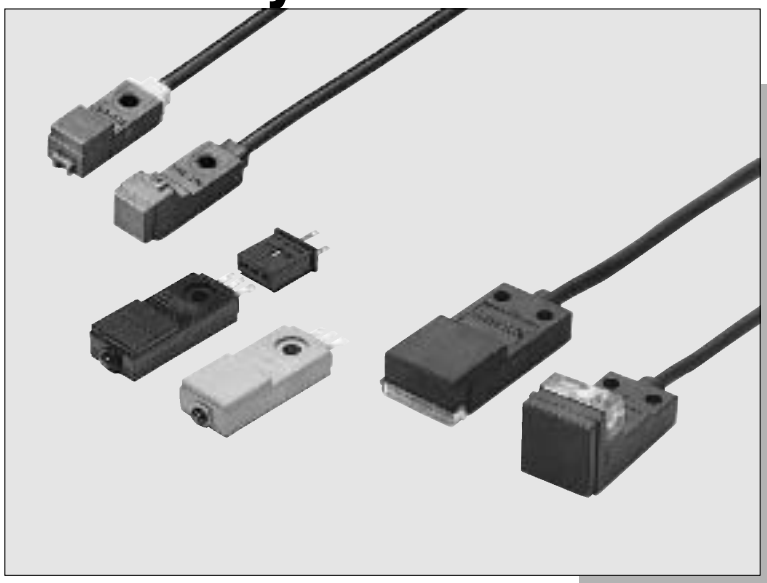
# GXL SERIES

# Micro-size Inductive Proximity Sensor

**Amplifier Built-in**



## High performance in micro-size design

Conforming to EMC Directive

UL Recognition (Only GXL-8F□ and GXL-8F□)

### Wide model variety

Models ranging from extremely compact type to long sensing range type are available to suit various applications.

### Versatile mounting

Since the sensor is fingertip size, it can be mounted in a tight space.

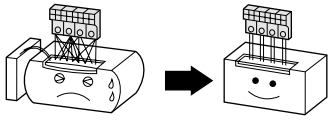
### Reduced wiring operation

The wiring cost of the DC 2-wire type is 2/3 that of a conventional model. Besides, the possibility of miswiring is reduced.

**Particularly convenient when many sensors are used.**

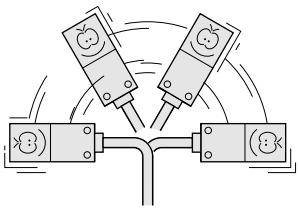
**Wiring of the 3-wire type is cumbersome.**

**Wiring of the 2-wire type is simple and neat.**



### Flexible cable type

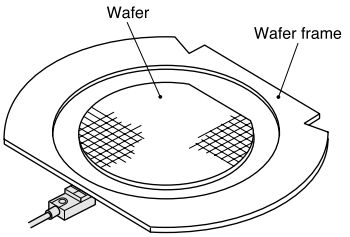
The bending durability of its cable is ten times that of the conventional model. The sensor can be mounted on a moving table or a robot arm.



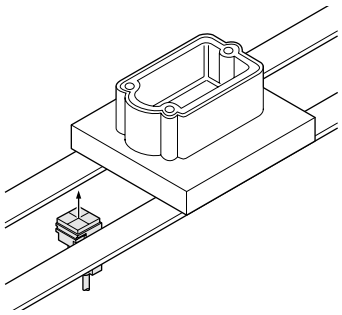
※ Except PNP output type and 5 m 16.404 ft cable attached NPN output type

## APPLICATIONS

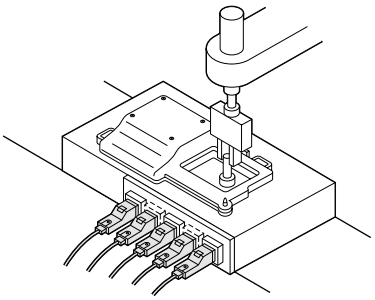
**Detecting wafer frame**




**Detecting aluminum pallet**

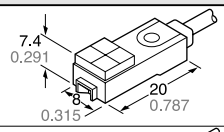
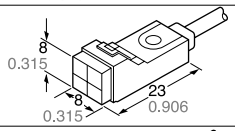
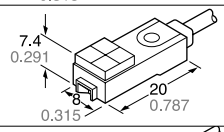
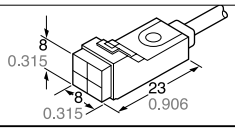


**Code reading**



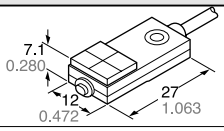
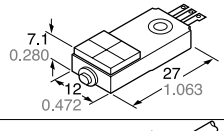
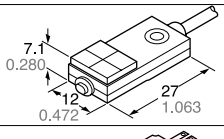
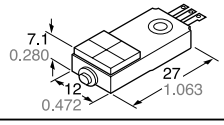
## ORDER GUIDE

### GXL-8 type

| Type | | Appearance (mm in) | Sensing range (Note 1) | Model No. (Note 2) | Output | Output operation |
|---|---|---|---|---|---|---|
| DC 2-wire | Front sensing |  | Maximum operation distance 2.5 mm 0.098 in (0 to 1.8 mm) (0 to 0.071 in) Stable sensing range | **GXL-8FU** | Non-contact DC 2-wire type | Normally open |
| | | | | **GXL-8FUI** | | |
| | | | | **GXL-8FUB** | | Normally closed |
| | | | | **GXL-8FUIB** | | |
| | Top sensing |  | | **GXL-8HU** | | Normally open |
| | | | | **GXL-8HUI** | | |
| | | | | **GXL-8HUB** | | Normally closed |
| | | | | **GXL-8HUIB** | | |
| NPN output | Front sensing |  | | **GXL-8F** | NPN open-collector transistor | Normally open |
| | | | | **GXL-8FI** | | |
| | | | | **GXL-8FB** | | Normally closed |
| | | | | **GXL-8FIB** | | |
| | Top sensing |  | | **GXL-8H** | | Normally open |
| | | | | **GXL-8HI** | | |
| | | | | **GXL-8HB** | | Normally closed |
| | | | | **GXL-8HIB** | | |

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.

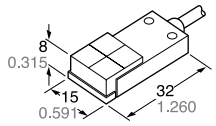
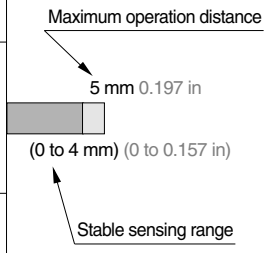
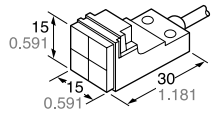
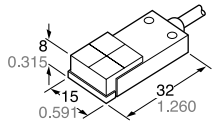
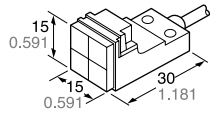
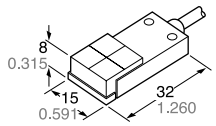
### GXL-N12 type

| Type | | Appearance (mm in) | Sensing range (Note 1) | Model No. (Note 2) | Output | Output operation |
|---|---|---|---|---|---|---|
| NPN output | Cable type |  | Maximum operation distance 3 mm 0.118 in (0 to 2 mm) (0 to 0.079 in) Stable sensing range | **GXL-N12F** (Note 3) | NPN open-collector transistor | Normally open |
| | | | | **GXL-N12FI** (Note 3) | | |
| | | | | **GXL-N12FB** | | Normally closed |
| | | | | **GXL-N12FIB** | | |
| | Terminal type |  | | **GXL-N12FT** (Note 3) | | Normally open |
| | | | | **GXL-N12FTI** (Note 3) | | |
| | | | | **GXL-N12FTB** | | Normally closed |
| | | | | **GXL-N12FTIB** | | |
| PNP output | Cable type |  | | **GXL-N12F-P** | PNP open-collector transistor | Normally open |
| | | | | **GXL-N12FI-P** | | |
| | | | | **GXL-N12FB-P** | | Normally closed |
| | | | | **GXL-N12FIB-P** | | |
| | Terminal type |  | | **GXL-N12FT-P** | | Normally open |
| | | | | **GXL-N12FTI-P** | | |
| | | | | **GXL-N12FTB-P** | | Normally closed |
| | | | | **GXL-N12FTIB-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.
3) These models, with normally open NPN output, are also available as 5 V supply voltage type. Please contact our office for details.

