation of sensing range at +23 °C +73 °F and rated voltage in the range of allowable temperature and supply voltage						
Material		Enclosure: Brass (Nickel plated), Sensing part: PPS						
Cable (except for M12 plug-in connector type)		0.44 mm² (0.15 mm² for **GX-M8□**) 3-core cabtyre cable, 2 m 6.56 ft long						
Cable extension		Extension up to total 10 m 32.80 ft is possible with 0.34 mm², or more, cable.						
Net weight (Note 5)	2 m cable length type	40 g approx.	70 g approx.	90 g approx.	150 g approx.	75 g approx.	100 g approx.	180 g approx.
	M12 plug-in connector type	15 g approx.	20 g approx.	45 g approx.	110 g approx.	25 g approx.	55 g approx.	140 g approx.
Accessories		Nut: 2 pcs.						

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) It is the value in state where the circumference of a detection side has a metal object.
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) It is the leakage current when the output is in the OFF state.
5) The weight includes the weight of two nuts.

SPECIFICATIONS

DC 2-wire type

Item \ Type		Standard type				Long range type			
Model No.	Normally open	GX-M8A-U(-J)	GX-M12A-U(-Z)	GX-M18A-U(-Z)	GX-M30A-U(-Z)	GX-ML8A-U(-J)	GX-ML12A-U(-Z)	GX-ML18A-U(-Z)	GX-ML30A-U(-Z)
	Normally closed	GX-M8B-U(-J)	GX-M12B-U(-Z)	GX-M18B-U(-Z)	GX-M30B-U(-Z)	GX-ML8B-U(-J)	GX-ML12B-U(-Z)	GX-ML18B-U(-Z)	GX-ML30B-U(-Z)
Max. operation distance (Note 2,3)		1.5 mm 0.06 in ±10 %	2 mm 0.08 in ±10 %	5 mm 0.20 in ±10 %	10 mm 0.39 in ±10 %	2.5 mm 0.10 in ±10 %	4 mm 0.16 in ±10 %	8 mm 0.32 in ±10 %	15 mm 0.59 in ±10 %
Stable sensing range (Note 2,3)		0 to 1.2 mm 0 to 0.05 in	0 to 1.6 mm 0 to 0.06 in	0 to 4 mm 0 to 0.09 in	0 to 8 mm 0 to 0.22 in	0 to 2 mm 0 to 0.08 in	0 to 3.2 mm 0 to 0.13 in	0 to 6.4 mm 0 to 0.25 in	0 to 12 mm 0 to 0.47 in
Standard sensing object		Iron sheet 8 × 8 × t 1 mm 0.32 × 0.32 × t 0.04 in	Iron sheet 12 × 12 × t 1 mm 0.47 × 0.47 × t 0.04 in	Iron sheet 18 × 18 × t 1mm 0.71 × 0.71 × t 0.04 in	Iron sheet 30 × 30 × t 1 mm 1.18 × 1.18 × t 0.04 in	Iron sheet 8 × 8 × t 1 mm 0.32 × 0.32 × t 0.04 in	Iron sheet 12 × 12 × t 1 mm 0.47 × 0.47 × t 0.04 in	Iron sheet 18 × 18 × t 1 mm 0.71 × 0.71 × t 0.04 in	Iron sheet 30 × 30 × t 1 mm 1.18 × 1.18 × t 0.04 in
Hysteresis (Note 2)		15 % or less of operation distance (with standard sensing object)							
Repeatability (Note 2)		Along sensing axis: 5 % or less of operation distance							
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less							
Current consumption (Note 4)		0.5 mA or less							
Output		Non-contact DC 2-wire type • Load current: 1.5 to 100 mA • Residual voltage: 4.2 V or less (Note 5)							
	Utilization category	DC-12 or DC-13							
	Short-circuit protection	Incorporated							
Max. response frequency		1 kHz	1 kHz	1.2 kHz	1.3 kHz	1.1 kHz	1.3 kHz	1.5 kHz	0.8 kHz
Operation indicator		Yellow LED (lights up when the output is ON)							
Environmental resistance	Pollution degree	3 (Industrial environment)							
	Protection	IP67 (IEC)	IP69K (DIN), IP68 (IEC) (2 m cable length type only) , IP67 (IEC) (M12 plug-in connector type only)						
	Ambient temperature	–25 to +70 °C –13 to +158 °F, Storage: –40 to +85 °C –40 to +185 °F							
	Ambient humidity	50 % RH or less (at +70 °C +158 °F)							
	EMC	EN 60947-5-2							
	Voltage withstandability	500 V AC for one min. between all supply terminals connected together and enclosure							
	Vibration resistance	10 to 55 Hz frequency, 0.5 mm 0.02 in amplitude in X, Y and Z directions for 1.5 hours each							
	Shock resistance	294 m/s² acceleration (30 G approx.) in X, Y and Z directions for three times each							
Sensing range variation (Note 2)		Within ±10 % fluctuation of sensing range at +23 °C +73 °F and rated voltage in the range of allowable temperature and supply voltage							
Material		Enclosure: Brass (Nickel plated), Sensing part: PPS							
Cable (except for M12 plug-in connector type)		0.44 mm² [0.15 mm² for **GX-M(L)8□-U**] 2-core cabtyre cable, 2 m 6.56 ft long							
Cable extension		Extension up to total 10 m 32.80 ft is possible with 0.34 mm², or more, cable.							
Net weight (Note 6)	2 m cable length type	40 g approx.	70 g approx.	90 g approx.	150 g approx.	40 g approx.	70 g approx.	90 g approx.	150 g approx.
	M12 pigtailed(-J type) / M12 plug-in connector type	20 g approx.	20 g approx.	45 g approx.	110 g approx.	20 g approx.	20 g approx.	45 g approx.	110 g approx.
Accessories		Nut: 2 pcs.							

