Panasonic® **INSTRUCTION MANUAL**

Transmission-Type Digital Displacement Sensor / Sensor Head HG-T1010

CMJE-HGT1010 No.0075-72V

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 product inspects (judges / measures) objects. Do not use it to ensure safety, such as preventing accidents that will affect human life or property.
- The laser light is dangerous. Do not look at or touch direct laser light or reflected laser light.

This document provides a brief summary of mounting and other related information. For detailed information, refer to the "**HG-T Series User's Manual**" (**our Website: https://panasonic.net/id/pidsx/global**).

1 STANDARDS AND REGULATIONS

- This product conforms to the standards and regulations below.

<European Directives>
EMC Directive

2 CONTENTS OF PACKAGE

☐ Sensor Head (Emitter, Receiver) 1 pc.
☐ Instruction Manual (English / Japanese, Chinese / Korean) 1 pc. each
☐ General Information for Safety, Compliance, and Instructions (23 languages) 1 pc.

3 FOR SAFE USE OF LASER PRODUCTS

IEC / JIS / GB

- In order to prevent user injury caused by a laser product, the following standards have been established in the IEC, JIS and GB standards.

IEC: IEC 60825-1-2014
JIS: JIS C 6802-2014
GB: GB 7247.1-2012

These standards classify laser products by level of laser hazard, and specify safety preventive measures to be implemented for each class.
This product is equivalent to a "**Class 1 Laser Product**" based on JIS C 6802-2014 "Radiation Safety Standards for Class 1 Laser Products".

- **Explanation of hazard levels**

Classification	Summary of hazard evaluation
Class 1	A laser that is safe when operated under operating conditions that can be reasonably foreseen.

- The following label is affixed to the side of this product based on the safety standards for laser products.
- **Warning label**

Emitter side

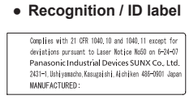
<Label position>

FDA

- **Export to the USA.**

When included in equipment for export to the USA, the product is subject to the regulations of the laser standards of the FDA (Food and Drug Administration). In order to prevent user injury caused by a laser product, Part 1040 (Performance Standards for Light-Emitting Products) of the FDA standards has been established. These standards classify laser products by level of laser hazard, and specify safety preventive measures to be implemented for each class.
This product is based on the FDA Standard(FDA 21 CFR 1040. 10 and 1040.11), according to Laser Notice No. 50.(**Class 1 Laser Product**)
The following label is affixed to this product based on FDA rules.

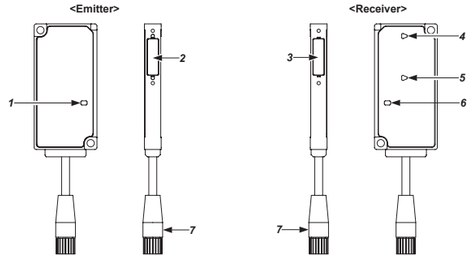
- **Recognition / ID label**



<Label position>

Emitter side

4 DESCRIPTION OF PARTS



	Name	Function
1	Laser emission indicator (Green)	Lights while laser light is emitted.
2	Light-emitting face	Face that emits the laser.
3	Light-receiving face	Face that receives the laser.
4	Beam alignment indicator / TOP (Orange / Green)	• Lights green: Beam is aligned. (Note 1) • OFF: Laser light is not received. (Note 1) • Blinks green: Beam is aligned, but the light received is faint. (Note 2) • Lights orange: Beam is aligned, but light received is intense due to stray light or otherwise. (Note 2) • Blinks orange: Beam is aligned, but partially blocked due to an obstacle or otherwise. (Note 2)
5	Beam alignment indicator / BOTTOM (Orange / Green)	
6	Judgment output indicator (Orange / Green)	• Lights green: Controller judgment output is within the set range. • Lights orange: Controller judgment output is outside the set range. • OFF: Beam alignment function is in use.
7	Sensor head connection cable connector	Connects to the sensor head connection cable.

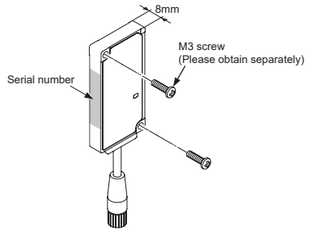
Notes: 1) For details on beam alignment, refer to "**6 BEAM ALIGNMENT AND REFERENCE WAVEFORM REGISTRATION**".
2) For detailed information on beam states, refer to the **"HG-T Series User's Manual" (our Website: https://panasonic.net/id/pidsx/global)**.

5 MOUNTING

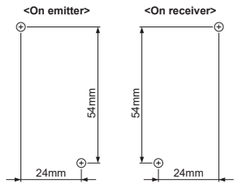
- **Mounting the sensor head**

- Do not allow contaminants that will refract light such as water, oil or fingerprints, or contaminants that will block light such as dust or dirt, to collect on the light-emitting and light-receiving faces of the sensor head If there is dirt or other contamination on a surface, wipe with lens paper or a soft cloth that will not leave lint or dust. If there is significant dirt, wipe with a cotton swap or other material that has been moistened with absolute alcohol.
- A serial number is indicated on the reverse sides of the light-emitting and light-receiving faces of the product. Always combine an emitter and receiver with identical serial numbers.