## ORDER GUIDE

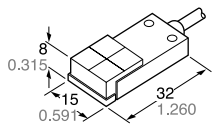
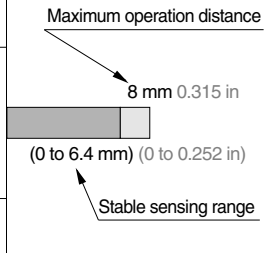
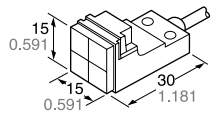
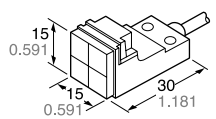
### GXL-15 (Standard) type

| Type | | Appearance (mm in) | Sensing range (Note 1) | Model No. (Note 2) | Output | Output operation |
|---|---|---|---|---|---|---|
| DC 2-wire | Front sensing |  |  | **GXL-15FU** | Non-contact DC 2-wire type | Normally open |
| | | | | **GXL-15FUI** | | |
| | | | | **GXL-15FUB** | | Normally closed |
| | | | | **GXL-15FUIB** | | |
| | Top sensing |  | | **GXL-15HU** | | Normally open |
| | | | | **GXL-15HUI** | | |
| | | | | **GXL-15HUB** | | Normally closed |
| | | | | **GXL-15HUIB** | | |
| NPN output | Front sensing |  | | **GXL-15F** | NPN open-collector transistor | Normally open |
| | | | | **GXL-15FI** | | |
| | | | | **GXL-15FB** | | Normally closed |
| | | | | **GXL-15FIB** | | |
| | Top sensing |  | | **GXL-15H** | | Normally open |
| | | | | **GXL-15HI** | | |
| | | | | **GXL-15HB** | | Normally closed |
| | | | | **GXL-15HIB** | | |
| PNP output | Front sensing |  | | **GXL-15F-P** | PNP open-collector transistor | Normally open |
| | | | | **GXL-15FI-P** | | |
| | | | | **GXL-15FB-P** | | Normally closed |
| | | | | **GXL-15FIB-P** | | |



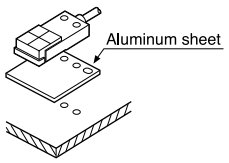
Notes: 1) The maximum operation distance stands for the maximum distance for which the sensor can detect the standard sensing object.
The stable sensing range stands for the sensing range for which the sensor can stably detect the standard sensing object even if there is an ambient temperature drift and/or supply voltage fluctuation.
2) '**I**' in the model No. indicates a different frequency type.

### GXL-15 (Long sensing range) type ··· For mounting on non-magnetic material (Note 3)

| Type | | Appearance (mm in) | Sensing range (Note 1) | Model No. (Note 2) | Output | Output operation |
|---|---|---|---|---|---|---|
| DC 2-wire | Front sensing |  |  | **GXL-15FLU** | Non-contact DC 2-wire type | Normally open |
| | | | | **GXL-15FLUI** | | |
| | | | | **GXL-15FLUB** | | Normally closed |
| | | | | **GXL-15FLUIB** | | |
| | Top sensing |  | | **GXL-15HLU** | | Normally open |
| | | | | **GXL-15HLUI** | | |
| | | | | **GXL-15HLUB** | | Normally closed |
| | | | | **GXL-15HLUIB** | | |
| NPN output | Top sensing |  | | **GXL-15HL** | NPN open-collector transistor | Normally open |
| | | | | **GXL-15HLI** | | |
| | | | | **GXL-15HLB** | | Normally closed |
| | | | | **GXL-15HLIB** | | |



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.
3) To mount the long sensing range **GXL-15** on a magnetic body, such as iron, the enclosed aluminum sheet, or any other aluminum sheet having a minimum size of 30 × 39.5 × t 0.3 mm 1.181 × 1.555 × t 0.012 in (**GXL-15HLU**□ / **GXL-15HL**□: 30 × 30 × t 0.3 mm 1.181 × 1.181 × t 0.012 in), should be inserted between the sensor and the magnetic body.
However, it is not necessary to use the aluminum sheet when mounting on a non-magnetic body, such as, aluminum or an insulator.



## ORDER GUIDE

### Flexible cable type and 5 m 16.404 ft cable length type

Flexible cable type and 5 m 16.404 ft cable length type (standard: 1 m 3.281 ft) are also available.

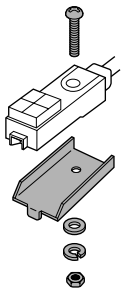
**• Table of Model Nos.**

| Type | | Standard | Flexible cable type | 5 m 16.404 ft cable length type | Flexible cable & 5 m 16.404 ft cable length type |
|---|---|---|---|---|---|
| DC 2-wire | Front sensing | GXL-8FU | GXL-8FU-R | GXL-8FU-C5 | GXL-8FU-R-C5 |
| | | GXL-8FUI | GXL-8FUI-R | GXL-8FUI-C5 | GXL-8FUI-R-C5 |
| | | GXL-8FUB | GXL-8FUB-R | GXL-8FUB-C5 | GXL-8FUB-R-C5 |
| | | GXL-8FUIB | GXL-8FUIB-R | GXL-8FUIB-C5 | GXL-8FUIB-R-C5 |
| | Top sensing | GXL-8HU | GXL-8HU-R | GXL-8HU-C5 | GXL-8HU-R-C5 |
| | | GXL-8HUI | GXL-8HUI-R | GXL-8HUI-C5 | GXL-8HUI-R-C5 |
| | | GXL-8HUB | GXL-8HUB-R | GXL-8HUB-C5 | GXL-8HUB-R-C5 |
| | | GXL-8HUIB | GXL-8HUIB-R | GXL-8HUIB-C5 | GXL-8HUIB-R-C5 |
| | Front sensing | GXL-15FU | GXL-15FU-R | GXL-15FU-C5 | GXL-15FU-R-C5 |
| | | GXL-15FUI | GXL-15FUI-R | GXL-15FUI-C5 | GXL-15FUI-R-C5 |
| | | GXL-15FUB | GXL-15FUB-R | GXL-15FUB-C5 | GXL-15FUB-R-C5 |
| | | GXL-15FUIB | GXL-15FUIB-R | GXL-15FUIB-C5 | GXL-15FUIB-R-C5 |
| | Top sensing | GXL-15HU | GXL-15HU-R | GXL-15HU-C5 | GXL-15HU-R-C5 |
| | | GXL-15HUI | GXL-15HUI-R | GXL-15HUI-C5 | GXL-15HUI-R-C5 |
| | | GXL-15HUB | GXL-15HUB-R | GXL-15HUB-C5 | GXL-15HUB-R-C5 |
| | | GXL-15HUIB | GXL-15HUIB-R | GXL-15HUIB-C5 | GXL-15HUIB-R-C5 |
| | Front sensing | GXL-15FLU | GXL-15FLU-R | GXL-15FLU-C5 | GXL-15FLU-R-C5 |
| | | GXL-15FLUI | GXL-15FLUI-R | GXL-15FLUI-C5 | GXL-15FLUI-R-C5 |
| | | GXL-15FLUB | GXL-15FLUB-R | GXL-15FLUB-C5 | GXL-15FLUB-R-C5 |
| | | GXL-15FLUIB | GXL-15FLUIB-R | GXL-15FLUIB-C5 | GXL-15FLUIB-R-C5 |
| | Top sensing | GXL-15HLU | GXL-15HLU-R | GXL-15HLU-C5 | GXL-15HLU-R-C5 |
| | | GXL-15HLUI | GXL-15HLUI-R | GXL-15HLUI-C5 | GXL-15HLUI-R-C5 |
| | | GXL-15HLUB | GXL-15HLUB-R | GXL-15HLUB-C5 | GXL-15HLUB-R-C5 |
| | | GXL-15HLUIB | GXL-15HLUIB-R | GXL-15HLUIB-C5 | GXL-15HLUIB-R-C5 |
| NPN output | Front sensing | GXL-8F | GXL-8F-R | GXL-8F-C5 | GXL-8F-R-C5 |
| | | GXL-8FI | GXL-8FI-R | GXL-8FI-C5 | GXL-8FI-R-C5 |
| | | GXL-8FB | GXL-8FB-R | GXL-8FB-C5 | — |
| | | GXL-8FIB | GXL-8FIB-R | GXL-8FIB-C5 | GXL-8FIB-R-C5 |
| | Top sensing | GXL-8H | GXL-8H-R | GXL-8H-C5 | — |
| | | GXL-8HI | GXL-8HI-R | GXL-8HI-C5 | — |
| | | GXL-8HB | GXL-8HB-R | GXL-8HB-C5 | — |
| | | GXL-8HIB | GXL-8HIB-R | GXL-8HIB-C5 | — |
| | Front sensing | GXL-N12F | GXL-N12F-R | GXL-N12F-C5 | GXL-N12F-R-C5 |
| | | GXL-N12FI | GXL-N12FI-R | GXL-N12FI-C5 | GXL-N12FI-R-C5 |
| | | GXL-N12FB | GXL-N12FB-R | GXL-N12FB-C5 | GXL-N12FB-R-C5 |
| | | GXL-N12FIB | GXL-N12FIB-R | GXL-N12FIB-C5 | GXL-N12FIB-R-C5 |
| | | GXL-N12FT | — | — | — |
| | | GXL-N12FTI | — | — | — |
| | | GXL-N12FTB | — | — | — |
| | | GXL-N12FTIB | — | — | — |
| | Front sensing | GXL-15F | GXL-15F-R | GXL-15F-C5 | GXL-15F-R-C5 |
| | | GXL-15FI | GXL-15FI-R | GXL-15FI-C5 | GXL-15FI-R-C5 |
| | | GXL-15FB | GXL-15FB-R | GXL-15FB-C5 | GXL-15FB-R-C5 |
| | | GXL-15FIB | GXL-15FIB-R | GXL-15FIB-C5 | — |
| | Top sensing | GXL-15H | — | GXL-15H-C5 | — |
| | | GXL-15HI | — | — | — |
| | | GXL-15HB | — | GXL-15HB-C5 | — |
| | | GXL-15HIB | — | — | — |
| | Top sensing | GXL-15HL | — | GXL-15HL-C5 | — |
| | | GXL-15HLI | — | — | — |
| | | GXL-15HLB | — | — | — |
| | | GXL-15HLIB | — | — | — |
| PNP output | Front sensing | GXL-N12F-P | — | GXL-N12F-P-C5 | — |
| | | GXL-N12FI-P | — | GXL-N12FI-P-C5 | — |
| | | GXL-N12FB-P | — | GXL-N12FB-P-C5 | — |
| | | GXL-N12FIB-P | — | GXL-N12FIB-P-C5 | — |
| | | GXL-N12FT-P | — | — | — |
| | | GXL-N12FTI-P | — | — | — |
| | | GXL-N12FTB-P | — | — | — |
| | | GXL-N12FTIB-P | — | — | — |
| | Front sensing | GXL-15F-P | — | GXL-15F-P-C5 | — |
| | | GXL-15FI-P | — | GXL-15FI-P-C5 | — |
| | | GXL-15FB-P | — | GXL-15FB-P-C5 | — |
| | | GXL-15FIB-P | — | GXL-15FIB-P-C5 | — |

## ORDER GUIDE

### Accessories

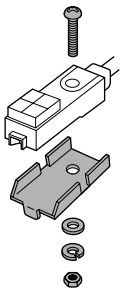
• **MS-GXL8**
(Sensor mounting bracket for **GXL-8F**, **GXL-8H** type)



1 pc. each of screw, nut, spring washer and plain washer is attached.

