Panasonic® **INSTRUCTION MANUAL**

# Contact-Type Digital Displacement Sensor / Sensor Head
# HG-S□

MJE-HGS1010 No.0103-72V

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 device for personnel protection.
- When using devices for personnel protection, use products that meet the laws and standards for personnel protection that apply in each region or country, such as OSHA, ANSI and IEC.

This document provides a brief summary of mounting and other related information. For detailed information, refer "**our web site (https://industry.panasonic.com/)** ".

## 1 REGULATIONS AND STANDARDS

- This product conforms to the regulations and standards below.

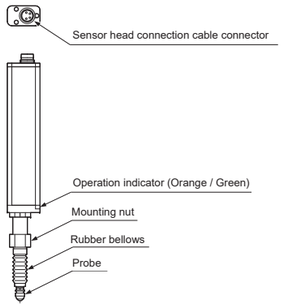
**<Conformity Directives / Conforming Regulations>**
EU Law: EMC Directive 2014/30/EU
British Legislation: EMC Regulations 2016/1091

**- Applicable Standards**
EN 61000-6-4, EN 61000-6-2

## 2 CONTENTS OF PACKAGE

| | |
|---|---|
| ☐ Sensor head | 1 pc. |
| ☐ Mounting nut | 1 pc. |
| ☐ Sensor head fastening wrench | 1 pc. |
| ☐ Rubber bellows (**HG-S□R** only) | 1 pc. |
| ☐ Instruction Manual (English / Japanese, Chinese / Korean) | 1 pc. each |
| ☐ General Information for Safety, Compliance, and Instructions | 1 pc. |

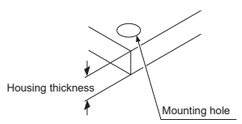
## 3 DESCRIPTION OF PARTS




## 4 MOUNTING

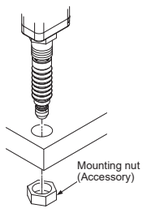
- When tightening the mounting nut, take care not to damage the rubber bellows.
- If the rubber bellows is deformed, a load will occur when the spindle operates and damage may result.
- Note that the mounting direction of the provided mounting nut differs according to the thickness of the housing.

***1.*** Open a hole in the housing in which the sensor head will be mounted.

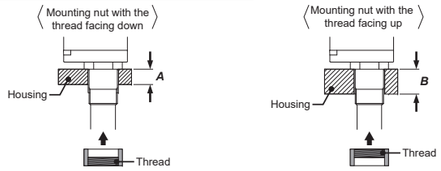



| | Mounting hole | Housing thickness |
|---|---|---|
| **HG-S1010**(**R**)、**HG-S1110**(**R**) | ø8H7$\left(^{+0.015}_{0}\right)$mm | 6.5～12.5mm |
| **HG-S1032** | ø12H7$\left(^{+0.018}_{0}\right)$mm | 6.5～10.5mm |
| **HG-S1050** | | 6.5～12.5mm |

***2.*** Insert the sensor head into the hole you opened in the housing, and fasten lightly with the provided mounting nut.

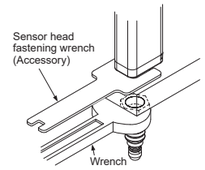



### Installation of mounting nut attachment

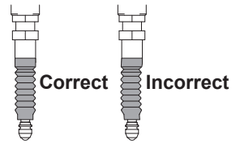



| | Housing thickness | |
|---|---|---|
| | ***A*** | ***B*** |
| **HG-S1010**(**R**)、**HG-S1110**(**R**) | 6.5～10mm | 10～12.5mm |
| **HG-S1032** | 6.5～8.5mm | 8.5～10.5mm |
| **HG-S1050** | | 8.5～12.5mm |

***3.*** Fasten the sensor head.
When fastening the sensor head, tighten the mounting nut with a wrench while holding the sensor head in place with the sensor head fastening wrench as shown at right.
Tighten to a torque of 12.5N·m or less (**HG-S1032 / HG-S1050**: 15N·m or less).




