Panasonic INSTRUCTION MANUAL

Amplifier-separated Inductive Proximity Sensor
GS Series

MJE-GSGA No.0034-56V

GA/GS Series
Discontinued Sept 2020

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 standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.**

1 SPECIFICATIONS

● Sensor head

Item \ Type	Non-threaded type			Threaded type				Front sensing type
Model No.	GS-3S	GS-5S	GS-8S	GS-8M	GS-10M	GS-12M	GS-14M	GS-14T
Max. operation distance (Note 1)	2mm	3mm	4mm	3.5mm	4mm	6mm	8mm	8mm
Stable sensing range (Note 1)	0 to 0.8mm	0 to 1mm	0 to 2mm	0 to 1.5mm	0 to 2mm	0 to 3mm	0 to 5mm	0 to 5mm
Standard sensing object	Iron sheet 18 × 18 × t1mm							
Hysteresis	50 μm or less					60 μm or less	70 μm or less	
Protection	IP67 (IEC)							
Ambient temperature	-10 to +60°C, Storage: -10 to +60°C							
Ambient humidity	35 to 95% RH, Storage: 35 to 95% RH							
Material	Enclosure: Stainless steel [threaded type sensor head: Brass (Nickel plated)], Resin part: PVC							
Cable	High frequency coaxial cable, 3m long (intrinsic impedance: 50Ω)							
Weight (Note 2)	35g approx.	36g approx.	37g approx.	44g approx.	45g approx.	50g approx.	53g approx.	46g approx.
Accessories	—			Nut: 2 pcs., Toothed lock washer: 1 pc.				—

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) The weight of the threaded type includes the weight of two nuts and one toothed lock washer.

● Amplifier

Item \ Type	AC supply type		DC supply type
Model No.	GA-2	GA-2R	GA-2D
Supply voltage	90 to 260V AC		10 to 28V DC
Power / current consumption	2.5VA approx.	9VA approx.	20mA approx.
Output	AC non-contact (Thyristor) ・Switching capacity: 260V AC 2 to 100mA	Relay contact 1a ・Switching capacity: 250V AC 2A (resistive load) ・Rated load life: 500,000 or more	NPN open-collector transistor ・Max. sink current: 200mA ・Applied voltage: 30V DC or less (between output and 0V) ・Residual voltage: 1.5V or less (at 200mA sink current) 0.4V or less (at 16mA sink current) PNP open-collector transistor ・Max. source current: 200mA ・Residual voltage: 1.5V or less (at 200mA source current)
Output operation	Selectable either Normally open or Normally closed		
Short-circuit protection	—	—	Incorporated
Response time	10ms or less		1ms or less
Operation indicator	Red LED (lights up when the output is ON)		
Sensitivity adjuster	15-turn potentiometer		
Ambient temperature	-10 to +60°C (No dew condensation or icing allowed), Storage: -10 to +60°C		
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH		
Material	Cover: ABS, Terminal part: PBT		
Weight	130g approx.	150g approx.	75g approx.
Accessory	Adjusting screwdriver: 1 pc.		

2 CAUTIONS

Be sure to use the sensor head with the amplifier as a set. Furthermore, take care that if the cable of the sensor head is cut or extended, the sensing range and the hysteresis change.

- 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 use during the initial transient time (**GA-2**, **GA-2D**: 300ms, **GA-2R**: 500ms) after the power supply is switched on.
- 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.
- Take care that the sensor does not come in direct contact with oil, grease, organic solvents, such as, thinner etc., or strong acid, and alkaline.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.
- Since the cable end is not waterproof, do not use the sensor in the application where water may seep in from the cable end.
- This sensor is suitable for indoor use only.
- Make sure that the sensing end is not covered with metal dust, scrap or spatter. It will result in malfunction.

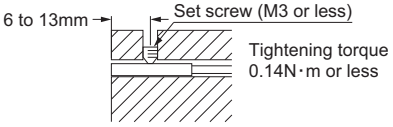
3 MOUNTING

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

Mounting with a set screw

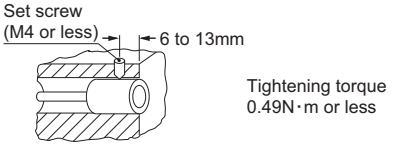
・ Make sure to use a set screw with a cup-point end.

<Non-threaded type sensor head>



Note: Do not apply excess torque.

