

**DC Three-wire Type
Cylindrical Inductive Proximity Sensor
GX-300 Series**

MJE-GX3ML No.0070-74V

Thank you very much for purchasing Panasonic products. 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.
- Risk of explosion. Do not connect sensor to AC power supply.
- Do not use the product in an environment where flammable or explosive gas is present.

1 COMPLIANT STANDARDS / REGULATIONS

- This product complies with the following standards and regulations:

<EU Directives>
EMC Directives



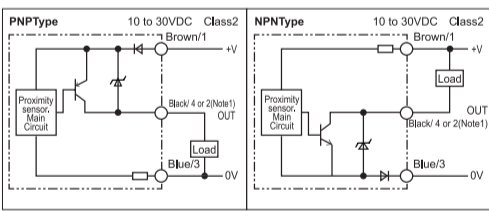
2 PRECAUTIONS

- 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 ms after turning on, please use in the stable state. If the sensing object is located near the sensor's sensing surface, an output mis-pulse may be generated for 300 ms or longer at the time of power-on. Be sure to check the product for proper operation under actual operating condition before using.
- 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.
- Please use gloves to protect yourself from injury caused by screw.
- For the connector type and pigtailed type, check the specifications of the connector cable to be used. Please do not use it under conditions that exceed the range of its specifications of both the product and the connector cable.
- Please make sure there is no foreign matter in connector part before connecting the connector cable to the connector type and pigtailed type.
- In the IO-Link mode, the cable between the IO-Link master and sensor must have a length of 20m or less.

3 I/O CIRCUIT DIAGRAM

Standard I/O mode (SIO mode)

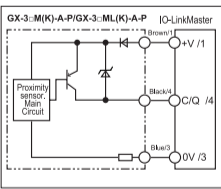
If using the product as a general sensor, it operates in the standard I/O mode (SIO mode).



Note:1) -A type : 4, -B type : 2

IO-Link Communication mode (COM mode)

GX-3□M(K)-A-P, GX-3□ML(K)-A-P only
(IO-Link is not supported for NC-type PNP outputs or all types of NPN outputs.)



Connector Pin Arrangement

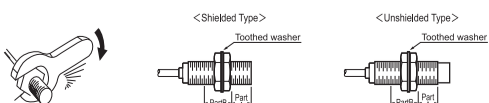


Adaptive connector cable:
CN-24S Series

4 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.
- The allowable tightening strength depends on the distance from the edge of the head, as shown in the following table. (A is the distance from the edge of the head. B includes the nut on the head side. If the edge of the nut is in part A, the tightening torque for part A applies instead.)
- The following strengths assume washers are being used.



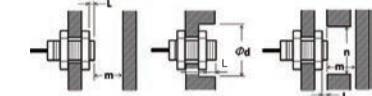
Model No. <Shielded Type>	Part A		Part B
	Dimension (mm)	Torque	Torque
GX-308M(K)	9	9N·m	12N·m
GX-312M(K)	-	30N·m	-
GX-318M(K)	-	70N·m	-
GX-330M(K)	-	180N·m	-

Model No. <Unshielded Type>	Part A		Part B
	Dimension (mm)	Torque	Torque
GX-308ML(K)	3	9N·m	12N·m
GX-312ML(K)	-	30N·m	-
GX-318ML(K)	-	70N·m	-
GX-330ML(K)	-	180N·m	-

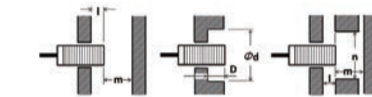
Influence of Surrounding Metal

- When the Proximity Sensor is mounted in metal, ensure that the minimum distance given in the following table are maintained.
- When mounting the Proximity Sensor using a nut and toothed washer, only use the provided nut.
- Nuts that are supplied along with each models are different. Refer to Dimensions for details on shapes.