***4.*** Make sure that the rubber bellows has not become deformed as shown at right.
If the rubber bellows is deformed, restore the normal shape by rotating the bellows or otherwise.

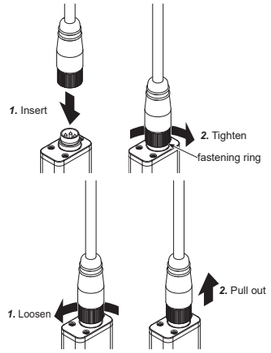



### Connecting the sensor head connection cable

- When attaching the connector, make sure it is firmly tightened. If loose, the connector may come off and cause an error.
- When disconnecting, always make sure that the fastening ring has been completely loosened before pulling out the cable.
Risk of damage if you pull the cable with excessive force (15N or more) with the fastening ring tightened.

### How to connect

***1.*** Insert the sensor head connection cable into the connector for the sensor head connection cable on the sensor head.
***2.*** Turn the fastening ring on the sensor head connector in the direction shown to firmly tighten the ring.




### How to remove

***1.*** Turn the fastening ring on the sensor head connector in the direction shown to loosen the ring.
***2.*** Grasp the connector and pull up to remove the cable.




## 5 SPECIFICATIONS

| Type | | 10mm type | | | |
|---|---|---|---|---|---|
| | | General purpose | | High precision | |
| | | Standard type | Low measuring force type | Standard type | Low measuring force type |
| Model No. | | **HG-S1010** | **HG-S1010R** | **HG-S1110** | **HG-S1110R** |
| Position detection method | | Optical absolute linear encoder method | | | |
| Measurement range | | 10mm | | | |
| Stroke | | 10.5mm or more | | | |
| Measuring force (Note 1) (Note 2) | Downward mount | 1.65N or less 1.10N (Note 3) | 0.35N or less 0.30N (Note 3) | 1.65N or less 1.10N (Note 3) | 0.35N or less 0.30N (Note 3) |
| | Upward mount | 1.35N or less 0.85N (Note 3) | – | 1.35N or less 0.85N (Note 3) | – |
| | Side mount | 1.50N or less 0.95N (Note 3) | 0.25N or less 0.20N (Note 3) | 1.50N or less 0.95N (Note 3) | 0.25N or less 0.20N (Note 3) |
| Resolution | | 0.5μm | | 0.1μm | |
| Sampling cycle | | 1ms | | | |
| Indication accuracy (P-P) | Full range | 2.0μm or less | | 1.0μm or less | |
| | Limited range | 1.0μm or less (any 60μm) | | 0.5μm or less (any 60μm) | |
| Hot swap function | | Incorporated | | | |
| Protective structure | | IP67 (IEC) (Note 4) | – | IP67 (IEC) (Note 4) | – |
| Ambient temperature | | -10 to +55°C (No dew condensation or icing allowed), Storage: -20 to +60°C | | | |
| Ambient humidity | | 35 to 85% RH, Storage: 35 to 85% RH | | | |
| Mechanical life (Note5) | | 100 million times or more (reference value) | | | |
| Tip deviation amount | | 35μm (typical value) | | | |
| Grounding method | | Capacitor grounding | | | |
| Material | | Body: Zinc, Holder: Stainless steel, Spindle: Tool steel, Probe: Ceramic, Rubber bellows: NBR (black) | | | |
| Weight (main unit only) | | Approx. 80g | | | |

Notes: 1) Measured at an ambient temperature of +20°C, unless otherwise specified.
2) **HG-S□R** is standard state without the rubber bellows.
3) Typical value near center of measurement.
4) Excludes damage and deterioration to the rubber bellows due to external causes.
5) Typical value in a clean environment in which there is no contact with liquids such as water or oil, and no settling of particulate matter.

