#### Panasonic<sup>®</sup> **INSTRUCTION MANUAL**

### Micro Laser Distance Sensor [CMOS] **HG-C Series**

ME-HGC1000 No.0092-08V

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**

- This product is for the sensing (determination and measurement) of objects. Do not use this product to secure safety, such as accident prevention which may affect human life and property.
- Do not stare directly into the laser beam, or through observation optical equipment, such as lenses or etc. as it is dangerous.

### 1 REGULATIONS AND STANDARDS

• This product conforms to the regulations and standards below.

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

- Applicable Standards

EN 61000-6-4, EN 61000-6-2 <Standards in US / Canada>

CAN/CSA-C22.2 NO. 60947-5-2-14



### **2 CONFIRMATION OF PACKED CONTENTS**

□Sensor	1 pc.
☐ Laser warning label (JIS Standards, GB Standard)	1 set each
☐ FDA certification label	1 pc.
☐ Instruction Manual (Japanese, English, Korean)	1 pc. each language
General Information for Safety, Compliance, and Instructions	1 pc.

### 3 SAFE USE OF LASER PRODUCT

• For the purpose of preventing any injury which may occur to the user by the use of the laser product in advance, the following standards have been established by the IEC Standards, JIS Standards, GB Standards and FDA Standards.

IEC: IEC 60825-1-2014 JIS C 6802-2014 GB 7247.1-2012 FDA: PART 1040.10

These standards classifies laser products according to the level of hazard and provide the safety measures for respective classes.

### FDA Standards Outline

Requirements	Class*1					
Requirements		lla	II	IIIa	IIIb	IV
Performance (all laser products) Protective housing [1040.10 (f) (1)] Safety interlocks [1040.10 (f) (2)] Location of controls [1040.10 (f) (7)] Viewing optics [1040.10 (f) (8)] Scanning safeguards [1040.10 (f) (9)]	R <sup>*2</sup>	R <sup>*2</sup>	R <sup>*2</sup>	R <sup>*2</sup>	R <sup>*2</sup>	R <sup>*2</sup>
	R <sup>*3,4</sup>	R <sup>*3,4</sup>	R <sup>*3,4</sup>	R <sup>*3,4</sup>	R <sup>*3,4</sup>	R <sup>*3,4</sup>
	N/A	R	R	R	R	R
	R	R	R	R	R	R
	R	R	R	R	R	R
Performance (laser system) Remote control connector [1040.10 (f) (3)] Key control [1040.10 (f) (4)] Emission indicator [1040.10 (f) (6)] Beam attenuator [1040.10 (f) (6)] Reset [1040.10 (f) (10)]	N/A N/A N/A N/A	N/A N/A N/A N/A	N/A N/A R R N/A	N/A N/A R R N/A	R R R <sup>10</sup> R N/A	R R R*10 R R*13
Performance (specific-purpose products) Medical [1040.11 (a)] Measurement, leveling, alignment [1040.11 (b)] Demonstration [1040.11 (c)]	S	S	S	S*8	S*8	S'8
	S	S	S	S	NP	NP
	S	S	S	S	S*11	S*11
Labeling (all laser products)  Certification / identification [1010.2,3]  Protective housing [1040.10 (g) (6), (7)]  Aperture [1040.10 (g) (4)]  Class warning [1040.10 (g) (1), (2), (3)]	R	R	R	R	R	R
	D <sup>*5</sup>	R*5	R*5	R*5	R*5	R*5
	N/A	N/A	R	R	R	R
	N/A	R*6	R*7	R*9	R*12	R*12
Information (all laser products) User information [1040.10 (h) (1)] Product literature [1040.10 (h) (2) (i)] Service information [1040.10 (h) (2) (ii)]	R	R	R	R	R	R
	N/A	R	R	R	R	R
	R	R	R	R	R	R

Required

N/A: Not applicable

Not applicable:
 Same as for other products of that Class. Also see footnotes:
 Not permitted:
 Depends on level of interior radiation.

Class is based on the maximum level of laser exposure during operation

Required wherever and whenever human access to laser radiation above Class I limits is not

needed for products to perform its functions.

Required for protective housings opened during operation or maintenance, if human access thus gained is not always necessary when housing is opened. The requirements for interlock differ depending on the class of inner radiation.

The contents of label differ depending on the level and wavelength of laser radiation inside

the protective housing. Warning statement label

CAUTION logotype.

The method to measure the level of laser radiation to human body is required CAUTION if 2.5 mWcm<sup>-2</sup> or less, DANGER is greater than 2.5 mWcm<sup>-2</sup>

Delay required between indication and emission

Exception should be provided for demonstration of laser products or light shows using laser of Class IIIb or IV.

DANGER logotype

Required after August 20, 1986.



WARNING label



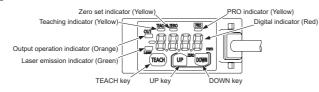


### <Label position>



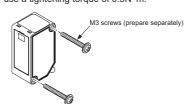
- An English warning label is attached to this product. When this product is used in Japan or China, peel off the English warning label, and attach the Japanese or Chinese warning label.
- . When exporting this product to the United States of America attach the FDA certification label to the cable close to the sensing device

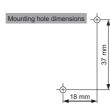
### **4 PART DESCRIPTION**



### **5 MOUNTING**

- When mounting this product, use M3 screws (prepare separately). Use a tightening torque of 0.5N·m for mounting.
- When mounting this product using the sensor mounting bracket (optional), also use a tightening torque of 0.5N·m.