• **MS-GXL8-4**
(Sensor mounting bracket for **GXL-8FU**, **GXL-8HU** type)

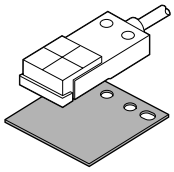
• **MS-GXL12-1**
(Sensor mounting bracket for **GXL-N12** type)



1 pc. each of screw, nut, spring washer and plain washer is attached.
(Not included with the **MS-GXL12-1**. (Bracket only) Please use only the items included with the sensor.)

• **MS-A15F**
(Aluminum sheet for **GXL-15FLU** type)

• **MS-A15H**
(Aluminum sheet for **GXL-15HLU**, **GXL-15HL** type)

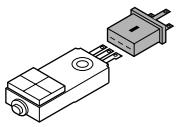


## OPTIONS

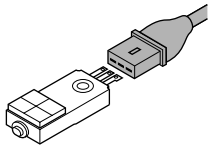
| Designation | Model No. | Description | |
|---|---|---|---|
| Connector | **CN-13** | Connector for the terminal type | |
| | **CN-13-C1** | Length: 1 m 3.281 ft | Mating cable for the terminal type |
| | **CN-13-C3** | Length: 3 m 9.843 ft | |
| Sensor mounting bracket | **MS-GXL8-3** | Mounting bracket for NPN output of **GXL-8** type | |
| | **MS-GXL12-2** | Mounting bracket for **GXL-N12** type | |
| | **MS-GXL15** | Mounting bracket for **GXL-15** type | |
| | **MS-GXL15-2** | Mounting bracket for **GXL-15F** type | |

### Connector

• **CN-13**

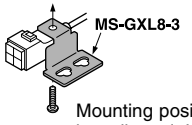


• **CN-13-C1**
• **CN-13-C3**



### Sensor mounting bracket

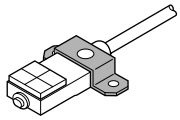
• **MS-GXL8-3**




Mounting position can be adjusted. It is rust-free, being stainless steel.

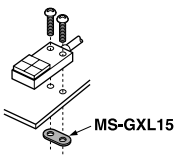
A set of one M2.6 (length: 8 mm 0.315 in) pan head screw and two M3 (length: 8 mm 0.315 in) screws with washers are attached.

• **MS-GXL12-2**



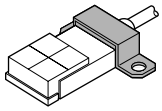
Screws are not supplied.

• **MS-GXL15**




Screws are not supplied.

• **MS-GXL15-2**



## SPECIFICATIONS

### DC 2-wire type

| Item \ Type | | GXL-8 type | | GXL-15 type | | | |
|---|---|---|---|---|---|---|---|
| | | | | Standard | | Long sensing range (For mounting on non-magnetic body) (Note 1) | |
| | Standard Model No. | Front sensing | Top sensing | Front sensing | Top sensing | Front sensing | Top sensing |
| | | GXL-8FU | GXL-8HU | GXL-15FU | GXL-15HU | GXL-15FLU | GXL-15HLU |
| Max. operation distance (Note 2) | | 2.5 mm 0.098 in ± 20 % | | 5 mm 0.197 in ± 10 % | | 8 mm 0.315 in ± 10 % | |
| Stable sensing range (Note 2) | | 0 to 1.8 mm 0 to 0.071 in | | 0 to 4 mm 0 to 0.157 in | | 0 to 6.4 mm 0 to 0.252 in | |
| Standard sensing object | | Iron sheet 15 × 15 × t 1 mm 0.591 × 0.591 × t 0.039 in | | Iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in | | Iron sheet 30 × 30 × t 1 mm 1.181 × 1.181 × t 0.039 in | |
| Hysteresis | | 20 % or less of operation distance | | | | | |
| Repeatability | | Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less | | | | | |
| Supply voltage | | 12 to 24 V DC ± 10 % Ripple P-P 10 % or less | | | | | |
| Current consumption (Note 3) | | 0.8 mA or less | | | | | |
| Output | | Non-contact DC 2-wire type<br>• Load current: 3 to 70 mA (Note 4)<br>• Residual voltage: 3 V or less (Note 5) | | Non-contact DC 2-wire type<br>• Load current: 3 to 100 mA (Note 4)<br>• Residual voltage: 3 V or less (Note 5) | | | |
| | Utilization category | DC-12 or DC-13 | | | | | |
| | Short-circuit protection | Incorporated | | | | | |
| Max. response frequency | | 1 kHz | | | | | |
| Operation indicator | | Normally closed type: Red LED (lights up when the output is ON) | | | | | |
| 2-color indicator | | Normally open type: Lights up in green under stable sensing condition<br>Lights up in red under unstable sensing condition | | | | | |
| Environmental resistance | Pollution degree | 3 (Industrial environment) | | | | | |
| | Protection | IP67 (IEC), IP67 g (JEM) | | | | | |
| | Ambient temperature | − 25 to + 70 °C − 13 to + 158 °F, Storage: − 30 to + 80 °C − 22 to + 176 °F | | | | | |
| | Ambient humidity | 45 to 85 % RH, Storage: 35 to 95 % RH | | | | | |
| | EMC | EN 50081-2, EN 50082-2, EN 60947-5-2 | | | | | |
| | Voltage withstandability | 1,000 V AC for one min. between all supply terminals connected together and enclosure | | | | | |
| | Insulation resistance | 50 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure | | | | | |
| | Vibration resistance | 10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each | | | | | |
| | Shock resistance | 1,000 m/s² acceleration (100 G approx.) in X, Y and Z directions for three times each | | | | | |
| Sensing range variation | Temperature characteristics | Over ambient temperature range − 25 to + 70 °C − 13 to + 158 °F: Within $^{+15}_{-10}$ % of sensing range at + 20 °C + 68 °F | | | | | |
| | Voltage characteristics | Within ± 2 % for ± 10 % fluctuation of the supply voltage | | | | | |
| Material | | Enclosure: PBT, Indicator part: Polyalylate | | | Enclosure: PET (Glass fiber reinforced) Indicator part: Polyalylate | Enclosure: PBT Indicator part: Polyalylate | Enclosure: PET (Glass fiber reinforced) Indicator part: Polyalylate |
| Cable (Note 6) | | 0.15 mm² 2-core oil, heat and cold resistant cable, 1 m 3.281 ft long | | 0.2 mm² 2-core oil, heat and cold resistant cable, 1 m 3.281 ft long | | | |
| Cable extension | | Extension up to total 50 m 164.042 ft is possible with 0.3 mm², or more, cable. | | | | | |
| Weight | | 12 g approx. | | 20 g approx. | | | |
| Accessories | | **MS-GXL8-4** (Sensor mounting bracket): 1 set | | ——— | | **MS-A15F** (Aluminum sheet): 1 pc. | **MS-A15H** (Aluminum sheet): 1 pc. |

Notes: 1) To mount the long sensing range **GXL-15** type on a magnetic body, such as iron, the enclosed aluminum sheet, or any other aluminum sheet having a minimum size of 30 × 39.5 × t 0.3 mm 1.181 × 1.555 × t 0.012 in (**GXL-15HLU** type: 30 × 30 × t 0.3 mm 1.181 × 1.181 × t 0.012 in), should be inserted between the sensor and the magnetic body.
However, it is not necessary to use the aluminum sheet when mounting on a non-magnetic body, such as, aluminum or an insulator.
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 with the ambient temperature. Refer to '**I/O CIRCUIT AND WIRING DIAGRAMS**' for more details.
5) When the cable is extended, the residual voltage becomes larger according to the resistance of the cable.
The residual voltage of 5 m 16.404 ft cable length type increases by 0.1 V.
6) The flexible cable type (model No. with suffix '**-R**') has a 0.15 mm² (**GXL-15** type: 0.2 mm²) flexible, oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long.

