Panasonic® INSTALLATION INSTRUCTIONS

Long range laser distance sensor
HG-F13A-A-□

MJE-HGF1 No.0089-59V

Thank you for purchasing a Panasonic product.
Read this Installation Instructions Manual carefully and follow them to install the product correctly and safely.
Keep this manual in a safe location for reference whenever necessary.

In this Installation Instructions Manual, safety precautions are classified into "⚠ WARNING" depending on the level of hazard.

⚠WARNING	Indicates that there is a risk of death or serious injury

⚠WARNING

🚫	Do not use this product as a sensing device for personal protection. Using this product as a sensing device for personal protection will result in death or serious injury.
❗	For sensing devices for personal protection, use products that conform to the laws and standards related to personal protection in each country, such as OSHA, ANSI, and IEC.
🚫	This product is intended to be used to detect target objects and is not provided with control functions that prevent accidents to ensure safety.
🚫	Avoid observing beams in dark surroundings.
🚫	Do not look at beams using an optical device such as an optical telephoto system.
🚫	Never attempt to disassemble, repair, or modify this product.
❗	Control or adjustment according to procedures other than those provided in this Installation Instructions Manual and the separate User's Manual may cause exposure to hazardous emitted laser beams.

This manual provides a simple summary of installation procedures, etc.
For details, refer to the **HG-F1** Series User's Manual
(our website: https://industrial.panasonic.com/ac/e/dl_center/manual/).

1 REGULATIONS AND STANDARDS

● This product conforms to the standards and regulations 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
USA Regulation : FDA21 CFR 1040.10 and 1040.11 (Laser Notice No.56)
<Conforming Standards>
USA / Canada Standards : UL 61010-1, CAN/CSA No.61010-1
Other Standards   : IEC 60825-1, JIS C 6802, GB 7247.1,
                        KS C IEC 60825-1

Note: When using this product, be sure to check and comply with the regulations and standards applicable in the country or region where the product is used.
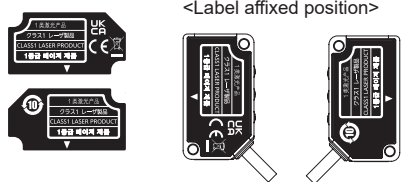
2 SAFE USE OF LASER PRODUCT

IEC / JIS / GB / KS

● To prevent laser products from affecting their users, IEC, JIS, GB, and KS have respective standards.
These standards classify laser products into classes according to the hazard level of laser, and prescribe safety and preventive measures that should be implemented for each class.
This product belongs to "**Class 1 laser product**" according to IEC 60825-1(JIS C 6802, GB 7247.1. KS C IEC 60825-1) "Radiation Safety of 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.

Note: Pay attention to safety since hazardous laser beams may be emitted in the event of an unexpected failure.

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

● Warning label

<Label affixed position>

FDA

● Exporting to the USA

If this product is incorporated into facilities or equipment to be exported to the USA, it is subject to the laser regulations of the U.S. Food and Drug Administration (FDA). To prevent laser products from affecting their users, PART1040 (Performance Standards for Light-Emitting Products) was established as one of the FDA regulations. These standards classify laser products into classes according to the hazard level of laser and prescribe safety and preventive measures that should be implemented for each class.
This product complies with the FDA regulations (FDA 21 CFR 1040.10 and 1040.11) in accordance with FDA Laser Notice No. 56, except for complying with IEC 60825-1 Ed. 3. (**Class 1 Laser Product**)
When exporting this product to the USA, affix the FDA certificate / identification label near the end of the cable.
For details on standards, refer to the **HG-F1 Series User's Manual**
(our website: https://industrial.panasonic.com/ac/e/dl_center/manual/).

● FDA certificate / identification label

<Label affixed position>
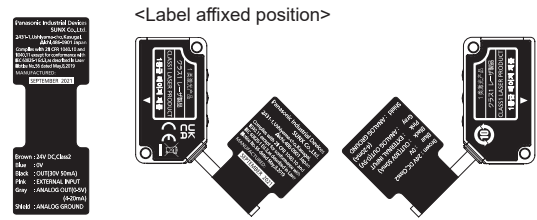
3 CAUTIONS

Specifications

● This product has been developed / produced for industrial use only.
● Do not use this product outside the range of the specifications. Doing so will cause an accident or product failure. There is also a risk of a noticeable reduction of service life.
● There is a certain deviation in the directionality of this product. When using this product, install the product using a mounting bracket or similar fitting to allow the adjustment of beam axis.
● The internal memory (non-volatile memory) of this product has a service life. Settings cannot be configured more than one million times.
● Leaked light exists around the detection point, and if an object with high reflectance is present around the detection point, this product may be affected by that.
● If a regular reflection light enters the beam receiving window, proper measurement may not be possible. If the reflectance of the detected object is high, carefully select the installation location.