- Use M3 screws (obtain separately) to mount the product.
Tighten to a torque of 0.5N·m or less.



Mounting hole dimensions



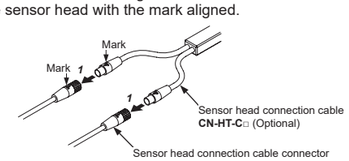
The mounting holes in the emitter and receiver are bilaterally symmetric.

- Attaching the sensor head and Sensor Head Connection Cable **CN-HT-C**□ (optional)

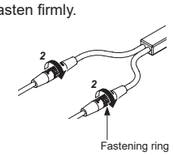
- Always use Sensor Head Connection Cable **CN-HT-C**□ (optional) to connect the product to the controller.
- If the sensor head connection cable is connected to the controller, always turn off the controller power before inserting or removing the connectors.
- Do not grasp the cable to pull out or insert the connectors. Wires may break if excessive stress is applied to the cable.
- After inserting the connectors, verify that both are attached firmly. If loose, a connector may fall out and cause an error.
- The sensor head connection cable branches into two cables. The cables are identical and can be connected to either the emitter or receiver

Mounting procedure

1. Insert the sensor head connecting cable to the sensor head connection cable connector of the sensor head with the mark aligned.

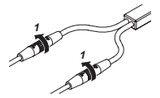


2. Turn the fastening ring on each sensor head connection cable connector in the direction of the arrow to fasten firmly.

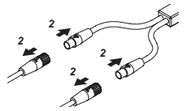


Removal procedure

1. Turn the fastening ring on each sensor head connection cable connector in the direction of the arrow to loosen.



2. Grasp each connector on the sensor head connection cable and pull out to remove.



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.

6 BEAM ALIGNMENT AND REFERENCE WAVEFORM REGISTRATION

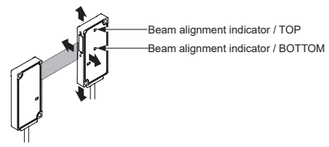
- When installing the product, always register a reference waveform. If a reference waveform is not registered, correct measurement will not be possible.
- Register the reference waveform without a measurement object.
- When detecting a measurement object with a regular reflection component such as glass or a mirror surface, reflected light from the measurement object may prevent correct detection. In this event, mount the emitter and receiver pair at an angle so that the reflected light does not enter the emitter or reflector. After adjusting the angle, always perform beam alignment.

<Beam alignment>

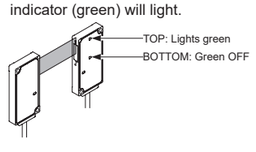
- Check the beam alignment indicator (orange / green) on the receiver as you align the beam.
- You can also check the state of the emitter / receiver beam on the digital display of the controller.

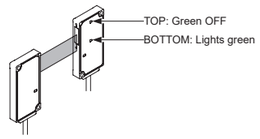
Alignment procedure

1. Move the receiver to align the beam while checking the beam alignment indicator (orange / green) on the receiver.
If the laser is not incident on the receiver, the beam alignment indicator will not light.

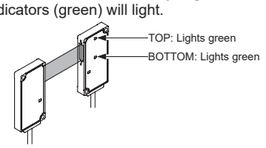


2. If the beam is skewed toward the TOP, only the TOP beam alignment indicator (green) will light.
If the beam is skewed toward the BOTTOM, only the BOTTOM beam alignment indicator (green) will light.





3. When the emitter / receiver beam is correctly aligned, both the TOP and BOTTOM beam alignment indicators (green) will light.



<Reference waveform registration>

- You can perform reference waveform registration by pressing the ENTER key on the controller with the beam correctly aligned. The reference waveform is stored in EEPROM in the receiver.

Note: For detailed information on beam alignment and waveform registration, refer to the **"HG-T Series User's Manual" (our Website: https://panasonic.net/id/pidsx/global)**.

7 CAUTIONS

The **HG-T**□ Sensor Head is designed to be used in combination with an **HG-TC**□ Controller. If used with a separately purchased dedicated controller, the specifications will not be met and product malfunctioning or damage may occur.