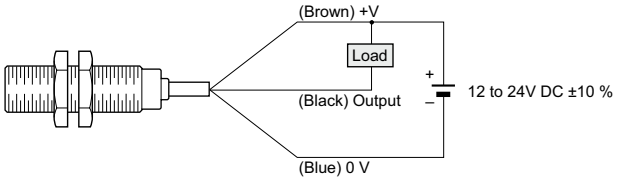
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) It is the value in state where the circumference of a detection side has a metal object.
3) The maximum operation distance stands for the maximum distance for 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) It is the leakage current when the output is in the OFF state.
5) When the cable is extended, the residual voltage becomes larger.
6) The weight includes the weight of two nuts.

WIRING DIAGRAMS

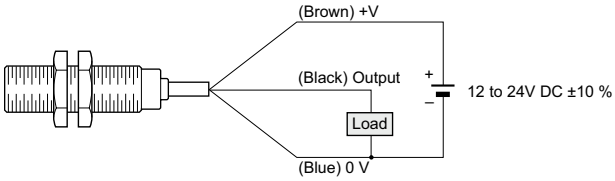
DC 3-wire type

Wiring diagram

NPN output type



PNP output type



Connector pin position

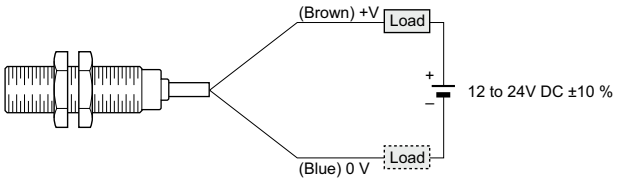
M12 connector

- **Normally Open**
  1 : +V
  2 : Not connected
  3 : 0 V
  4 : Output

- **Normally Closed**
  1 : +V
  2 : Output
  3 : 0 V
  4 : Not connected

DC 2-wire type

Wiring diagram



Connector pin position

M12 connector

- **Normally Open**
  (except for **GX-M8□-U-J** and **GX-ML8□-U-J**)
  1 : Not connected
  2 : Not connected
  3 : +V
  4 : 0 V

- **Normally Open**
  (**GX-M8□-U-J** and **GX-ML8□-U-J** only)
  1 : +V
  2 : Not connected
  3 : Not connected
  4 : 0 V

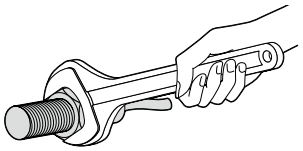
- **Normally Closed**
  1 : +V
  2 : 0 V
  3 : Not connected
  4 : Not connected

PRECAUTIONS FOR PROPER USE

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

Mounting

- The tightening torque should be under the value given below.



Model No.	Sensor size	Tightening torque	
		Sensor	Connector (Note)
GX-M□	M8	5 N·m	2 N·m
	M12	6 N·m	2 N·m
	M18	15 N·m	2 N·m
	M30	40 N·m	2 N·m
GX-M(L)8□-U-J	M8	5 N·m	1.5 N·m

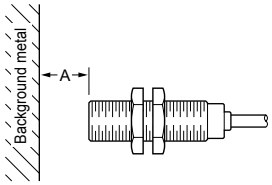
Note: Connector is equipped with **-Z** type or **-J** type.

Distance from surrounding metal

- As metal around the sensor may affect the sensing performance, pay attention to the following points.

Influence of surrounding metal

- The surrounding metal will affect the sensing performance. Keep the minimum distance specified in the table below.