Power Supply

● Verify that the supply voltage fluctuations are within the rating when using the product. Note that applying a voltage greater than the rated voltage or directly applying AC power will cause damage or burning.
● To ensure performance, use the product at least 30 minutes (warm-up time) after the power is turned ON.
● 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.
● Make sure that the power supply input satisfies the following items.
  1) The power supply unit must be certified for use in your region.
  2) The power supply unit must have an output holding time of 20 ms or more.
  3) The power supply unit must have the rated output voltage of 24 V DC± 10% and the ripple (P-P) of 10% or less.
  4) The power supply unit must provide SELV (safety extra low voltage) or PELV (protective extra low voltage) confirming to the EMC Directive if the CE marking compliance is required.
  5) The power supply unit must provide SELV (safety extra low voltage) or PELV (protective extra low voltage) confirming to the EMC Regulations if the UKCA marking compliance is required.
  6) The power supply unit must support Class 2 if cTÜVus marking compliance is required.
● If surges occur, take countermeasures such as connecting a surge absorber to the source of the surges.

Wiring

● Before wiring work always turn the power OFF.
● Do not wire in parallel with a high-voltage line or power line, or run through the same conduit. Doing so may result in malfunctioning due to induction.
● Arrange the load to ensure that a current of 50 mA or higher does not flow to the control output line. Also avoid incorrect wiring such as polarity connection error of the power supply. Failure to do so will cause damage or burning.
● The overall length of the cable can be extended to 10m maximum with a cable size of 0.3 mm^2 or more. Use a shielded cable to extend the analog line.
● Do not apply stress such as excessive bending or pulling to the extracted part of a cable.

Usage Environment

● This product is suitable for indoor use only.
● Do not install the sensor in the following locations.
  • Locations subject to flammable gas, corrosive gas, or excessive dust
  • Locations subject to dust, metal particles, or saline matter
  • Locations subject to benzine, paint thinner, alcohol or other organic solvents or strong alkaline solutions such as ammonia or caustic soda
  • Locations subject to severe vibration or shock
  • Locations subject to direct sunlight
  • Locations subject to water, oil, or chemicals
  • Locations where load is applied to the sensor
● Avoid using this product in environments where condensation occurs due to sudden temperature change.
● Performance may not be satisfactory in a strong electromagnetic field.
● Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance, although it depends on the type.
● Keep the light emitting and receiving windows of this product clean and free of water, oil, fingerprints, and other substances that refract light as well as dust, grit, and other objects that intercept light. When cleaning the surfaces, wipe off contaminants with a lint-free soft cloth or lens cleaning paper.
● Make sure to turn OFF the power supply before cleaning the light emitting and receiving windows of this product.
● This product is a precision device. Do not drop or otherwise subject to shock. Doing so will cause product failure.
● If a background object is present at the specific region shown below, a distance different from the actual distance may be displayed owing to the sensing principle. Please check actual operation in the actual usage environment.
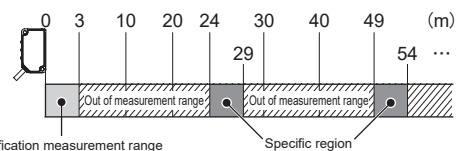
If there is any object in the specific region, block the laser beam within the range of less than 24 m.

Other Matters

● When this device becomes inoperable or unnecessary, dispose of the product properly as industrial waste by abiding by the applicable law in the country.

4 BEFORE USING THIS PRODUCT

Contents of Package

☐ Sensor — 1 pc.
☐ FDA certificate / identification label — 1 pc.
☐ Installation Instructions Manual (English / Japanese, Chinese / Korean) — 1 pc.each
☐ General Information for Safety, Compliance, and Instructions — 1 pc.

