Panasonic® INSTRUCTION MANUAL

# DC Three-wire Type Cylindrical Inductive Proximity Sensor (small-sized type)
# GX-300 Series

MJE-GX3S No.0069-13V

Thank you very much for purchasing Panasonic 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 laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- Risk of explosion.Do not connect sensor to AC power supply.

## 1 COMPLIANT STANDARDS / REGULATIONS

- This product complies with the following standards and regulations:

**<EU Directives>**
EMC Directives CE

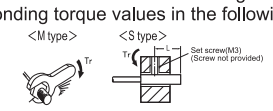
## 2 PRECAUTIONS

- This product has been developed / produced for industrial use only.
- Do not install the product in the following locations.Doing so may result in product failure or malfunction.
  - Outdoor locations directly subject to sunlight, rain, snow, water droplets, or oil.
  - Locations subject to atmospheres with chemical vapors, in particular solvents and acids.
  - Locations subject to corrosive gases.
- The Sensor may malfunction if used near ultrasonic cleaning equipment,high-frequency equipment, transceivers, cellular phones, inverters, or other devices that generate a high-frequency electric field.
- Laying the Proximity Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in incorrect operation and damage due to induction. Wire the Sensor using a separate conduit or independent conduit.
- The following conditions shall be observed if you use the product under an environment using cutting oil that may affect product's life and/or performance.
  - Usage in oil or water is prohibited.
- Impact on the product life may differ depending on the oil you use. Before using the cutting oil, make sure that it should not cause deterioration or degradation of sealing components.
- Never use thinner or other solvents. Otherwise, the Sensor surface may be dissolved.
- When turning on the power by influence of temperature environment,an output mis-pulse sometimes occurs. After the sensor has passed for 300 msec after turning on, please use in the stable state.
- The sensor is adjusted with a high degree of accuracy, so do not use in the environment with sudden temperature change.
- Do not attempt to disassemble, repair, or modify the product.
- Do not use a voltage that exceeds the rated operating voltage range. Applying a voltage that is higher than the operating voltage range may result in damage or burnout.
- Be sure that the power supply polarity and other wiring is correct. Incorrect wiring may cause explosion or burnout.
- If the power supply is connected directly without a load, the internal elements may explode or burn. Be sure to insert a load when connecting the power supply.

## 3 MOUNTING

### Tightening Force

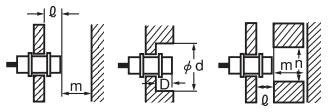
- Do not tighten the sensor mounting nuts with excessive force. Secure the mounting nuts to the corresponding torque values in the following table.




| Model No. | Tr | L |
|---|---|---|
| **GX-303S** | ≦0.2N・m | 13～21㎜ |
| **GX-304S** | | 8～21㎜ |
| **GX-305S** | ≦0.4N・m | |
| **GX-305M** | 1N・m | - |

### INFLUENCE OF SURROUNDING METAL

- Must Use the Accessory Nut When Using **GX-305M**.

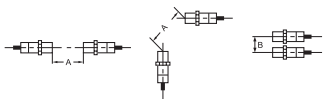



(Unit:mm)

| | GX-303S | GX-304S | GX-305S | GX-305M |
|---|---|---|---|---|
| ℓ | 0 | 0 | 0 | 0 |
| m | 3 | 5 | 3 | 5 |
| ϕd | 3 | 4 | 5.4 | 5 |
| D | 0 | 0 | 0 | 0 |
| n | 8 | 10 | 8 | 10 |

### MUTUAL INFLUENCE

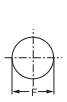
- When the Proximity Sensor is embedded in metal, ensure that the minimum distances given in the following table are maintained.




(Unit:mm)

| | GX-303S | GX-304S | GX-305S | GX-305M |
|---|---|---|---|---|
| A | 20 | | | |
| B | 15 | | | |

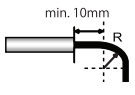
### DIMENSIONS OF FIXING HOLE




(Unit:mm)

| Model No. | F |
|---|---|
| **GX-303S** | $\phi 3.3^{+0.5}_{0}$ |
| **GX-304S** | $\phi 4.2^{+0.5}_{0}$ |
| **GX-305S** | $\phi 5.7^{+0.5}_{0}$ |
| **GX-305M** | $\phi 5.5^{+0.5}_{0}$ |

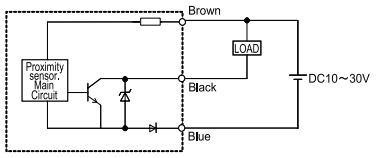
### ANGLE R OF THE BENDING CABLE



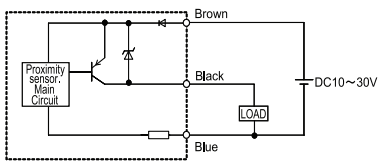

| Model No. | R |
|---|---|
| **GX-303S** | min. 7mm |
| **GX-304S** | min. 9mm |
| **GX-305S** | |
| **GX-305M** | |