<Threaded type sensor head>

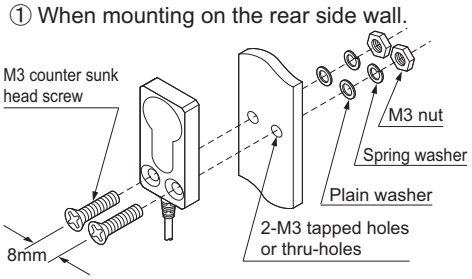


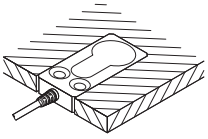
Mounting with nut

Model No.	Tightening torque
GS-8M	3.43N·m or less
GS-10M	9.8N·m or less
GS-12M	9.8N·m or less
GS-14M	19.6N·m or less

Mounting GS-14T

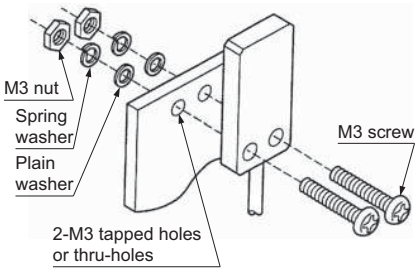
① When mounting on the rear side wall.





For this is a shield type sensor, the whole sensing probe (except the sensing face) can be embedded into metal.

② When mounting on the rear of the object.



● 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.

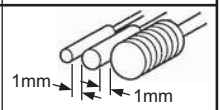
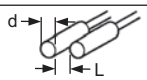
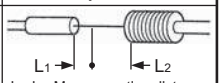
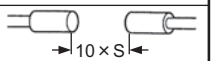
Correction coefficient

Metal	Correction coefficient
Iron	1
Stainless steel (SUS304)	0.8 approx.
Brass	0.6 approx.
Aluminum	0.4 approx.

Note: The sensing range will also change if the sensing object is smaller than the standard sensing object or if it is plated.

● Mutual interference

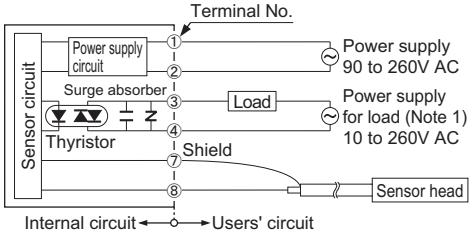
- When two or more sensors are installed in parallel or face to face, keep the minimum separation distance specified below to avoid mutual interference.

	Type	Conditions
Parallel arrangement	The neighboring sensors are different models (Excluding the combination of **GS-8S** to **GS-10M** or **GS-14M** to **GS-14T**)	 The sensors can be placed to 1mm to each other.
	The neighboring sensors are the same models (Including the combination of **GS-8S** to **GS-10M** or **GS-14M** to **GS-14T**)	 d: Diameter of sensor head ・L≧3d for max. operation distance ・L≧d for stable sensing range ・The sensors can be placed to 1mm to each other when a polystryrence capacitor 0.001 μF is connected between terminal No. ⑦ and ⑧ of the amplifier. But in this case, the max. operation distance is reduced by 10%.
Series arrangement	The neighboring sensors are different models (Excluding the combination of **GS-8S** to **GS-10M** or **GS-14M** to **GS-14T**)	 L1, L2: Max. operation distance Make the max. operation distance between two sensors greater than L1 + L2.
	The neighboring sensors are the same models (Including the combination of **GS-8S** to **GS-10M** or **GS-14M** to **GS-14T**)	 S: Stable sensing range Make the distance between two sensors greater than 10 times of the stable sensing range.

4 CONNECTION

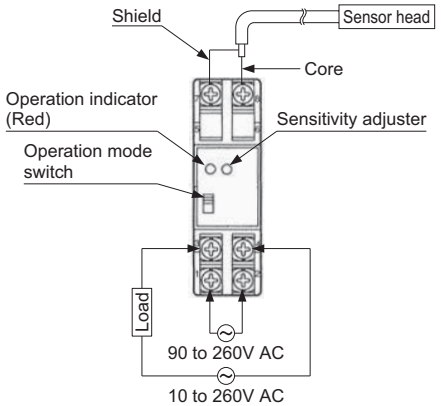
GA-2 (AC supply type)

● I/O circuit diagram



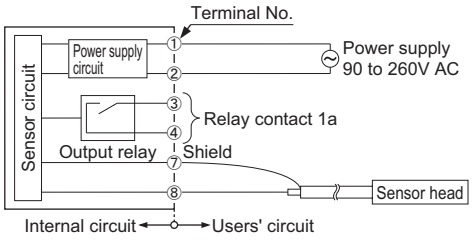
Notes: 1) The sensor is damaged if connected with no load.
2) Confirm that the current is within the range of 2 to 100mA after connecting the load.