## SPECIFICATIONS

### NPN and PNP output type

| Item \ Type | NPN output | | | | | | | PNP output | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **GXL-8** type | | **GXL-N12** type | | **GXL-15** type | | | **GXL-N12** type | | **GXL-15** type |
| | | | Cable type | Terminal type | Standard | | Long sensing range (For mounting on non-magnetic body) (Note 1) | Cable type | Terminal type | Standard |
| Standard Model No. | Front sensing | Top sensing | Front sensing | | Front sensing | Top sensing | Top sensing | Front sensing | | Front sensing |
| | **GXL-8F** | **GXL-8H** | **GXL-N12F** | **GXL-N12FT** | **GXL-15F** | **GXL-15H** | **GXL-15HL** | **GXL-N12F-P** | **GXL-N12FT-P** | **GXL-15F-P** |
| Max. operation distance (Note 2) | 2.5 mm 0.098 in ± 20 % | | 3 mm 0.118 in ± 10 % | | 5 mm 0.197 in ± 10 % | | 8 mm 0.315 in ± 10 % | 3 mm 0.118 in ± 10 % | | 5 mm 0.197 in ± 10 % |
| Stable sensing range (Note 2) | 0 to 1.8 mm 0 to 0.071 in | | 0 to 2 mm 0 to 0.079 in | | 0 to 4 mm 0 to 0.157 in | | 0 to 6.4 mm 0 to 0.252 in | 0 to 2 mm 0 to 0.079 in | | 0 to 4 mm 0 to 0.157 in |
| Standard sensing object | Iron sheet 15 × 15 × t 1 mm 0.591 × 0.591 × t 0.039 in | | Iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in | | | | Iron sheet 30 × 30 × t1 mm 1.181 × 1.181 × t0.039 in | Iron sheet 20 × 20 × t 1 mm 0.787 × 0.787 × t 0.039 in | | |
| Hysteresis | 20 % or less of operation distance | | | | | | | | | |
| Repeatability | Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less | | | | Along sensing axis, perpendicular to sensing axis: 0.06 mm 0.002 in or less | | | Along sensing axis, perpendicular to sensing axis: 0.04 mm 0.002 in or less | | |
| Supply voltage | 12 to 24 V DC ± 10 % Ripple P-P 10 % or less | | | | | | | | | |
| Current consumption | 15 mA or less | | | | | | | | | |
| Output | NPN open-collector transistor<br>• Maximum sink current: 100 mA<br>• Applied voltage: 30 V DC or less (between output and 0 V)<br>• Residual voltage: 1 V or less (at 100 mA sink current)<br>0.4 V or less (at 16 mA sink current) | | | | | | | PNP open-collector transistor<br>• Maximum source current: 100 mA<br>• Applied voltage: 30 V DC or less (between output and + V)<br>• Residual voltage: 1 V or less (at 100 mA source current)<br>0.4 V or less (at 16 mA source current) | | |
| Utilization category | DC-12 or DC-13 | | | | | | | | | |
| Short-circuit protection | — | | | | | | | | | |
| Max. response frequency | 500 Hz | | | | 250 Hz | | | 500 Hz | | 250 Hz |
| Operation indicator | Red LED (lights up when the output is ON) | | | | | | | | | |
| Environmental resistance: Pollution degree | 3 (Industrial environment) | | | | | | | | | |
| Environmental resistance: Protection | IP67 (IEC), IP67 g (JEM) except for the terminal type | | | | | | | | | |
| Environmental resistance: Ambient temperature | − 10 to + 55 °C 14 to + 131 °F, Storage: − 30 to + 80 °C − 22 to + 176 °F | | | | | | | | | |
| Environmental resistance: Ambient humidity | 45 to 85 % RH, Storage: 35 to 95 % RH | | | | | | | | | |
| Environmental resistance: EMC | EN 50081-2, EN 50082-2, EN 60947-5-2 | | | | | | | | | |
| Environmental resistance: Voltage withstandability | 1,000 V AC for one min. between all supply terminals connected together and enclosure | | | | | | | | | |
| Environmental resistance: Insulation resistance | 50 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure | | | | | | | | | |
| Environmental resistance: Vibration resistance | 10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each | | | | | | | | | |
| Environmental resistance: Shock resistance | 1,000 m/s² acceleration (100 G approx.) in X, Y and Z directions for three times each | | | | | | | | | |
| Sensing range variation: Temperature characteristics | Over ambient temperature range − 10 to + 55 °C + 14 to + 131 °F: Within $\pm^{15}_{10}$ % of sensing range at + 20 °C + 68 °F | | | | | | | | | |
| Sensing range variation: Voltage characteristics | Within ± 2 % for ± 10 % fluctuation of the supply voltage | | | | | | | | | |
| Material | Enclosure: PBT, Indicator part: Polyalylate | | | | Enclosure: PET (Glass fiber reinforced) Indicator part: Polyalylate | | | Enclosure: PBT Indicator part: Polyalylate | | |
| Cable (Note 3) | 0.08 mm² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long | | 0.15 mm² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long | — | 0.15 mm² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long | | — | | | 0.15 mm² 3-core oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long |
| Cable extension | Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable. | | | | | | | | | |
| Weight | 12 g approx. | | 20 g approx. | 5 g approx. | 20 g approx. | | | 5 g approx. | | 20 g approx. |
| Accessories | **MS-GXL8** (Sensor mounting bracket): 1 set | | **MS-GXL12-1** (Sensor mounting bracket): 1 pc. M3 pan head screw, plain washer, spring washer and nut: 1 set **MS-R1** (Rubber washer): 1 pc. | | — | | **MS-A15H** (Aluminum sheet): 1 pc. | **MS-GXL12-1** (Sensor mounting bracket): 1 pc. M3 pan head screw, plain washer, spring washer and nut: 1 set **MS-R1** (Rubber washer): 1 pc. | | — |

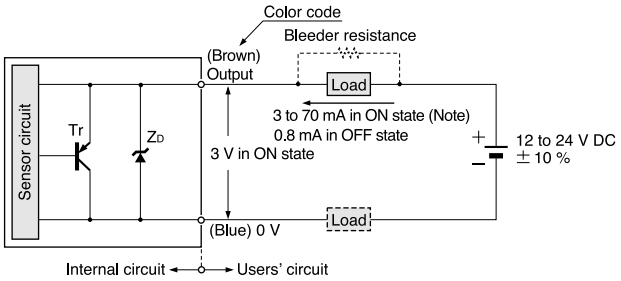
Notes: 1) To mount the long sensing range **GXL-15** type on a magnetic body, such as iron, the enclosed aluminum sheet or any other aluminum sheet having a minimum size of 30 × 30 × t 0.3 mm 1.181 × 1.181 × t 0.012 in, should be inserted between the sensor and the magnetic body.
However, it is not necessary to use the aluminum sheet when mounting on a non-magnetic body, such as, aluminum or an insulator.
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) The flexible cable type (model No. with suffix '**-R**') has a 0.15 mm² (**GXL-8** type: 0.1 mm²) flexible, oil, heat and cold resistant cabtyre cable, 1 m 3.281 ft long.

## I/O CIRCUIT AND WIRING DIAGRAMS

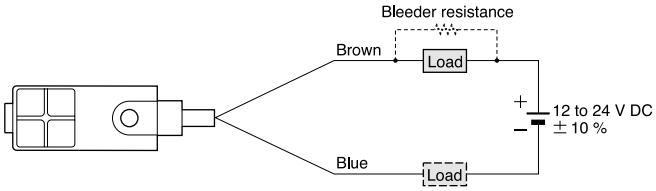
### DC 2-wire type

#### GXL-8FU / GXL-8HU type

**I/O circuit diagram**

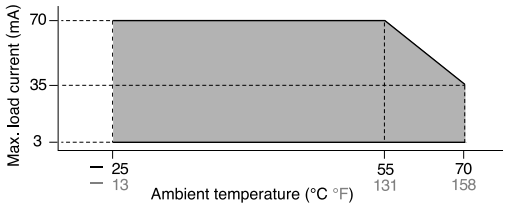



**Wiring diagram**




Symbols ... ZD: Surge absorption zener diode
Tr : PNP output transistor

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

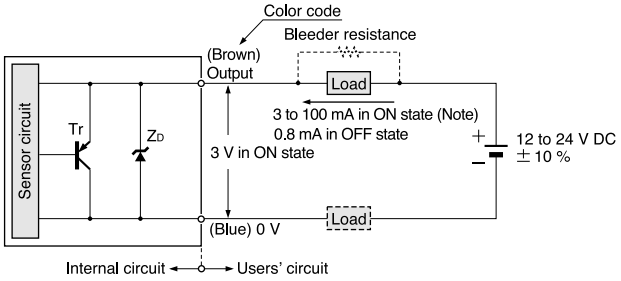



**Conditions for the load**

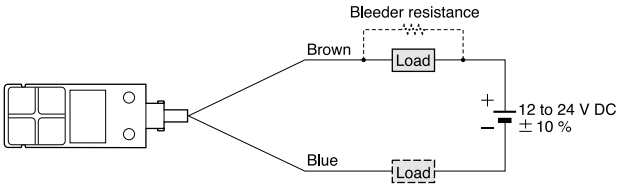
1) The load should not be actuated by the leakage current (0.8 mA) in the OFF state.
2) The load should be actuated by (supply voltage − 3 V) in the ON state.
3) The current in the ON state should be between 3 to 70 mA DC.
[In case the current is less than 3 mA, connect a bleeder resistance in parallel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