Optional Items

● Simple mounting bracket **MS-HG-01** (optional)

Surrounding Environment

● Operating ambient temperature: -10 to +45 °C (No icing allowed)
● Operating ambient humidity: 35 to 85 % RH (No dew condensation allowed)
● Operating ambient illuminance: Incandescent lamp: Light receiving surface illuminance of 3,000 ℓx or less
● Operating altitude: 2,000 m or less (Note)
● Degree of pollution: 2

Note: Do not use or store this product in environments where ambient air is pressurized to an air pressure higher than the atmospheric pressure at an altitude of 0 m.
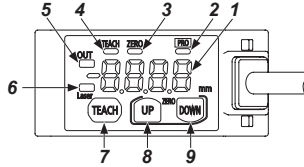
5 DESCRIPTION OF PARTS

■ Sensor Unit

■ Operation and Display Section
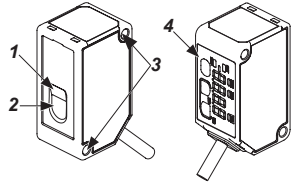
	Name
1	Beam emitting part (laser opening)
2	Beam receiving part
3	Mounting hole
4	Operation and display section

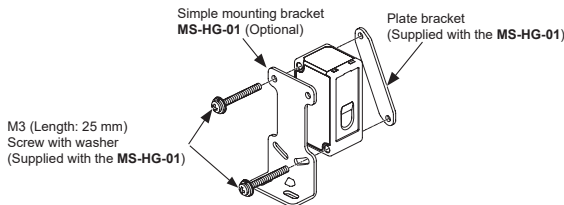|	Name
1	Digital display (Red)
2	PRO indicator (Yellow)
3	Zero set indicator (Yellow)
4	Teaching indicator (Yellow)
5	Output operation indicator (Orange)
6	Laser emission indicator (Green)
7	TEACH key
8	UP key
9	DOWN key

6 MOUNTING AND WIRING

Mounting Method

● When mounting this product, use M3 screws (prepare separately).
Use a tightening torque of 0.5 N·m or less for mounting.

M3 (Length: 25 mm) Screw with washer

(Mounting hole spacing)
37 mm
18 mm
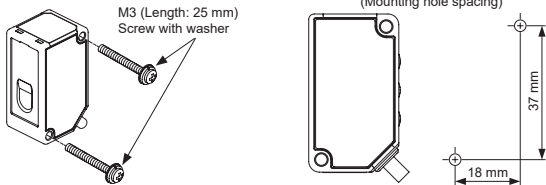
● When using multiple sensors, mount them so that emitted laser spot beams do not directly enter the beam receiving parts of sensors other than the beam-emitting sensor to avoid mutual interference. Also, mount them so that spot beams projected onto the workpiece do not overlap with the spot beams of other sensors.
● Do not mount the sensors closely side by side to prevent the temperature of the sensors from rising to more than the specified point due to heat generation.
● To prevent screws from loosening and falling, take a measure to prevent loosening of screws, such as use of screw and washer assemblies, depending on usage conditions.
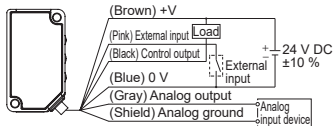
● Use the tightening torque of 0.5 N·m or less even when using the simple mounting bracket **MS-HG-01** (optional).
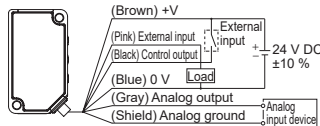

Simple mounting bracket **MS-HG-01** (Optional)
Plate bracket (Supplied with the **MS-HG-01**)
M3 (Length: 25 mm) Screw with washer (Supplied with the **MS-HG-01**)

Wiring Method

<When using the NPN output type>
HG-F13A-A-N

(Brown) +V
(Pink) External input
(Black) Control output
(Blue) 0 V
(Gray) Analog output
(Shield) Analog ground
Load
External input
24 V DC ±10 %
Analog input device

<When using the PNP output type>
HG-F13A-A-P

(Brown) +V
(Pink) External input
(Black) Control output
(Blue) 0 V
(Gray) Analog output
(Shield) Analog ground
External input
Load
24 V DC ±10 %
Analog input device

Note: Insulate unused terminals to avoid error input or short circuit.

How to Check Emitted Beam Spot

● This product provides the **Emitted beam spot check mode** in which the place irradiated with laser spot beams can be checked readily. When the product is in this mode, the spot beam is brighter and flashed.
Follow the procedure below to set to the **Emitted beam spot check mode** and adjust the workpiece position.