Mount A (Using the provided Nut)



Mount B (Embedded in the metal)



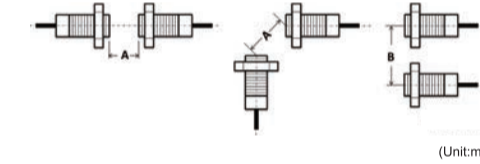
(Unit:mm)

Model No. (Shielded Type)	MountA				MountB				
	L	d	m	n	I	d	D	m	n
GX-308M	0	8	4.5	12	0	8	0	4.5	12
GX-312M	0	12	8	18	0	12	0	8	18
GX-318M	0	18	20	27	0	18	0	20	27
GX-330M	0	30	40	45	0	30	0	40	45
GX-308MK	0	8	4.5	12	0	8	0	4.5	12
GX-312MK	0	18	12	18	2.4	18	2.4	12	18
GX-318MK	0	27	24	27	3.6	27	3.6	24	27
GX-330MK	0	45	45	45	6	45	6	45	45

Model No. (Unshielded Type)	MountA				MountB				
	L	d	m	n	I	d	D	m	n
GX-308ML	6	24	8	24	6	24	6	8	24
GX-312ML	11	40	20	36	15	40	15	20	36
GX-318ML	18	55	40	54	22	55	22	40	54
GX-330ML	25	90	70	90	30	90	30	70	90
GX-308MLK	9	24	8	24	12	24	12	8	24
GX-312MLK	11	40	20	40	15	40	15	20	40
GX-318MLK	21	70	48	70	25	70	25	48	70
GX-330MLK	40	120	90	120	45	120	45	90	120

Mutual Interference

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



(Unit:mm)

Model No. (Shielded Type)	A	B	Model No. (Unshielded Type)	A	B
	GX-308M(K)	20		15	GX-308ML(K)
GX-312M(K)	30	20	GX-312ML(K)	120	100
GX-318M	50	35	GX-318ML	200	110
GX-318MK	60	35	GX-318MLK	200	120
GX-330M	100	70	GX-330ML	300	200
GX-330MK	110	90	GX-330MLK	350	300

Mounting Hole and Nut Dimensions

(Unit:mm)

Model No.	F	G
	GX-308M(K) GX-308ML(K)	$\phi 8.5^{+0.5}_0$
GX-312M(K) GX-312ML(K)	$\phi 12.5^{+0.5}_0$	17
GX-318M(K) GX-318ML(K)	$\phi 18.5^{+0.5}_0$	24
GX-330M(K) GX-330ML(K)	$\phi 30.5^{+0.5}_0$	36

5 TIMING CHART

Operation Mode(Note1)	Sensing area		Proximity Sensor	Indicator
	Non-sensing area	Sensing area		
Standard I/O mode (SIO)	N.O.	ON	ON	Communication Indicator (Green)
		OFF	OFF	Operation Indicator (Orange)
		OFF	OUT	OUT
	N.C.	ON	ON	Communication Indicator (Green)
		OFF	OFF	Operation Indicator (Orange)
		OFF	OUT	OUT
IO-Link mode (COM) (Note1)	N.O.	Flashing (1sec cycle)	ON	Communication Indicator (Green)
		ON	ON	Operation Indicator (Orange)
		OFF	OUT	OUT
	N.C.	Flashing (1sec cycle)	ON	Communication Indicator (Green)
		ON	ON	Operation Indicator (Orange)
		OFF	OUT	OUT

Note: 1) The operation mode can be changed by the IO-Link communications. The timer function of the output can be set up by the IO-Link communications. Refer to GX-300 Series INDEXLIST.

6 ERROR INDICATION

(Common to the standard I/O mode and IO-Link mode)

LED indication (Note1)	Condition	Action
Orange / Green		
Alternate blinking of orange-color and green-color	The sensor might be broken internally, such as disconnection of the detection coil.	Start up (Turn ON) the sensor again. If the error occurs again, replace the sensor.
Blinking	Not Lighting	The load is short-circuited. Check the wiring and connector connection again.
Not Lighting	Blinking	Inconsistency has occurred on the settings (service data) written in by the IO-Link communications. Execute the system command to "Restore Factory Settings" to initialize the settings. Refer to index 2 of service data.