#### GXL-15FU / GXL-15HU / GXL-15FLU / GXL-15HLU type

**I/O circuit diagram**

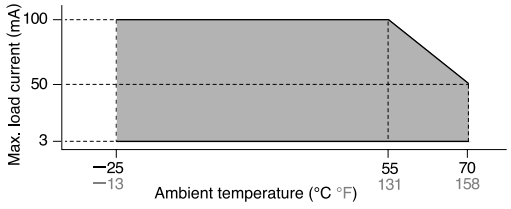



**Wiring diagram**




Symbols ... ZD: Surge absorption zener diode
Tr : PNP output transistor

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



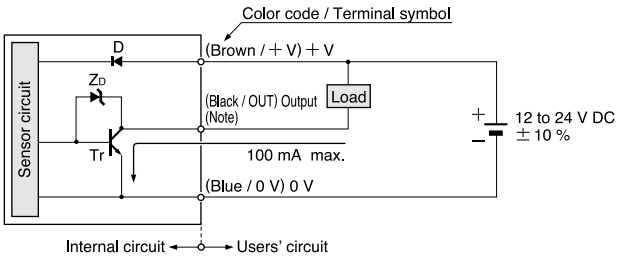

**Conditions for the load**

1) The load should not be actuated by the leakage current (0.8 mA) in the OFF state.
2) The load should be actuated by (supply voltage − 3 V) in the ON state.
3) The current in the ON state should be between 3 to 100 mA DC.
[In case the current is less than 3 mA, connect a bleeder resistance in parallel to the load so that a current of 3 mA, or more, flows.]

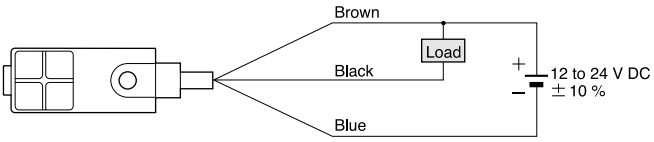
## I/O CIRCUIT AND WIRING DIAGRAMS

### NPN output type

#### I/O circuit diagram




#### Wiring diagram

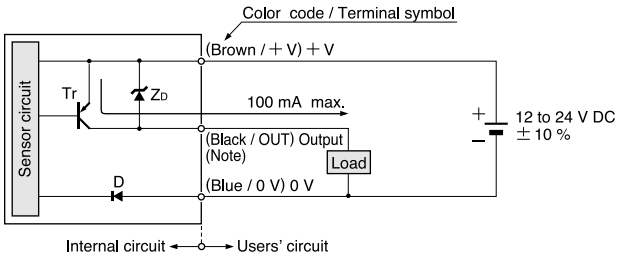



Note: The output does not incorporate a short-circuit protection circuit.
Do not connect it directly to a power supply or a capacitive load.

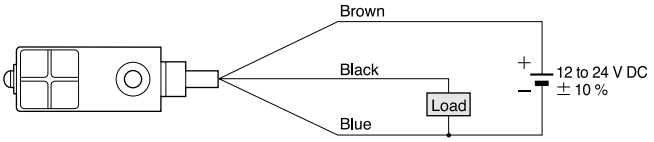
Symbols ... D : Reverse supply polarity protection diode
ZD: Surge absorption zener diode
Tr : NPN output transistor

### PNP output type

#### I/O circuit diagram




#### Wiring diagram



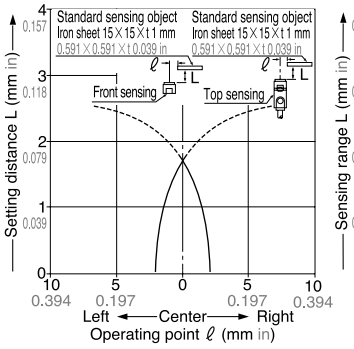

Note: The output does not incorporate a short-circuit protection circuit.
Do not connect it directly to a power supply or a capacitive load.

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

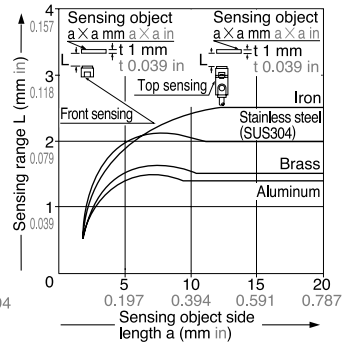
## SENSING CHARACTERISTICS (TYPICAL)

### GXL-8 type

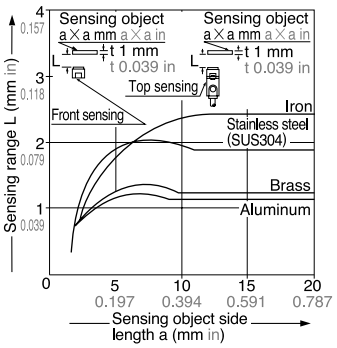
**Sensing field (common)**




**Correlation between sensing object size and sensing range (DC 2-wire type)**



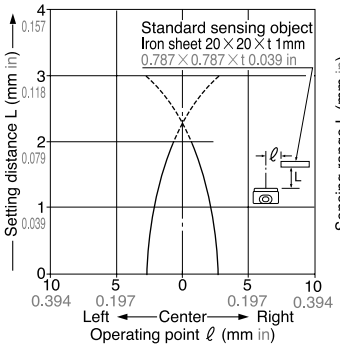

**Correlation between sensing object size and sensing range (NPN output type)**



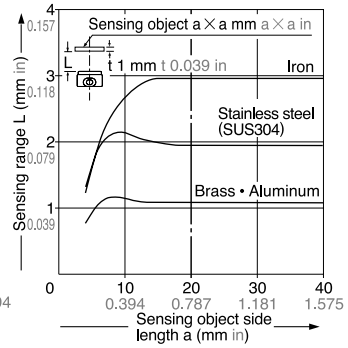

As the sensing object size becomes smaller than the standard size (iron sheet 15×15×t 1 mm 0.591×0.591×t 0.039 in), the sensing range shortens as shown in the left figures.

### GXL-N12 type

**Sensing field**



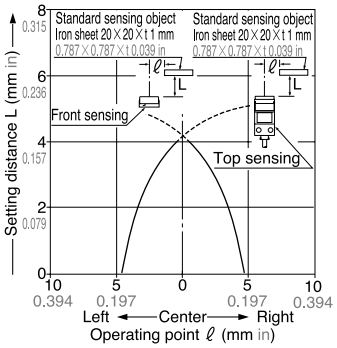

**Correlation between sensing object size and sensing range**



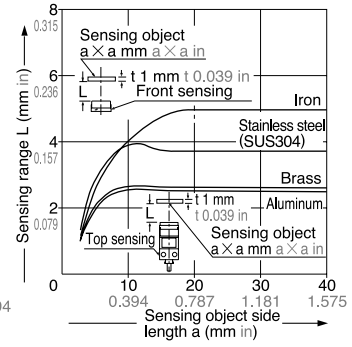

As the sensing object size becomes smaller than the standard size (iron sheet 20×20×t 1 mm 0.787×0.787×t 0.039 in), the sensing range shortens as shown in the left figure.

### GXL-15 (Standard) type

**Sensing field**



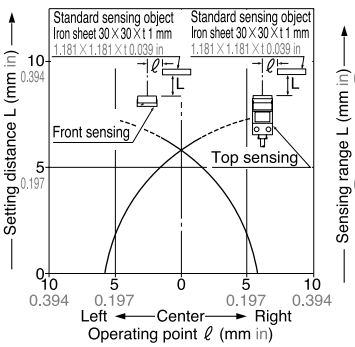

**Correlation between sensing object size and sensing range**



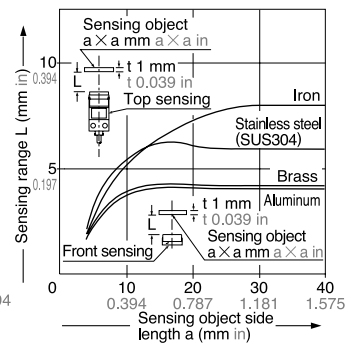

As the sensing object size becomes smaller than the standard size (iron sheet 20×20×t 1 mm 0.787×0.787×t 0.039 in), the sensing range shortens as shown in the left figure.

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

**Sensing field**




**Correlation between sensing object size and sensing range**




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

## PRECAUTIONS FOR PROPER USE

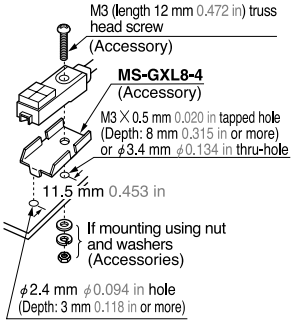
### All models

This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

### Mounting

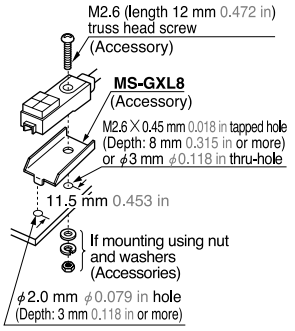
#### GXL-8 (DC 2-wire) type

- The tightening torque should be 0.5 N·m or less.
- To mount the sensor with a nut, the thru-hole diameter should be $\phi$3.4 mm $\phi$0.134 in. With the attached mounting screw and nut, take care that the thickness of the mounting plate should be 2.3 mm 0.091 in or less.
- If a screw other than the attached screw is used, make sure to use a M3 truss head screw.
  (Do not use a flat head screw or a pan head screw.)