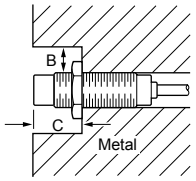


Type	A (mm in)			
	M8	M12	M18	M30
DC 3-wire shielded type	3 0.12	4 0.16	10 0.39	20 0.79
DC 3-wire non-shielded type	-	21 0.83	36 1.42	66 2.60
DC 2-wire standard type	4.5 0.18	6 0.23	15 0.59	30 1.18
DC 2-wire long range type	8 0.32	12 0.47	25 0.98	45 1.77

Embedding of the sensor in metal

- Sensing range may decrease if the sensor is completely embedded in metal. Especially for the non-shielded type, keep the minimum distance specified in the right table.

Sensor size	B (mm in)	C (mm in)
M12	12 0.47	12 0.47
M18	18 0.71	18 0.71
M30	30 1.18	30 1.18

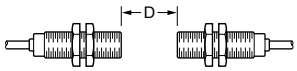


Note: With the non-shielded type, the sensing range may vary depending on the position of the nuts.

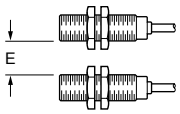
Mutual interference

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

Face to face mounting



Parallel mounting



Type	D (mm in)				E (mm in)			
	M8	M12	M18	M30	M8	M12	M18	M30
DC 3-wire shielded type	18 0.71	24 0.94	60 2.36	120 4.72	3 0.12	4 0.16	10 0.39	20 0.77
DC 3-wire non-shielded type	-	84 3.30	144 5.67	264 10.39	-	48 1.89	72 2.83	120 4.72
DC 2-wire standard type	18 0.71	24 0.94	60 2.36	120 4.72	3 0.12	4 0.16	10 0.39	20 0.77
DC 2-wire long range type	30 1.18	50 1.97	100 3.93	180 7.09	5 0.20	8 0.32	16 0.63	30 1.18

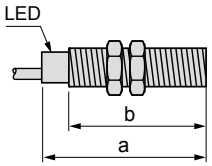
Wiring

- 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.
- Ensure that an isolation transformer is utilized for the DC power supply. If an autotransformer is utilized, the main body or power supply may be damaged.
- If the used power supply generates a surge, connect a surge absorber to the power supply to absorb the surge.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, 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.
- Damage or burnout may result in case of short circuit of load or miswiring.
- Make a cable length as short as possible to lessen noise pickup.

Others

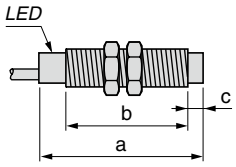
- Our products have been developed / produced for industrial use only.
- Avoid using a product where there is excessive vapor, dust or corrosive gas, or in a place where it could be exposed directly to water or chemicals.
- Take care that the sensor does not come in direct contact with water, oil, grease or organic solvents, such as, thinner, etc.
- Do not use in an environment containing infammable or explosive gases.
- Never disassemble or modify the product.

DIMENSIONS (Unit: mm in)

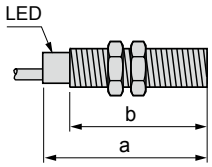


DC 3-wire type

Sensors		2 m cable length type (mm in)		M12 plug-in connector type (mm in)	
Shielded type		a	b	a	b
M8	GX-M8□	33 1.30	25 0.98	45 1.77	24 0.94
M12	GX-M12□	35 1.38	25 0.98	50 1.97	30 1.18
M18	GX-M18□	39 1.54	28 1.10	50 1.97	28 1.10
M30	GX-M30□	43 1.69	32 1.26	55 2.17	32 1.26



Sensors		2 m cable length type (mm in)			M12 plug-in connector type (mm in)		
Non-shielded type		a	b	c	a	b	c
M12	GX-MK12□	55 2.17	42 1.65	5 0.20	66 2.60	42 1.65	5 0.20
M18	GX-MK18□	60 2.36	44 1.73	8 0.32	72 2.83	44 1.73	8 0.32
M30	GX-MK30□	63 2.48	41 1.61	13 0.51	74 2.91	41 1.61	13 0.51



DC 2-wire type

Sensors		2 m cable length type (mm in)		M12 plug-in connector type (mm in) (M8 size: M12 pigtailed type)	
Standard type, Long range type		a	b	a	b
M8	GX-M(L)8□-U (-J)	33 1.30	25 0.98	–	24 0.94
M12	GX-M(L)12□-U (-Z)	35 1.38	25 0.98	50 1.97	30 1.18
M18	GX-M(L)18□-U (-Z)	39 1.54	28 1.10	50 1.97	28 1.10
M30	GX-M(L)30□-U (-Z)	43 1.69	32 1.26	55 2.17	32 1.26

Disclaimer
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