- This product has been developed / manufactured for industrial use only.
- The receiver in this product uses an EEPROM. The EEPROM has a service life of one million setting operations.
- 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.
- To ensure performance, do not use the product after turning ON the power until it has warmed up for at least 30 minutes.
- Do not wire in parallel with a high-voltage line or power line, or run through the same conduit. Risk of malfunctioning due to induction.
- Do not apply stress such as excessive bending or pulling to the extracted part of a cable.
- Do not touch or allow any foreign objects to enter the terminal inside the connector.
- Do not allow ambient light such as sunlight to directly enter the sensor head receiver. When precision is particularly required, take measures such as attaching a shield to the sensor head.
- Avoid use in a location subject to sudden temperature changes that cause condensation.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Do not use in a location where there are corrosive or other harmful gases.
- 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.
- The product cannot be used in an environment that contains flammable or explosive gases.
- Performance may not be satisfactory in a strong electromagnetic field.
- Do not use the product in a location subject to intense vibration or shock.
- The connectors are not structurally dustproof, waterproof, or corrosion-resistant. Do not use the product underwater or in the rain. Take care of the usage environment.
- This product is a precision device. Do not drop or otherwise subject to shock. Risk of product damage.
- Never attempt to disassemble, repair, or modify the product.
- When the product becomes unusable or unneeded, dispose of the product appropriately as industrial waste.

8 SPECIFICATIONS

Type	Measurement width:10mm / standard type
Model No.	**HG-T1010**
Combined controller	**HG-TC**□
Position detection method	CMOS method
Installation distance	0 to 500mm
Measurement width	10mm
Light source	Red semiconductor laser Class 1 [JIS / IEC / GB / FDA (Note 1)] Maximum output: 0.3mW, Peak emission wavelength: 655nm
Repeatability (Note 2)	1μm (at an installation distance of 20mm) 2.5μm (at an installation distance of 100mm) 5μm (at an installation distance of 500mm)
Linearity (Note 3)	±0.12% F.S. (at an installation distance of 20mm) ±0.28% F.S. (at an installation distance of 100mm)
Minimum sensing object (Note 4)	ø0.5mm (at an installation distance of 500mm)
Temperature characteristic (Note 5)	±0.03% F.S./°C
Protection	IP67 (IEC) (excluding the connector)
Pollution degree	2
Ambient temperature	-10 to +45°C (No condensation or icing), Storage: -20 to +60°C
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH
Ambient illuminance	Incandescent light: 5,000lx at the light-receiving face (Note 6)
Operating altitude	2,000m or less (Note 7)
Grounding method	Capacitor grounding
Material	Case: Aluminum die-casting, Light emitting / receiving faces: Glass
Cable	Attached 0.2m shielded cable with 4-conductor type, round connector
Weight	Emitter : 30 g approx., Receiver : 30 g approx.

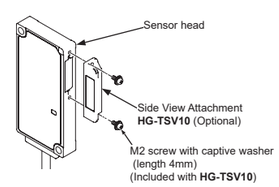
Specification figures are based on the digital measurement values obtained with a sensor combined with an **HG-TC**□ controller.They were measured under the following condition unless otherwise specified.
- Ambient temperature : +20°C
- Average controller count setting: 16 times
- Measurement object : Opaque knife edge
- Measurement object position condition: Light half-blocked at the center of 100-mm installation distance

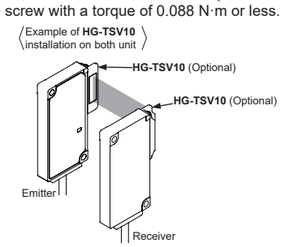
Notes: 1) This is based on the FDA Standard, according to Laser Notice No. 50 of the FDA Standard.
2) P-P value of deviations in digital measurements obtained with light half-blocked at the center of installation distance
3) Indicates the error from the ideal line formed by digital measurements.
4) When light is light blocked at the center of 500-mm installation distance.
5) When light is light half-blocked at the center of 100-mm installation distance.
6) When the sampling cycle of the controller is set to "Standard Sampling". For detailed information, refer to the **"HG-T Series User's Manual"** (**our Website: https://panasonic.net/id/pidsx/global**).
7) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0m.

9 SIDE VIEW ATTACHMENT (OPTIONAL)

- When attaching the Side View Attachment to the emitter, make sure that beam alignment can be performed.
- After mounting the Side View Attachment to the sensor head, check whether the beam axis of the sensor head is aligned. After checking the beam axis, register the reference waveform and conduct operation check.

- By attaching the Side View Attachment **HG-TSV10** (optional) to the product, you can change the laser light emission direction.
- To attach the HG - TSV 10 to the product, use the included setscrew (M2 screw with washer, length: 4 mm). Tighten the screw with a torque of 0.088 N·m or less.





Notes: 1) **HG-TSV10** is sold individually. Two **HG-TSV10** units are required when installing to both emitter and receiver.

- Specifications

Model No.	**HG-TSV10**
Combined sensor head	**HG-T1010** (Note 1)
Installation distance	0 to 100mm (typical)
Linearity (Note2)	±56μm (typical)
Material	Main unit: LCP, optical surface: glass
Accessory	Set screw (M2 screw with washer, length: 4 mm): 2 pcs.
Weight	Approx. 2g

Notes: 1) Cannot be attached to the sensor head **HG-T1110** (measurement width:10mm / slim type).
Notes: 2) Measured at an installation distance of 100mm.

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