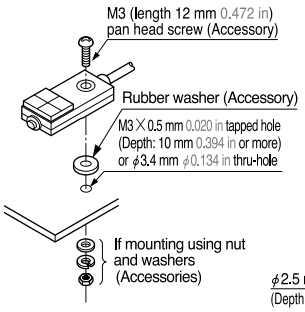

#### GXL-8 (NPN output) type

- The tightening torque should be 0.5 N·m or less.
- To mount the sensor with a nut, the thru-hole diameter should be $\phi$3 mm $\phi$0.118 in. With the attached mounting screw and nut, take care that the thickness of the mounting plate should be 2.3 mm 0.091 in or less.
- If a screw other than the attached screw is used, make sure to use a M2.6 truss head screw.
  Note: Do not use a M3 screw.

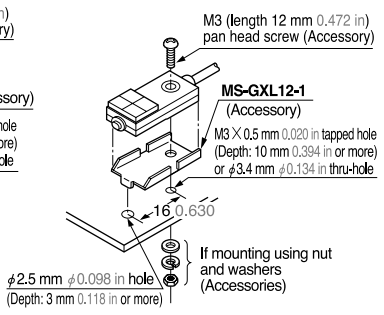



#### GXL-N12 type

<One point fixing>



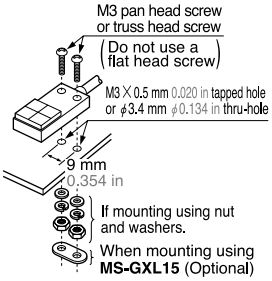

<Two point fixing>

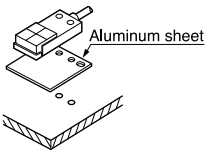


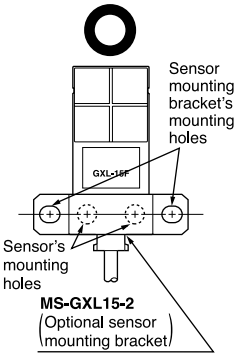

- The tightening torque should be 0.49 N·m or less.
- To mount the sensor with a nut, the thru-hole diameter should be $\phi$3.4 mm $\phi$0.134 in.

#### GXL-15 type

- The tightening torque should be 1 N·m or less.
- To mount the sensor with the optional sensor mounting bracket **MS-GXL15**, the thru-hole diameter should be $\phi$3.4 mm $\phi$0.134 in.
- Screw, nut or washers are not supplied. Please arrange them separately.
- To mount the long sensing range **GXL-15** type on a magnetic body, such as iron, the enclosed aluminum sheet, or any other aluminum sheet having a minimum size of 30 × 39.5 × t 0.3 mm 1.181 × 1.555 × t 0.012 in (**GXL-15HLU□** / **GXL-15HL□**: 30 × 30 × t 0.3 mm 1.181 × 1.181 × t 0.012 in), should be inserted between the sensor and the magnetic body.
  However, it is not necessary to use the aluminum sheet when mounting on a non-magnetic body, such as, aluminum or an insulator.
- When mounting the inductive proximity sensor with the optional sensor mounting bracket **MS-GXL15-2**, if the bracket is mounted close to the sensing part, the bracket itself gets sensed and the operation becomes unstable.
  Make sure to mount such that the mounting holes of the sensor and those of the mounting bracket are in one horizontal straight line.



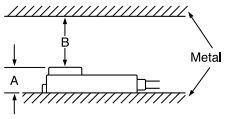



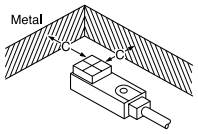




### Influence of surrounding metal

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

#### Front sensing type

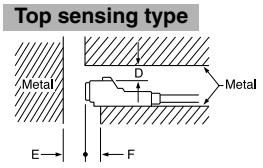


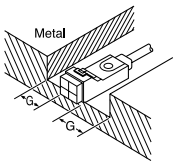




| | GXL-8F type | GXL-N12F type | GXL-15FU / GXL-15F type | GXL-15FLU type |
|---|---|---|---|---|
| A | 7 mm 0.276 in | 7 mm 0.276 in | 8 mm 0.315 in | 8 mm 0.315 in (Note) |
| B | 8 mm 0.315 in | 20 mm 0.787 in | 20 mm 0.787 in | 30 mm 1.181 in |
| C | 3 mm 0.118 in | 10 mm 0.394 in | 7 mm 0.276 in | 10 mm 0.394 in |

Note: The **GXL-15FLU** type should be mounted on an insulator or a non-magnetic body. To mount it on a magnetic body, such as iron, use the enclosed aluminum sheet.

#### Top sensing type




| | GXL-8H type | GXL-15HU / GXL-15H type | GXL-15HLU / GXL-15HL type |
|---|---|---|---|
| D | 4 mm 0.157 in | 6 mm 0.236 in | 12 mm 0.472 in |
| E | 10 mm 0.394 in | 20 mm 0.787 in | 30 mm 1.181 in |
| F | 3 mm 0.118 in | 0 mm 0 in | 10 mm 0.394 in (Note) |
| G | 3 mm 0.118 in | 3 mm 0.118 in | 10 mm 0.394 in |

Note: When **GXL-15HLU** / **GXL-15HL** type is mounted on an insulator or a non-magnetic body, or seated on the enclosed aluminum sheet, the distance 'F' can be zero.

## PRECAUTIONS FOR PROPER USE

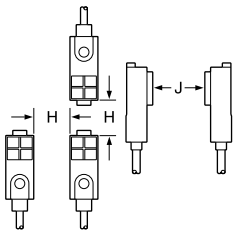
### All models

#### Mutual interference prevention

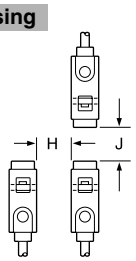
- When two or more sensors are installed in parallel or face to face, keep the minimum separation distance specified below to avoid mutual interference.

| | | H | J |
|---|---|---|---|
| **GXL-8** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 15 mm 0.591 in |
| | Between two **'I'** types or two non **'I'** types | 12 mm 0.472 in | 30 mm 1.181 in |
| **GXL-N12** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 15 mm 0.591 in |
| | Between two **'I'** types or two non **'I'** types | 20 mm 0.787 in | 40 mm 1.575 in |
| **GXL-15F GXL-15FU GXL-15HU** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 25 mm 0.984 in |
| | Between two **'I'** types or two non **'I'** types | 30 mm 1.181 in | 60 mm 2.362 in |
| **GXL-15H** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 25 mm 0.984 in |
| | Between two **'I'** types or two non **'I'** types | 40 mm 1.575 in | 60 mm 2.362 in |
| **GXL-15FLU GXL-15HLU** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 25 mm 0.984 in |
| | Between two **'I'** types or two non **'I'** types | 75 mm 2.953 in | 90 mm 3.543 in |
| **GXL-15HL** type | Between **'I'** type and non **'I'** type | 0 mm (Note 2) | 25 mm 0.984 in |
| | Between two **'I'** types or two non **'I'** types | 80 mm 3.150 in | 95 mm 3.740 in |

**Front sensing**




**Top sensing**




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, in a row, the minimum value of dimension H should be as given below.
**GXL-8** type: 2 mm 0.079 in, **GXL-N12** type: 4 mm 0.157 in
**GXL-15** (Standard) type: 7.5 mm 0.295 in
(**GXL-15H** type: 12.5 mm 0.492 in)
**GXL-15** (Long sensing range) type: 30 mm 1.181 in
(**GXL-15HL** type: 32.5 mm 1.280 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 plated.

**Correction coefficient**

| Model No. / Metal | **GXL-8FU GXL-8HU** type | **GXL-8F GXL-8H** type | **GXL-N12** type | **GXL-15FU** type | **GXL-15HU GXL-15FLU GXL-15HLU** type | **GXL-15F GXL-15H** type | **GXL-15HL** type |
|---|---|---|---|---|---|---|---|
| Iron | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Stainless steel (SUS304) | 0.82 approx. | 0.76 approx. | 0.70 approx. | 0.74 approx. | 0.75 approx. | 0.68 approx. | 0.76 approx. |
| Brass | 0.59 approx. | 0.50 approx. | 0.40 approx. | 0.53 approx. | 0.53 approx. | 0.47 approx. | 0.50 approx. |
| Aluminum | 0.57 approx. | 0.48 approx. | 0.35 approx. | 0.52 approx. | 0.51 approx. | 0.45 approx. | 0.48 approx. |

#### Others

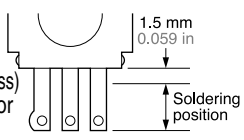
- Do not use during the initial transient time [10 ms (DC 2-wire type: 50 ms)] after the power supply is switched on.
- The output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load (excluding the DC 2-wire type).

### GXL-N12FT type CN-13

#### Soldering

- To solder the terminals of the sensor and connector **CN-13**, observe the following conditions.

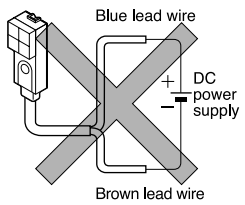
Soldering temperature: 260 °C 500 °F or less
Soldering time : 5 sec. or less (**CN-13**: 10 sec. or less)
Soldering position : 1.5 mm 0.059 in, or more, away from the sensor body.

