SUNX

INSTRUCTION MANUA

DC Two-wire Type
Cylindrical Inductive Proximity Sensor

GX-U Series

Thank you very much for using SUNX products. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

WARNING

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

1 SPECIFICATIONS

Item \ Type	Shielded type					Non-shielded type			
	Non-threaded type	Threaded type				Threaded type			
Model No. (Note 1) (Note 2) (Note 3)	**GX-5SU(B)**	**GX-8MU(B)**	**GX-12MU(B)**	**GX-18MU(B)**	**GX-30MU(B)**	**GX-8MLU(B)**	**GX-12MLU(B)**	**GX-18MLU(B)**	**GX-30MLU(B)**
Max. operation distance (Note 4)	1.5mm±10%	2mm±10%	3mm±10%	7mm±10%	10mm±10%	4mm±10%	8mm±10%	15mm±10%	22mm±10%
Stable sensing range (Note 4)	0 to 1.2mm	0 to 1.6mm	0 to 2.4mm	0 to 5.6mm	0 to 8mm	0 to 3.2mm	0 to 6.4mm	0 to 12mm	0 to 17.6mm
Standard sensing object	Iron sheet 6×6×t1mm	Iron sheet 8×8×t1mm	Iron sheet 12×12×t1mm	Iron sheet 18×18×t1mm	Iron sheet 30×30×t1mm	Iron sheet 20×20×t1mm	Iron sheet 30×30×t1mm	Iron sheet 50×50×t1mm	Iron sheet 70×70×t1mm
Supply voltage	12 to 24V DC $^{+10}_{-15}$% Ripple: P-P10% or less								
Current consumption (Note 5)	0.8mA or less								
Output	Non-contact DC 2-wire type ・Load current: 3 to 70mA (Note 6) ・Residual voltage: 3V or less (Note 7)								
Short-circuit protection	Incorporated								
Max. response frequency	1.7kHz	1.2kHz	1.2kHz	500Hz	350Hz	1.0kHz	650Hz	350Hz	220Hz
Operation indicator	Normally closed type: Orange LED (lights up when the output is ON)								
2-color indicator	Normally open type: Lights up in green under stable sensing condition, lights up in orange under unstable sensing condition								
Protection	IP67 (IEC), IP67g (JEM)								
Ambient temperature	-25 to +70℃, Storage: -30 to +80℃								
Ambient humidity	45 to 85% RH, Storage: 35 to 95% RH								
Material	Enclosure: Brass (Nickel plated) [However, Stainless steel (SUS303) for **GX-5SU**(**B**), **GX-8MU**(**B**) and **GX-8MLU**(**B**), Brass (fluorine resin coating) for spatter-resistant type] Sensing part: Nylon [However, Polyalylate for **GX-5SU**(**B**), Polyalylate (fluorine resin coating) for spatter-resistant type] Indicator part: Nylon [excluding **GX-5SU**(**B**), Polyalylate for spatter-resistant type]								
Weight (Note 8) (Note 9)	20g approx.	30g approx.	55g approx.	95g approx.	220g approx.	30g approx.	55g approx.	95g approx.	220g approx.
Accessories	—	Nut: 2 pcs., Toothed lock washer: 1 pc.							

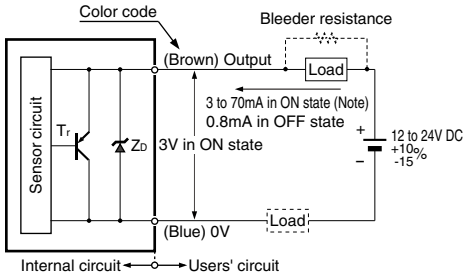
Notes: 1) Model with '**B**' is 'Normally closed type', and model without '**B**' is 'Normally open type'.
2) Model with '**F**' is 'Spatter-resistant type'.
GX-F12MU-J, **GX-F18MU-J**, **GX-F30MU-J** only.
3) Model with a suffix '**-J**' is 'Pigtailed type'. [Except for **GX-5SU**(**B**), **GX-8MU**(**B**) and **GX-8MLU**(**B**).]
(e.g.) The pigtailed type of **GX-12MLUB** is '**GX-12MLUB-J**'.
4) 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.
5) It is the leakage current when the output is in the OFF state.
6) The maximum load current varies depending on the ambient temperature. Refer to '**3 CONNECTION**'.
7) When the cable is extended, the residual voltage becomes larger.
8) The weight of the spatter-resistant type is as follows.
GX-F12MU-J: 35g approx., **GX-F18MU-J**: 75g approx., **GX-F30MU-J**: 200g approx.
9) The weight of the threaded type includes the weight of two nuts and one toothed lock washer.