| Type | | 32mm type | 50mm type |
|---|---|---|---|
| | | General purpose | |
| | | Standard type | |
| Model No. | | **HG-S1032** | **HG-S1050** (Note 1) |
| Position detection method | | Optical absolute linear encoder method | |
| Measurement range | | 32mm | 50mm |
| Stroke | | 32.5mm or more | 50.5mm or more |
| Measuring force (Note 2) | Downward mount | 2.97N or less 1.90N (Note 3) | 3.80N or less 1.90N (Note 3) |
| | Upward mount | 2.09N or less 1.19N (Note 3) | 3.20N or less 1.40N (Note 3) |
| | Side mount | 2.53N or less 1.50N (Note 3) | 3.40N or less 1.70N (Note 3) |
| Resolution | | 0.5μm | |
| Sampling cycle | | 1ms | |
| Indication accuracy (P-P) | Full range | 3.0μm or less | 3.5μm or less |
| | Limited range | 2.0μm or less (any 60μm) | – |
| Hot swap function | | Incorporated | |
| Protective structure | | IP67 (IEC) (Note 4) | |
| Ambient temperature | | -10 to +55°C (No dew condensation or icing allowed), Storage: -20 to +60°C | |
| Ambient humidity | | 35 to 85% RH, Storage: 35 to 85% RH | |
| Mechanical life (Note 5) | | 30 million times or more (reference value) | 10 million times or more (reference value) |
| Tip deviation amount | | 40μm (typical value) | |
| Grounding method | | Capacitor grounding | |
| Material | | Body: Aluminium, Holder: Free-cutting steel ,Spindle: Tool steel, Probe: Ceramic, Rubber bellows: NBR (black) | |
| Weight (main unit only) | | Approx. 150g | Approx. 180g |

Notes: 1) Connect to an HG-SC series controller manufactured in February 2019 or later.
2) Measured at an ambient temperature of +20°C, unless otherwise specified.
3) Typical value near center of measurement.
4) Excludes damage and deterioration to the rubber bellows due to external causes.
5) Typical value in a clean environment in which there is no contact with liquids such as water or oil, and no settling of particulate matter.

## 6 CAUTIONS

The special sensor head **HG-S□** is designed to be used with the controller **HG-SC□**. If used with other than the special sensor head option, the specifications will not be met and product malfunctioning or damage may occur.

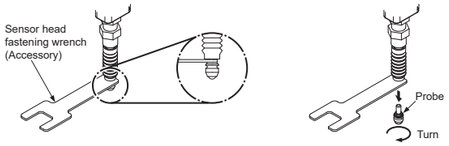
- This device has been developed / produced for industrial use only.
- Do not use this product outside the range of the specifications. Risk of an accident and product damage. There is also a risk of a noticeable reduction of service life.
- Deviations may occur in the measured value at the bottom dead center. Do not use the bottom dead center as a standard.
- Do not wire in parallel with a high-voltage line or power line, or run through the same conduit. Risk malfunctioning due to induction.
- Verify that the supply voltage fluctuations are 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.
- Do not use during the initial transient time after the power supply is switched ON.
- Do not apply stress such as excessive bending or pulling to the extracted part of a cable.
- When attaching the sensor head connection cable to this product, do not apply force to the product.
- Only one joint (optional) can be installed to one sensor head.
- If the Low measuring force type(**HG-S1010R/HG-S1110R**) is mounted in a lateral position and used with a roller-type probe (**HG-SS40U**, optional), the joint (optional) cannot be used.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Do not use this sensor in places where it may come in contact with corrosive gas, etc.
- Ensure that the product does not come into contact with organic solvents such as thinner.
- Ensure that the product does not come into contact with strong acid or alkaline.
- Ensure that the product does not come into contact with oil or grease.
- This product cannot be used in an environment containing flammable or explosive gases.
- Performance may not be satisfactory in a strong electromagnetic field.
- This product is a precision device. Do not drop or otherwise subject to shock. Risk of product damage.
- Do not allow excessive horizontal force to be applied to the spindle. This may cause reduced accuracy and durability.
- The standard rubber bellows is a consumable part. Replace it regularly as a preventive maintenance.The rubber bellows can deteriorate quickly depending on usage environment. If it deteriorates, it generates cracks and other problems, causing dust and water to enter and resulting in a malfunction.
- Never remove the standard rubber bellows except for replacement.
Risk of product damage due to infiltration by dust, water, or other contaminants.
- When the product becomes unusable or unneeded, dispose of the product appropriately as industrial waste.
- Never attempt to disassemble, repair, or modify the product.
- Note that the time it takes for the spindle to return to the bottom dead center may be delayed depending on the mounting orientation, spindle pressing depth, and holding time.