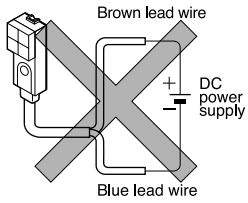



### DC 2-wire type

#### Wiring

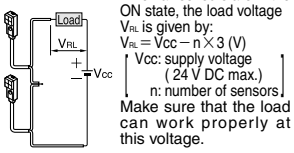
- The sensor must be connected to a power supply via a load. If the sensor is connected to a power supply without a load, the short-circuit protection makes the sensor inoperable. (The output stays in the OFF state and the indicator does not light up.) In this case, rectify by connecting the power supply via a load. Now, the sensor becomes operable. Further, take care that if the power supply is connected with reverse polarity without a load, the sensor will get damaged.




- For series connection (AND circuit) or parallel connection (OR circuit) of sensors, take care of the following.

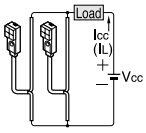
**Series connection (AND circuit)**




When all sensors are in the ON state, the load voltage $V_{RL}$ is given by:
$V_{RL} = Vcc - n \times 3$ (V)
Vcc: supply voltage (24 V DC max.)
n: number of sensors
Make sure that the load can work properly at this voltage.

Note: The output is generated normally even if the indicator does not light up properly.

**Parallel connection (OR circuit)**

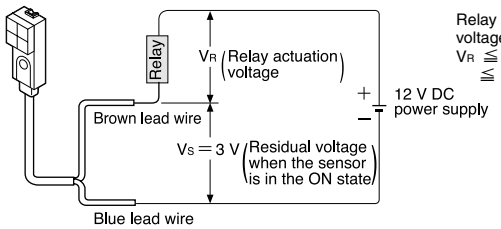



When all sensors are in the OFF state, the load leakage current Icc is given by:
$I_{cc} = n \times 0.8$ (mA)
(n: number of sensors)
Make sure that the load can work properly.
Note: The load current in the ON state is given by:

$$I_L = \frac{Vcc - 3\ V}{\text{Load resistance}}\ (\text{mA})$$

**GXL-8 type** :
$3\ mA \times n \leqq I_L \leqq 70\ mA$
(n: number of sensors turned ON)
**GXL-15 type** :
$3\ mA \times n \leqq I_L \leqq 100\ mA$
(n: number of sensors turned ON)

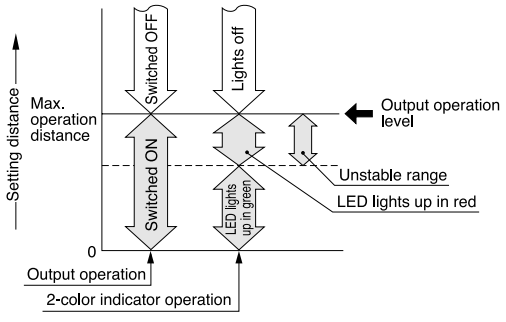
- The residual voltage of the sensor is 3 V. Before connecting a relay at the load, take care of its actuation voltage. (Some 12 V relays may not be usable.)




Relay actuation voltage:
$V_R \geqq 12 - 3\ V \geqq 9\ V$

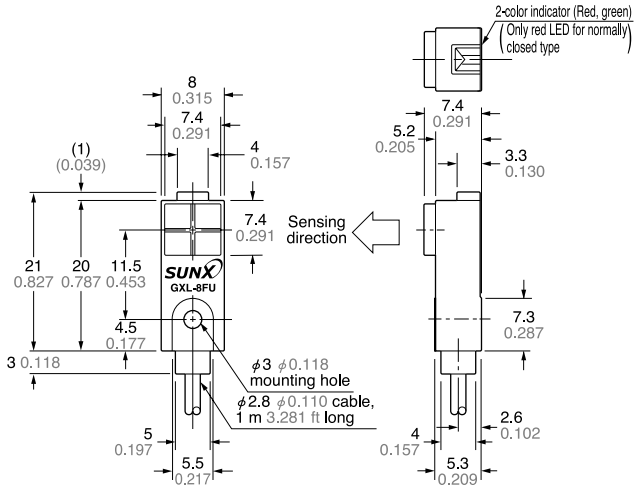
#### 2-color indicator (Normally open type only)

- When the sensing object is in the stable sensing range, the LED lights up in green, and when the sensing object is in the unstable sensing range, the LED lights up in red. While the LED lights up in green, the sensing is performed stably without being affected by temperature drifts or voltage fluctuations.