2 CAUTIONS

- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the sensor.
- 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 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.
- Do not use during the initial transient time (50ms) after the power supply is switched on.
- Extension up to total 50m is possible with a 0.3mm^2, or more, cable.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.
- Take care that the sensor does not come in direct contact with 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.
- Do not rub the surface of the spatter-resistant type sensor with a hard object. It will wear out the fluorine resin coating.

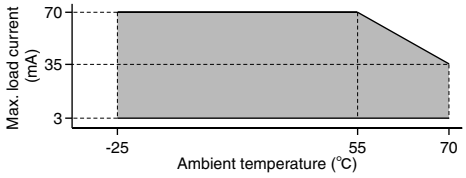
3 CONNECTION

● I/O circuit diagram



Symbols...Z_D: Surge absorption zener diode
T_r: PNP output transistor

Note: The maximum load current varies depending on the ambient temperature.



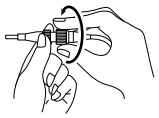
Conditions for the load

(1) The load should not be actuated by the leakage current (0.8mA) in the OFF state.
(2) The load should be actuated by (supply voltage - 3V) in the ON state.
(3) The current in the ON state should be between 3 to 70mA DC.
In case the current is less than 3mA, connect a bleeder resistance in parallel to the load so that a current of 3mA, or more, flows.

● Spatter-resistant type and pigtailed type

Connection

[Sensor side connector]
Convex
[Cable side connector]
Concave



① Align the guide of the sensor side connector with the groove of the cable side connector and push to mate the connectors.
② Holding the fixing ring of the sensor side connector, turn the fixing ring of the cable side connector clockwise till it stops.

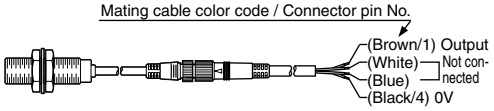
Note: Tighten the fixing ring completely to make the connection fully waterproof.

Removal

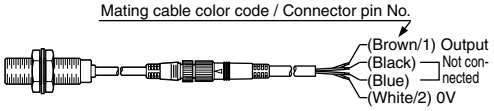
① Turn the fixing ring counterclockwise and, holding the fixing ring, pull to separate the connectors.

Notes: 1) Use the mating cables as shown below.
CN-24-C2 (Oil, heat and cold resistant cable, 4-core, 2m, Do not use it near a welding place.)
CN-24-C5 (Oil, heat and cold resistant cable, 4-core, 5m, Do not use it near a welding place.)
CN-22G-C2 (Spatter-resistant cable, 2-core, 2m)
CN-22G-C5 (Spatter-resistant cable, 2-core, 5m)
2) When the 4-core mating cable is used with the pigtailed type sensor, the wire color code differs from the color code of the cable type sensor.

GX-□U-J (Normally Open)

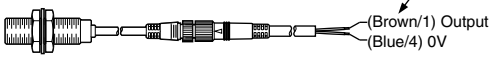


GX-□UB-J (Normally Closed)



GX-F□U-J (Spatter-resistant type)

The spatter-resistant mating cable has the same color code as the cable of the spatter-resistant type sensor.



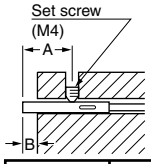
4 MOUNTING

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

Mounting with a set screw

- Tighten with the cup-point of a set screw (M4).

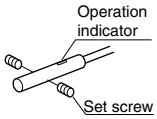
<Non-threaded type>

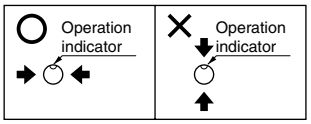


Mounting hole process dimension

Model No.	A (mm)	B (mm)	C (mm)	Tightening torque
GX-5SU□	5 to 30	3	$\phi 5.5^{+0.2}_{0}$	0.78N·m

- Do not fix on the operation indicator or opposite to it.