Note:1) Blinking at approx.0.3s intervals.

7 SPECIFICATIONS

● Model No.

GX-3 1 1 2 3 4 - 5 - 6 - 7 7

- 1 :Size (08:M8, 12:M12, 18:M18, 30:M30)
- 2 :Shape (M:Threaded type)
- 3 :None:Shielded type, L:Unshielded type
- 4 :Operation distance (None:Standard, K:Long sensing range)
- 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,J: Pigtailed type, Z:Connector type)

Type	Shielded Type								
	Normally open	GX-308M-A	GX-312M-A	GX-318M-A	GX-330M-A	GX-308MK-A	GX-312MK-A	GX-318MK-A	GX-330MK-A
Model No.	Normally closed	GX-308M-B	GX-312M-B	GX-318M-B	GX-330M-B	GX-308MK-B	GX-312MK-B	GX-318MK-B	GX-330MK-B
Max. operation distance (Note1)		1.5mm±10%	2mm±10%	5mm±10%	10mm±10%	2mm±10%	4mm±10%	8mm±10%	15mm±10%
Stable sensing range		0 to 1.2mm	0 to 1.6mm	0 to 4mm	0 to 8mm	0 to 1.6mm	0 to 3.2mm	0 to 6.4mm	0 to 12mm
Standard sensing object(iron)		8×8×1mm	12×12×1mm	18×18×1mm	30×30×1mm	8×8×1mm	12×12×1mm	24×24×1mm	45×45×1mm
Hysteresis		10% max. of sensing distance				15% max. of sensing distance			
Supply voltage		10 to 30 VDC (including 10% ripple (p-p)), Class 2							
Current consumption		16mA max.							
Output configuration		GX-3□□□□□□ :PNP open-collector transistor, GX-3□□□□□□ :NPN open-collector transistor							
Output	Load current	1-output models:10 to 30 VDC,Class 2, 200 mA max., (GX-308M:1-output models:10 to 30 VDC,Class 2, 200 mA max., (-40 to 70° C), 100 mA max., (70 to 85° C)				1-output models:10 to 30 VDC,Class 2, 200 mA max., (-40 to 70° C), 100 mA max., (70 to 85° C)			
	Residual voltage	1-output models: 2 V max. (Load current: 200 mA, Cable length: 2 m)				1-output models: 2 V max. (Load current: 200 mA, Cable length: 2 m)			
Operating mode		GX-3□□□□□□ : N.O. (Normally open), GX-3□□□□□□ : N.C. (Normally closed)							
Response frequency (Note1)		2,000Hz	1,500Hz	600Hz	400Hz	1,500Hz	1,000Hz	500Hz	250Hz
Indicator		In the Standard I/O mode (SIO mode) : Operation is indicated by orange-color, is not indicated by green-color. In the IO-Link mode : Operation is indicated by orange-color/lighting and green-color/blinking (at 1sec intervals), respectively.							
Degree of protection		Cable type, Pigtailed type : IEC 60529-IP67, ISO 20653 old standard: DIN 40050 PART9 : IP69K, JIS C 0920 Annex 1: IP67G Connector type: IEC 60529-IP67, ISO 20653 old standard: DIN 40050 PART9 : IP69K, All models : Type1 (UL 50)							
Pollution degree		3							
Altitude		2,000m or less							
Ambient temperature		Operating/Storage: -40 to 85° C (with no icing or condensation) (Note2)							
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)							
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case							
Material	Case	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass
	Sensing surface	Polybutylene terephthalate (PBT)							
Cable		0.2mm ³ -core oil, heat and cold resistant 4 cabtyrecable (Note3)		0.2mm ³ -core oil, heat and cold resistant 6 cabtyrecable (Note4)		0.2mm ³ -core oil, heat and cold resistant 4 cabtyrecable (Note3)		0.2mm ³ -core oil, heat and cold resistant 6 cabtyrecable (Note4)	
IO-Link Communication specification (Notes)		IO-Link specification:Ver.1.1, Baud rate:COM3 (230.4kbps), PD size:2byte, OD size:1byte (M-sequence type : TYPE2_2)							
Accessories		Clamping nuts (Nickel-plated brass), Toothed washer (Zinc-plated iron)							