## 4 I/O CIRCUIT DIAGRAM

### NPN output type

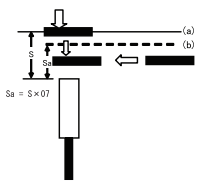



### PNP output type



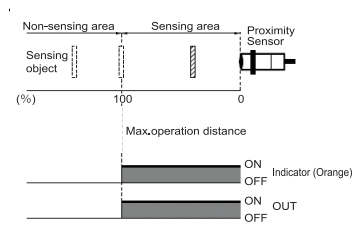

## 5 HOW TO DETERMINE THE SETTING DISTANCE

- Please use it after confirming the installation distance by following (a) and (b) with an actual detection object when you install (a)The detection distance receives the influence by the material of the detection object, thickness, shape, and the size. So,the detection object is brought close forward of the sensor and detection distance (S) is measured. (b)Please decide installation distance (Sa) with S×70% or less after measuring sensing distance(S).
- Please install the sensor to come within the range of (Sa) when the detection object moves from vertical direction.
- Please install the sensor to pass within the range of (Sa) when the detection object moves from horizontal direction.
- Please check the specifications and the graph of detection object size influence for your reference.

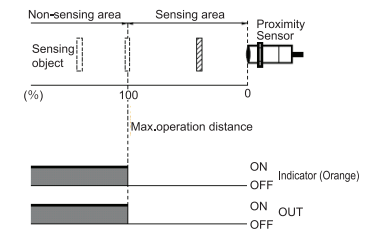



## 6 TIMING CHART

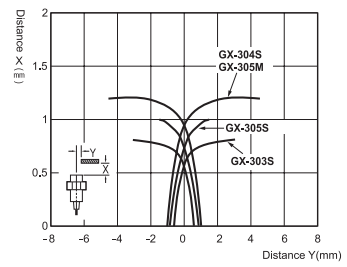
### NORMALLY OPEN




### NORMALLY CLOSE

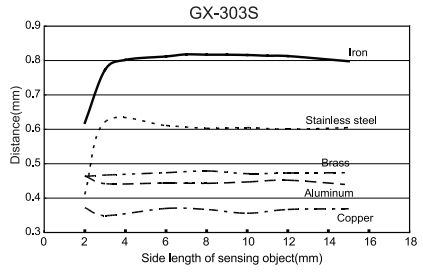



## 7 SENSING AREA (TYPICAL EXAMPLE)

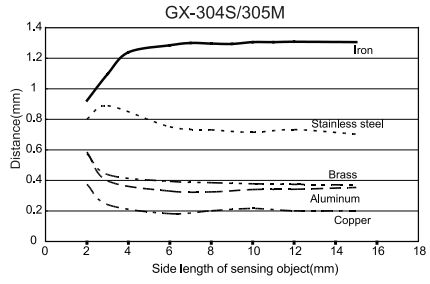



## 8 INFLUENCE OF SENSING OBJECT SIZE (TYPICAL EXAMPLE)

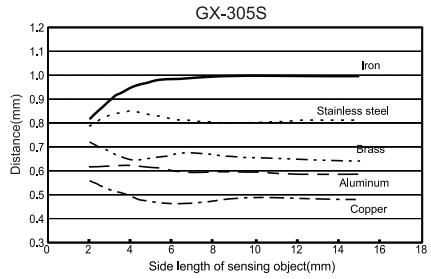
GX-303S




GX-304S/305M

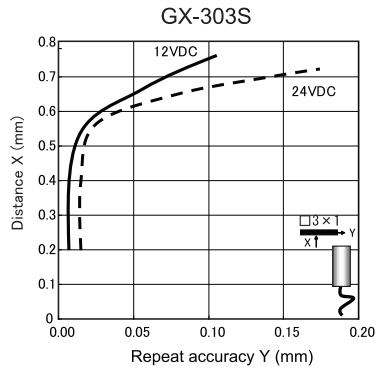



GX-305S

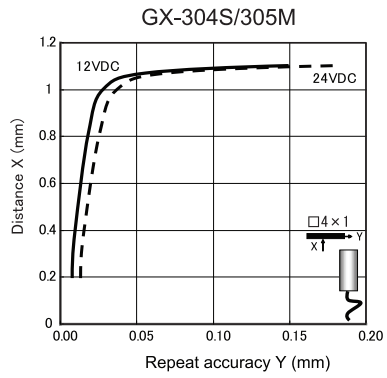



## 9 REPEAT ACCURACY (TYPICAL EXAMPLE)

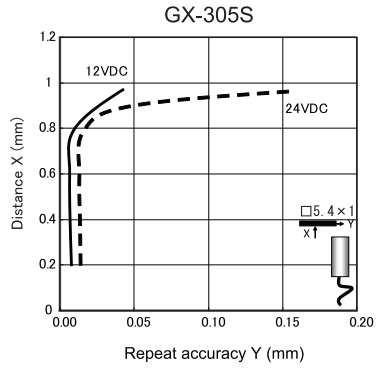
GX-303S



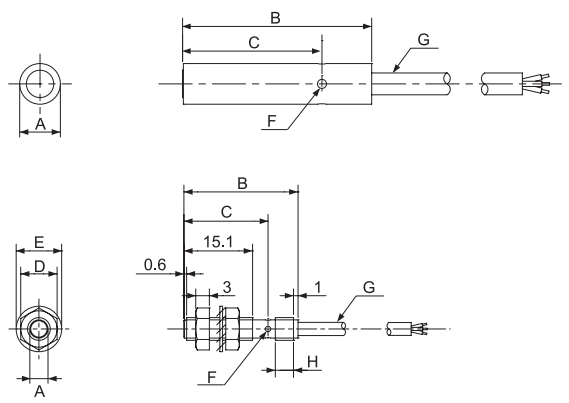

GX-304S/305M




GX-305S




## 10 DIMENSIONS (Unit:mm)




| | GX-303S | GX-304S | GX-305S | GX-305M |
|---|---|---|---|---|
| A | ϕ3 | ϕ4 | ϕ5.4 | M5×P0.5 |
| B | 27.1 | 25.1 | 25.1 | 25.1 |
| C | 18.0 | 18.5 | 18.5 | 18.5 |
| D | - | - | - | 8 |
| E | - | - | - | 10 |
| F | 4-ϕ1.0 | 4-ϕ1.2 | 4-ϕ1.2 | 4-ϕ1.2 |
| G | ϕ2.4 | ϕ2.9 | ϕ2.9 | ϕ2.9 |
| H | - | - | - | 4 |

## 11 SPECIFICATIONS

- **Model No.**

**GX-3** 1 1 2 3 4 – 5 – 6 – 7 7

1 :Size (03:ϕ3㎜, 04:ϕ4㎜, 05:M5 / ϕ5.4㎜)

2 :Shape (M:Threaded type, S:Non-threaded type)

3 None:Shielded type

4 :Operation distance (None:Standard)

5 :Operating mode [ A: N.O. (Normally open), B:N.C. (Normally closed)]

6 :Output configuration (N:NPN、P:PNP)

7 :Connecting method (None:Standard 2 m cable, C5:Standard 5m cable, R:Bending-resistant 2m cable, R5:Bending-resistant 5m cable)