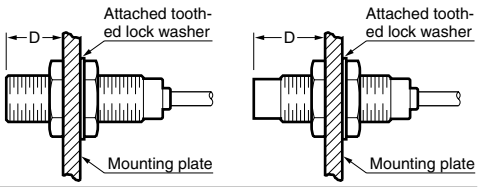




Mounting with nut

● Mount such that the nuts do not protrude from the threaded portion.

<Shielded threaded type> **<Non-shielded threaded type>**

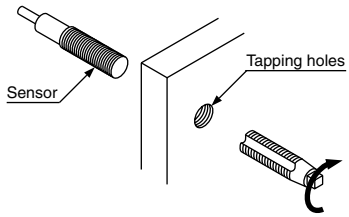


Model No.	Dimension D (mm)	Tightening torque
GX-8MU□	3 to 10.3	5.9N·m
	10.3 or more	11.8N·m
GX-□12MU□	3.5 to 13.5	10N·m
	13.5 or more	20N·m
GX-□18MU□	4 to 18	45N·m
	18 or more	80N·m
GX-□30MU□	5 to 21	80N·m
	21 or more	180N·m
GX-8MLU□	12 or more	11.8N·m
GX-12MLU□	15 or more	20N·m
GX-18MLU□	25 or more	80N·m
GX-30MLU□	30 or more	180N·m

● **Caution with GX-8MU□, GX-8MLU□, GX-□12MU□ and GX-12MLU□**

The root truncation of the threaeds is shallow owing to strengthening of the sensors against tightening.

When tapping holes on equipment to fix the sensors, the prepared hoels must be ϕ7.2mm or more with **GX-8MU□**, and **GX-8MLU□**, ϕ11.2mm or more with **GX-□12MU□**, and **GX-12MLU□**.

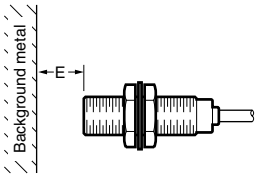


● **Distance from surrounding metal**

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

Influence of surrounding metal

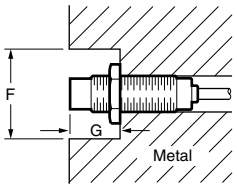
・ The surrounding metal will affect the sensing performance. Keep the minimum distance specified in the table below.



Model No.	E (mm)
GX-5SU□	4.5
GX-8MU□	4.5
GX-□12MU□	8
GX-□18MU□	20
GX-□30MU□	40
GX-8MLU□	8
GX-12MLU□	22
GX-18MLU□	45
GX-30MLU□	75

Embedding of the sensor in metal

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



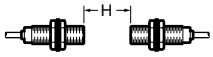
Model No.	F (mm)	G (mm)
GX-5SU□	ϕ12	3
GX-8MLU□	ϕ24	12
GX-12MLU□	ϕ50	15
GX-18MLU□	ϕ75	25
GX-30MLU□	ϕ105	30

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

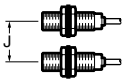
● **Mutual interference**

・ 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



Model No.	H (mm)	J (mm)
GX-5SU□	19	14
GX-8MU□	20	15
GX-□12MU□	35	20
GX-□18MU□	70	45
GX-□30MU□	115	70
GX-8MLU□	60	45
GX-12MLU□	145	95
GX-18MLU□	250	165
GX-30MLU□	350	250

● **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.

Correction coefficient

Metal / Model No.	Iron	Stainless steel (SUS304)	Brass	Aluminum
GX-5SU□	1	0.63 approx.	0.32 approx.	0.30 approx.
GX-8MU□	1	0.59 approx.	0.32 approx.	0.29 approx.
GX-□12MU□	1	0.75 approx.	0.51 approx.	0.49 approx.
GX-□18MU□	1	0.75 approx.	0.50 approx.	0.48 approx.
GX-□30MU□	1	0.69 approx.	0.44 approx.	0.42 approx.
GX-8MLU□	1	0.64 approx.	0.38 approx.	0.38 approx.
GX-12MLU□	1	0.67 approx.	0.44 approx.	0.43 approx.
GX-18MLU□	1	0.68 approx.	0.45 approx.	0.43 approx.
GX-30MLU□	1	0.67 approx.	0.44 approx.	0.43 approx.

Note: The sensing range also changes if the sensing object is plated.

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