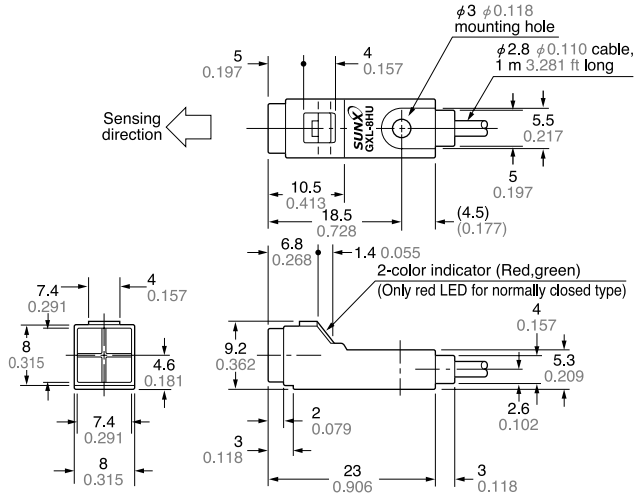


## DIMENSIONS (Unit: mm in)

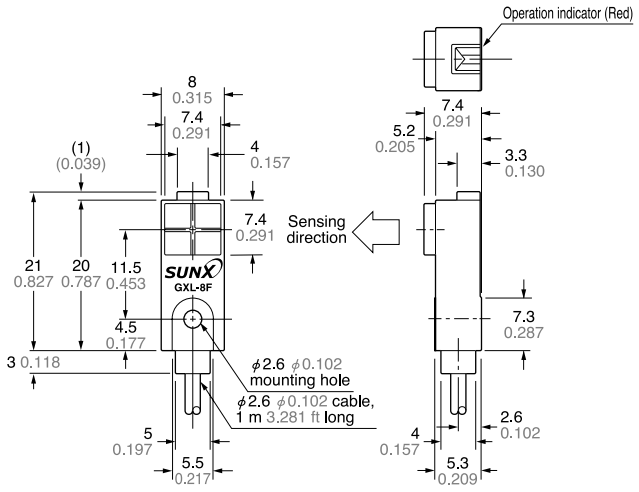
### GXL-8FU type Sensor



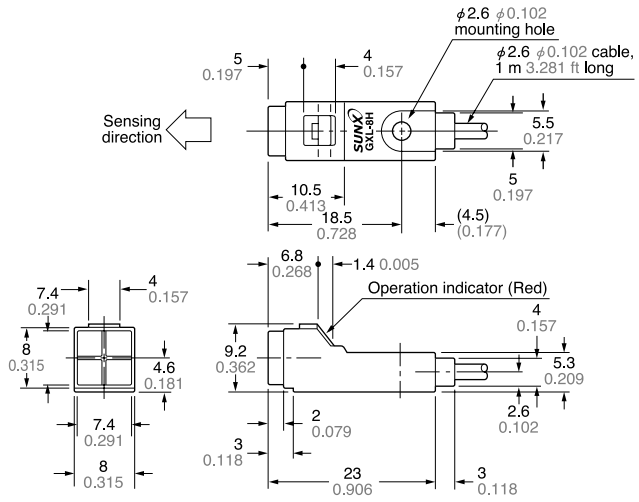

### GXL-8HU type Sensor



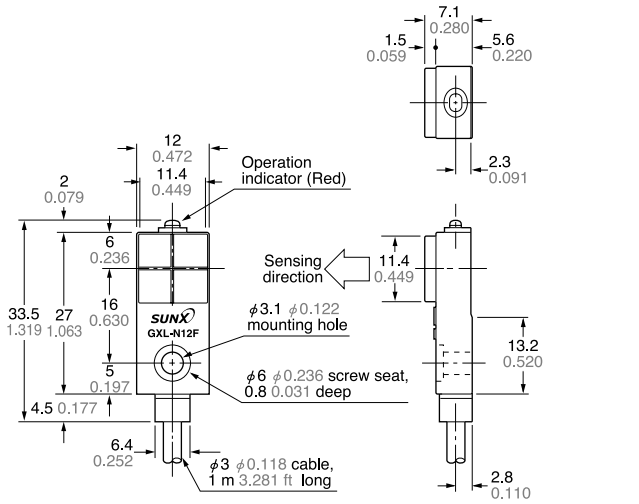

### GXL-8F type Sensor



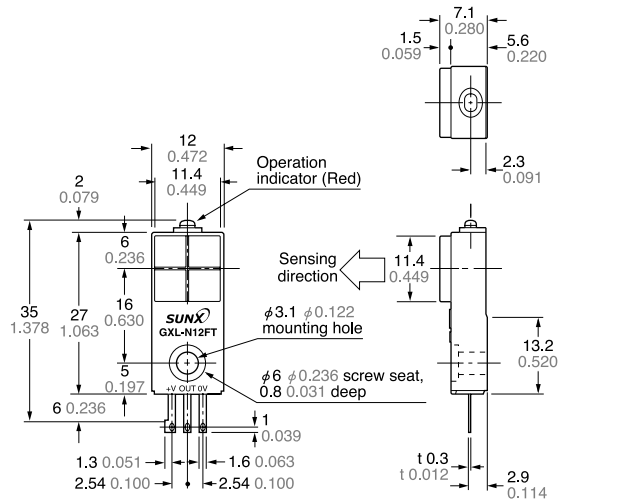

### GXL-8H type Sensor




### GXL-N12F type Sensor

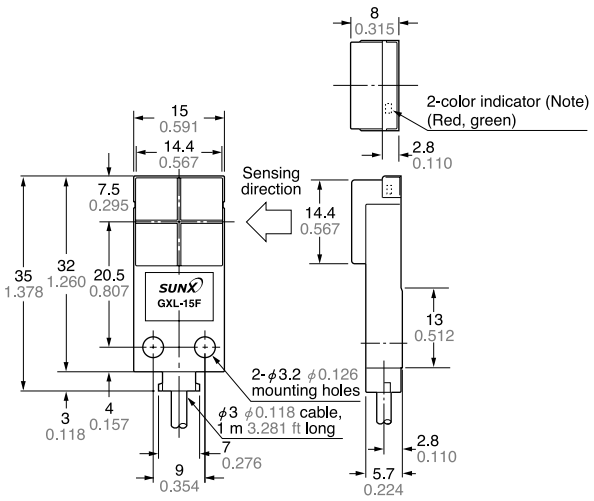



### GXL-N12FT type Sensor



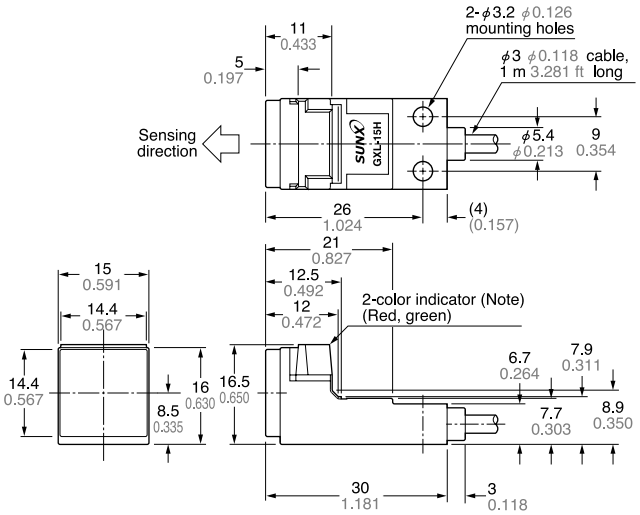
## DIMENSIONS (Unit: mm in)

### GXL-15F type Sensor




Note: Normally closed DC 2-wire type, NPN output type and PNP output type have an operation indicator (red) instead of the 2-color indicator.

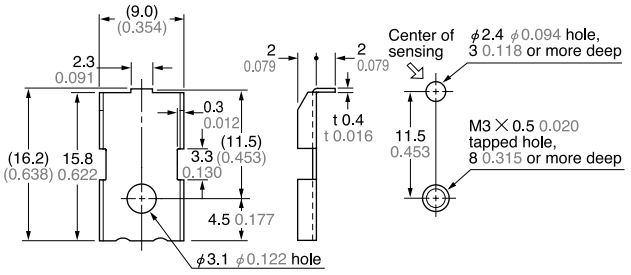
### GXL-15H type Sensor




Note: Normally closed DC 2-wire type and NPN output type have an operation indicator (red) instead of the 2-color indicator.

### MS-GXL8-4 Sensor mounting bracket for **GXL-8FU** / **GXL-8HU** type (Accessory)

**Mounting hole dimensions**

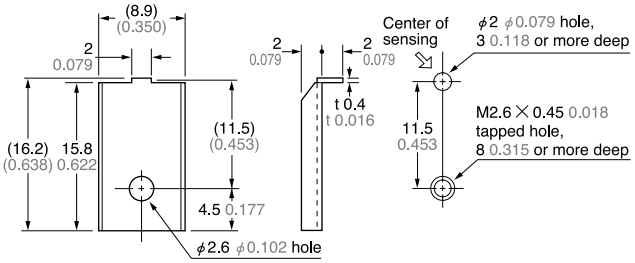



Material: Cold rolled carbon steel (SPCC)
(Nickel plated)

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

### MS-GXL8 Sensor mounting bracket for **GXL-8F** / **GXL-8H** type (Accessory)

**Mounting hole dimensions**

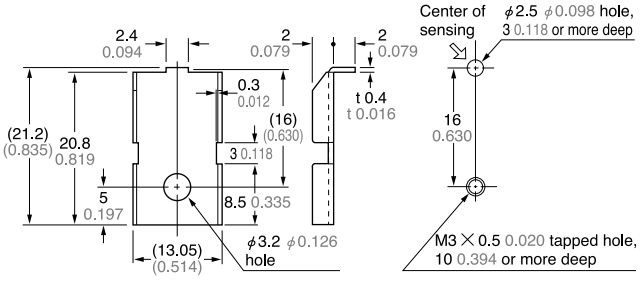



Material: Cold rolled carbon steel (SPCC)
(Nickel plated)

1 pc. each of M2.6 (length 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

### MS-GXL12-1 Sensor mounting bracket for **GXL-N12** type (Accessory)

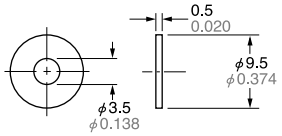
**Mounting hole dimensions**




Material: Cold rolled carbon steel (SPCC)
(Nickel plated)

1 pc. each of M3 (length 12 mm 0.472 in) pan head screw, plain washer, spring washer and rubber washer (φ9.5 × t 0.5 mm φ0.374 × t 0.020 in) is attached.

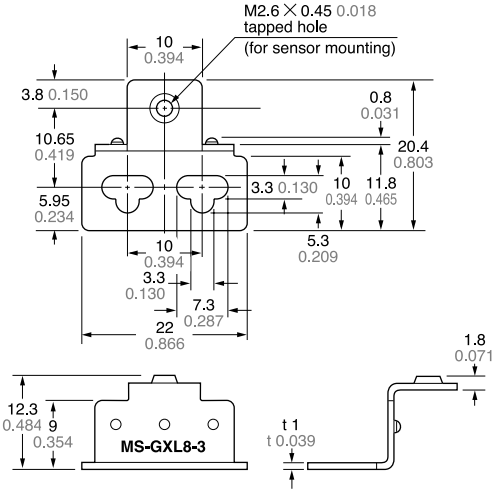
### MS-R1 Rubber washer for **GXL-N12** type (Accessory)




Material: NBR

## DIMENSIONS (Unit: mm in)

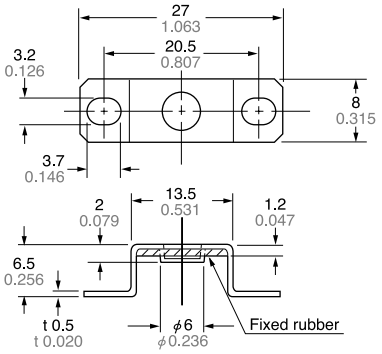
### MS-GXL8-3 Sensor mounting bracket for GXL-8F / GXL-8H type (Optional)




Material: Stainless steel (SUS304)

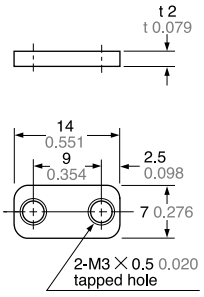
One M2.6 (length 8 mm 0.315 in) pan head screw and two M3 (length 8 mm 0.315 in) screws with washers are attached.

### MS-GXL12-2 Sensor mounting bracket for GXL-N12 type (Optional)



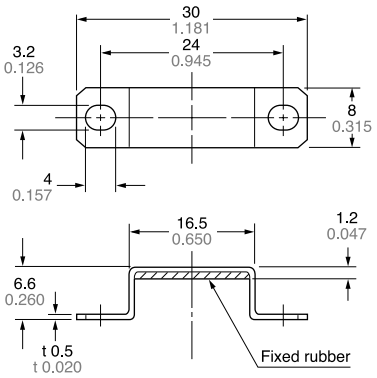

Material: Bracket ... Stainless steel (SUS304)
Fixed rubber ... FKM (Fluorine rubber)

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



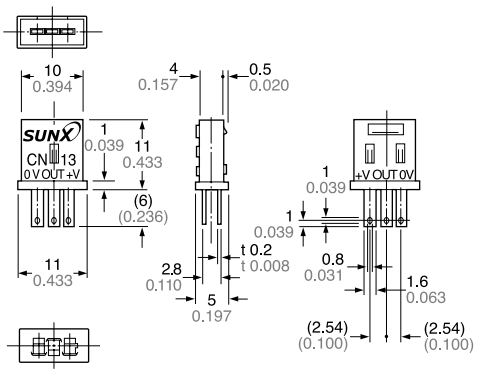

Material: Cold rolled carbon steel (SPCC)

### MS-GXL15-2 Sensor mounting bracket for GXL-15F type (Optional)




Material: Bracket ... Stainless steel (SUS304)
Fixed rubber ... FKM (Fluorine rubber)

### CN-13 Connector for terminal type (Optional)




### MS-A15F MS-A15H Aluminum sheet

(Accessory for GXL-15FLU, GXL-15HLU and GXL-15HL type)