| Type | | Shielded type | | | |
|---|---|---|---|---|---|
| Model No. | Normally open | **GX-303S-A** | **GX-304S-A** | **GX-305S-A** | **GX-305M-A** |
| | Normally closed | **GX-303S-B** | **GX-304S-B** | **GX-305S-B** | **GX-305M-B** |
| Max. operation distance | | 0.8mm±10% | 1.2mm±10% | 1.0mm±10% | 1.2mm±10% |
| Stable sensing range | | 0 ～ 0.56mm | 0 ～ 0.84mm | 0 ～ 0.84mm | 0 ～ 0.7mm |
| Standard sensing object(Iron) | | 3×3×1mm | 4×4×1mm | 5.4×5.4×1mm | 4×4×1mm |
| Hysteresis | | 15 % or less of operation distance (with standard sensing object) | | | |
| Supply voltage (Note1) | | 10 to 30 VDC (including 10% ripple (p-p)) | | | |
| Current consumption | | 10 mA max. | | | |
| Output configuration | | **GX-3□S-□-P**, **GX-305M-□-P** : PNP open-collector transistor<br>**GX-3□S-□-N**, **GX-305M-□-N** : NPN open-collector transistor | | | |
| Output (Note2) | Load current | 50 mA max. | 100 mA max. | | |
| | Residual voltage | 2 V max.(Note3) | | | |
| Operating mode | | **GX-3□S-A**, **GX-305M-A** : N.O. (Normally open)<br>**GX-3□S-B**, **GX-305M-B** : N.C. (Normally closed) | | | |
| Max. response frequency (Note4) | | 5kHz | 4kHz | | |
| Operation indicator | | Orange LED(lights up when the output is ON) | | | |
| Protection | | IP67(IEC) | | | |
| Ambient temperature | | -25 to +70℃, Storage: -25 to +80℃ | | | |
| Ambient humidity | | 35 to 95% RH, Storage: 35 to 95% RH | | | |
| Material | | Case:SUS303、Sensing part:Heat-resistant ABS, Cable:Polyvinyl chloride (PVC) | | | |
| Cable | | 0.09㎟ 3-core ϕ2.4 cabtyre cable. | 0.14㎟ 3-core ϕ2.9 cabtyre cable.<br>(Models with "-R" affixed to the Model No. come with a 0.15㎟ 3-core bending-resistant ϕ2.9 cabtyre cable.) | | |
| Accessories | | - | - | - | Clamping nuts: 2pcs.(SUS430)<br>Toothed washer : 1pc.(SUS303) |

Notes: 1) When used at a power of 12 V, the Sensor is less susceptible to the effects of internal self heat generation and therefore a more stable repeat accuracy can be obtained.
2) When the output is 20 mA or less, the Sensor is less susceptible to the effects of internal self heat generation and therefore a more stable repeat accuracy can be obtained.
3) **GX-303S**:load current 50mA,cable length 2m / **GX-304S**,**GX-305**,**GX-305M**:load current 100mA,cable length 2m
4) The response frequency is an average value.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