## 7 MAINTENANCE

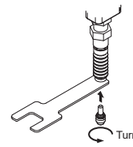
### How to replace the probe

- Always secure the spindle to prevent rotation before replacing the probe. Risk of product damage if an excessive torque (0.2N·m or more) is applied to the spindle.
- If the rubber bellows is damaged or deformed during probe replacement, the specifications of the protective structure may not be satisfied.

***1.*** Turn the probe screw in the direction of the arrow and remove the probe from the spindle. When turning the probe screw, hold the cut face of the spindle with the provided sensor head fastening wrench to prevent the spindle from turning.
Hold the sensor head fastening wrench in place, and turn only the probe.




***2.*** Attach the new probe to the spindle. The tightening torque should be 0.4N·m or less. Make sure that the probe does not come OFF.
When turning the probe screw, hold the cut face of the spindle with the provided sensor head fastening wrench to prevent the spindle from turning.
Hold the sensor head fastening wrench in place, and turn only the probe.

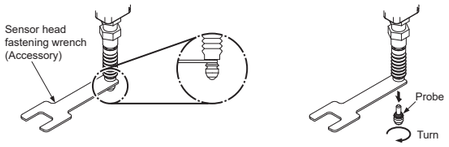



***3.*** After attaching the probe, wipe the spindle with absolute alcohol to remove any dirt.

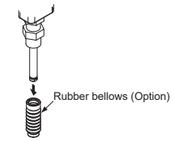
### How to replace the rubber bellows

- When replacing the rubber bellows, take care that no dirt or other contaminants get on the spindle. Risk of malfunctioning. If any dirt gets on the spindle, wipe clean with absolute alcohol. Do not allow the rubber bellows to become twisted during attachment.
- Note that the measuring force will vary depending on the attachment state of the rubber bellows.
- If the rubber bellows is deformed, a load will occur when the spindle operates and damage may result.

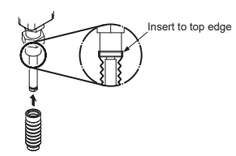
***1.*** Turn the probe screw in the direction of the arrow and remove the probe from the spindle. When turning the probe screw, hold the cut face of the spindle with the provided sensor head fastening wrench to prevent the spindle from turning.
Hold the sensor head fastening wrench in place, and turn only the probe.



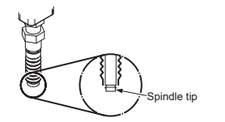

***2.*** Remove the rubber bellows from the spindle.



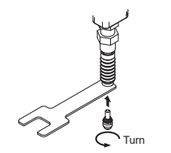

***3.*** Fit the new rubber bellows onto the spindle.
Insert to the top edge of the spindle as shown at right.



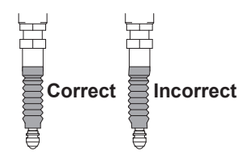

***4.*** Push the rubber bellows up with your finger until the tip of the spindle is exposed as shown at right.




***5.*** Attach the probe to the spindle. The tightening torque should be 0.4N·m or less. Make sure that the probe does not come OFF.
When turning the probe screw, hold the cut face of the spindle with the provided sensor head fastening wrench to prevent the spindle from turning.
Hold the sensor head fastening wrench in place, and turn only the probe.




***6.*** Make sure that the rubber bellows has not become deformed as shown at right.
If the rubber bellows is deformed, restore the normal shape by rotating the bellows or otherwise.





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