● Wiring diagram

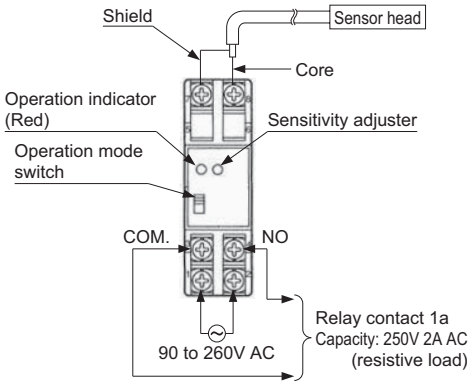


GA-2R (AC supply type)

● I/O circuit diagram

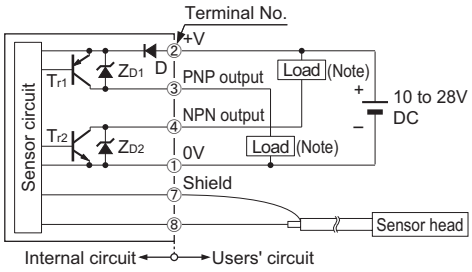


● Wiring diagram



GA-2D (DC supply type)

● I/O circuit diagram



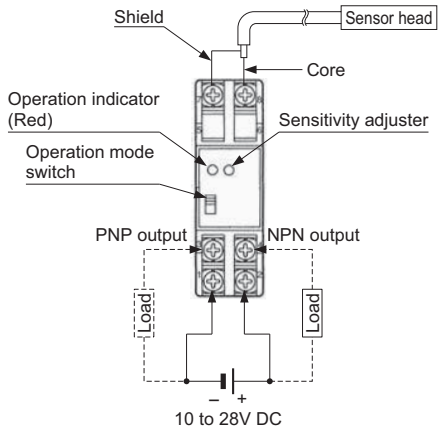
Note: Connect the surge absorption diode in parallel with the load when the conductance coil such as relay is connected or taken off.

Symbols...D: Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
T_{r1}: PNP output transistor
T_{r2}: NPN output transistor

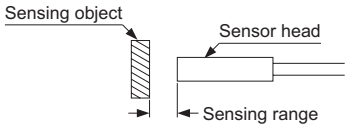
<Overcurrent protection>

- When the output current is over 300mA, the excessive current protection circuit is energized to stop the output. (But the operation indicator still glows)
- In order to reset the operation of the sensor, shift the operation mode switch to the reverse side for a moment and then shift the switch to previous position again. (Turning the power off or changing the sensing state is also valid for resetting the operation of the sensor.)

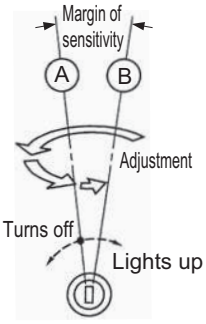
● Wiring diagram



5 SENSITIVITY ADJUSTMENT

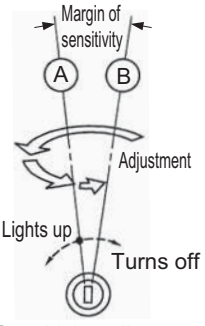


<In case of the normally open>



① Place the sensing object in a suitable position against the sensor probe, and then set the operation mode switch to 'NORM' position.
② Turn the sensitivity adjuster counter-clockwise till the operation indicator (red) turns off [if the operation indicator (red) has turned off before adjusting, go to step 3] below.
③ Turn the sensitivity adjuster slowly clockwise, till the point Ⓐwhere the operation indicator (red) lights up, and then turn the adjuster a little further clockwise. This is the point Ⓑwhere stable operation is obtained.

<In case of the normally closed>



① Place the sensing object in a suitable position against the sensor probe, and then set the operation mode switch to 'INV' position.
② Turn the sensitivity adjuster counter-clockwise till the operation indicator (red) lights up [if the operation indicator (red) has lights up before adjusting, go to step 3] below.
③ Turn the sensitivity adjuster slowly clockwise, till the point Ⓐwhere the operation indicator (red) turns off, and then turn the adjuster a little further clockwise. This is the point Ⓑwhere stable operation is obtained.

* In order to obtain an exact position of the object, please set the sensitivity adjuster at the point where the operation indicator (red) just turns on in either operation mode.

GA/GS Series
Discontinued
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