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1. After turning on the power supply, make sure that the following measurement display is displayed and then press and hold the UP key for three seconds or longer. The display changes to the **Emitted beam spot check mode**.

<Measurement display>   < Emitted beam spot check mode display>

Hold down for 3 seconds
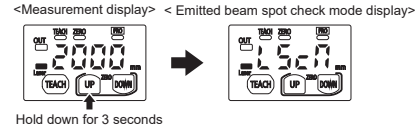
2. Spot beam is emitted from this product in a one second cycle. Check the spot beam and adjust the beam axis while moving the sensor.
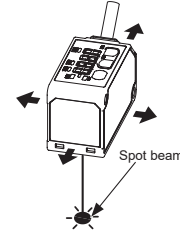
Spot beam

● When the **Emitted beam spot check mode** is used, sensing objects cannot be measured.
● By holding down the UP key for three seconds or longer while the **Emitted beam spot check mode** is used, you can deactivate the **Emitted beam spot check mode**.
● The display automatically returns to the measurement display when two minutes elapses after the sensor is set to the **Emitted beam spot check mode**. Press and hold the UP key for three seconds or longer again to continuously adjust the beam axis to set to the **Emitted beam spot check mode**.

7 LIST OF SETTING ITEMS

● The items that can be set with this product are as follows. For various setting methods, refer to the **HG-F1** Series User's Manual (our website: https://industrial.panasonic.com/ac/e/dl_center/manual/).

	Item	Function
	Emitted beam spot check mode	In this mode, you can readily check if laser spot beams are applied to the workpiece.
	Teaching	This function is used to set a threshold value. You can select the teaching method in the PRO mode sensing output setting.
	Peak / bottom hold function	This function is used to display the peak value or bottom value in a certain period.
	Zero setting	This function is used to force the current measured value to "zero" (reference value).
	Key lock	This function is used to disable function key operation.
PRO mode	Response time setting	This setting is used to select the time from when the sensing state changes to when the control output changes.
	Output operation setting	This setting is used to set the control output state for the light-ON state or the dark-ON state.
	Sensing output setting	This setting is used to select the operation mode for control output from the normal sensing mode and the window comparator mode.
	Analog output setting	This setting is used to select analog output from voltage output and current output.
	Analog scaling	Set optional two points at the upper limit and the lower limit to perform two-point correction before data is output in analog form.
	Hysteresis setting	Set the hysteresis value.
	Shift amount setting	Set a shift amount for performing teaching.
	External input setting	This setting is used to select the external input operation from zero setting, teaching, and beam emission stop.
	Timer setting	This setting is used to select the timer operation from off delay, on delay, and one shot.
	Timer time setting	Set the timer time.
	Hold setting	Set the digital display, the control output, and the analog output operation when a measurement error occurs.
	ECO setting	The digital display can be set to go OFF when key operation is not performed for 30 seconds.
	Reset setting	Setting is reset to the factory default state (initial value).

8 INSPECTION METHOD

Inspect the sensor regularly to maintain performance and enable optimum use. The main inspection items are as follows:
● Has any fastener for this product become loose?
● Have any input and output terminals become loose or come off?
● Is there any crack in the cable?
● Is there any discrepancy in position between the beam spot and the specified place?
● Is the supplied power within the rated voltage range (24 V DC ±10 %)?
● Is the operating ambient temperature within the specified range (-10 to +45 °C)?
● Is the operating ambient humidity within the specified range (35 to 85 % RH)?
● Are the light emitting and receiving windows of this product contaminated with dirt or foreign matter?

9 ERROR DISPLAY

● In case of errors, take the following measures.

Error code	Description	Remedy
Er01	Abnormal, damaged, or end-of-life internal memory	• Turn the power OFF and then ON, and enable the reset setting in setting items (initialization of this product). • If the sensor does not recover even after the above action is taken, consult your Panasonic representative.
Er11	Control output load has short-circuited and excessive current is flowing.	Turn OFF the power and check the load.
Er31	When the zero setting is enabled, the measurement is not performed normally.	Check if the sensing distance to be set is within the specification range.
Er41	During teaching, the measurement is not performed normally.	Check if the sensing distance to be set is within the specification range.
Er51	Abnormality in the beam emitting window or beam receiving window	Turn the power OFF and then ON. If the sensor does not recover even after being turned back on, consult your Panasonic representative.
Er90 Er91 Er92 Er93 Er94 Er95 Er96	System error	The product could be faulty. Please consult your Panasonic representative.