- Notes: 1) The response frequency is an average value.
- 2) The UL temperature rating for M12 Pigtailed type is -25 to 70°C.
- 3) Models with "-R" affixed to the Model No. have 0.2mm³-core flexible $\phi 4$ cabtyrecable.
- 4) Models with "-R" affixed to the Model No. have 0.2mm³-core flexible $\phi 6$ cabtyrecable.
- 5) IO-Link is not supported for NC-type PNP outputs or all types of NPN outputs.

Type	Unshielded Type								
	Normally open	GX-308ML-A	GX-312ML-A	GX-318ML-A	GX-330ML-A	GX-308MLK-A	GX-312MLK-A	GX-318MLK-A	GX-330MLK-A
Model No.	Normally closed	GX-308ML-B	GX-312ML-B	GX-318ML-B	GX-330ML-B	GX-308MLK-B	GX-312MLK-B	GX-318MLK-B	GX-330MLK-B
Max. operation distance		2mm±10%	5mm±10%	10mm±10%	18mm±10%	4mm±10%	8mm±10%	16mm±10%	30mm±10%
Stable sensing range		0 to 1.6mm	0 to 4mm	0 to 8mm	0 to 14.4mm	0 to 3.2mm	0 to 6.4mm	0 to 12.8mm	0 to 24mm
Standard sensing object(iron)		8 × 8 × 1mm	15 × 15 × 1mm	30 × 30 × 1mm	54 × 54 × 1mm	12 × 12 × 1mm	24 × 24 × 1mm	48 × 48 × 1mm	90 × 90 × 1mm
Hysteresis		10% max. of sensing distance				15% max. of sensing distance			
Supply voltage		10 to 30 VDC (including 10% ripple (p-p)), Class 2							
Current consumption		16mA max.							
Output configuration		GX-3□□□□□□ :PNP open-collector transistor, GX-3□□□□□□ :NPN open-collector transistor							
Output	Load current	1-output models:10 to 30 VDC,Class 2, 200 mA max., (GX-308ML:1-output models:10 to 30 VDC,Class 2, 200 mA max., (-40 to 70° C), 100 mA max., (70 to 85° C)				1-output models:10 to 30 VDC,Class 2, 200 mA max., (-40 to 70° C), 100 mA max., (70 to 85° C)			
	Residual voltage	1-output models: 2 V max. (Load current: 200 mA, Cable length: 2 m)				1-output models: 2 V max. (Load current: 200 mA, Cable length: 2 m)			
Operating mode		GX-3□□□□□□ : N.O. (Normally open), GX-3□□□□□□ : N.C. (Normally closed)							
Response frequency (Note1)		1,000Hz	800Hz	400Hz	100Hz	1,000Hz	800Hz	400Hz	100Hz
Indicator		In the Standard I/O mode (SIO mode): Operation indicator (orange, lit) and communication indicator (green, not lit) In the IO-Link communication mode (COM mode): Operation indicator (orange, lit) and communication indicator (green, blinking at 1 s intervals)							
Degree of protection		Cable type, Pigtailed type : IEC 60529-IP67, ISO 20653 old standard: DIN 40050 PART9 : IP69K, JIS C 0920 Annex 1: IP67G, Connector type: IEC 60529-IP67, ISO 20653 old standard: DIN 40050 PART9 : IP69K, All models : Type1 (UL 50)							
Pollution degree		3							
Altitude		2,000m or less							
Ambient temperature		Operating/Storage: -40 to 85° C (with no icing or condensation) (Note2)							
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)							
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case							
Material	Case	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass	SUS303	Nickel-plated brass
	Sensing surface	Polybutylene terephthalate (PBT)							
Cable		0.2mm ³ -core oil, heat and cold resistant 4 cabtyrecable							