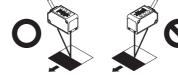


### **Mounting Direction**

. Direction to a movable body

### <When there are differences in material and color?</p>

· When performing measurements of moving objects with excessively different materials and colors mount the product per the following directions to minimize measurement errors.



### <Measurement of rotating objects>

· When measuring rotating objects. mount the product as follows. Measurement can be performed with minimized effect on the object caused by up / down deflection position deviation and etc.





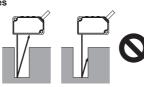
### <When there is a step>

· When there is a step in the moving object, mount the product as follows. Measurement can be performed with minimized effect from the edges of the steps.



### . Measuring of narrow locations and recesses

· When measuring in narrow locations or inside holes, mount the product so that optical path from the light emitting part to lightreceiving part is not interrupted



### . Mounting the sensor to a wall

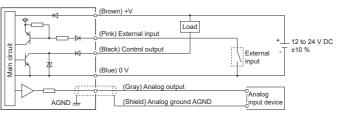
· Mount the product as follows, so that the multiple light reflections on the wall do not emit to the lightreceiving part. When the reflection factor on a wall is high, it is effective to use a dull black color



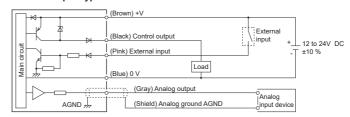


### 6 I/O CIRCUIT DIAGRAMS

### • NPN Output Type



### • PNP Output Type



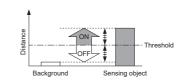
### 7 TEACHING

### 2-point teaching

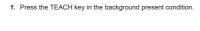
This is the basic teaching method.













2. Press the TEACH key in the sensing object present condition

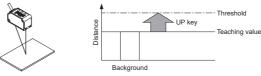


Stable sensing is possible

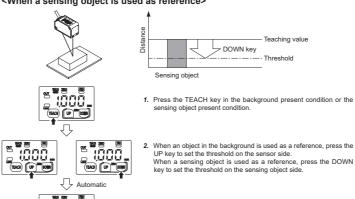


• This is teaching method in case small object or object in background are existing.

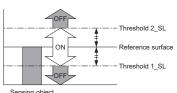
### <When an object in background is used as reference>



### <When a sensing object is used as reference>



- This is mode is used for setting the threshold range for the distance from the reference value of the sensing object, by performing 1-point teaching. This mode is used for sensing within the threshold range.
- When performing 1-point teaching (window comparator mode), preset "Window comparator mode 1" in the sensing output setting of the PRO mode. For the setting method, refer to " PRO MODE SETTING."



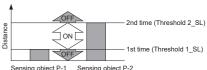


1. Press the TEACH key twice in the sensing object present condition (1st time: TEACH mode, 2nd time: Teaching)



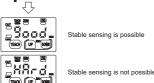
### 2-point teaching (Window comparator mode)

- This is method to set the threshold range by conducting the 2-point teaching. When performing 2-point teaching (window comparator mode), preset "Window
- comparator mode 2" in the sensing output setting of the PRO mode For the setting, refer to " PRO MODE SETTING.
- When conducting teaching, use sensing objects (P-1 and P-2) whose distance are different from each other.



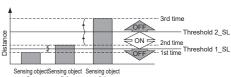






# 3-point teaching (Window comparator mode)

- This is the method to perform 3-point teaching (P-1, P-2, P-3) and to set the threshold range by setting threshold 1\_SL in the mid-point between the 1st time and 2nd time, and threshold 2 SL in the mid-point between the 2nd time and 3rd time as shown in the following figure.
- When performing 3-point teaching (window comparator mode), preset "Window comparator mode 3" in the sensing output setting of the PRO mode.
- For the setting, refer to "PRO MODE SETTING."
- When performing teaching, use sensing objects (P-1, P-2, P-3) with different distance • After teaching, P-1, P-2 and P-3 will be automatically rearranged from the smaller value.







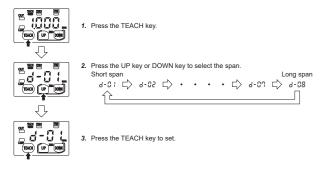


Stable sensing is not possibl

Stable sensing is possible

### Span adjustment in rising differential mode or trailing differential mode

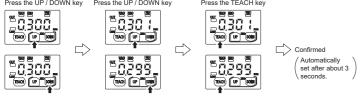
- This mode is used to cancel the gradual changes in the measured value, and to only detect sudden changes.
- When performing rising differential mode or trailing differential mode, preset "Rising differential mode" or "Trailing differential mode" in the sensing output setting of the PRO mode. For the setting method, refer to "P PRO MODE SETTING."
- The threshold can be set by using the threshold value fine adjustment function For the threshold value fine adjustment function, refer to " THRESHOLD VAL-**UE FINE ADJUSTMENT FUNCTION.**



### 8 THRESHOLD VALUE FINE ADJUSTMENT FUNCTION

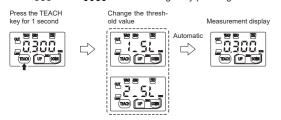
- Fine adjustment of the threshold can be performed in the measurement display.
- Fine adjustment of the threshold can be performed even after teaching.

### <Normal sensing mode, rising differential mode or trailing differential mode>

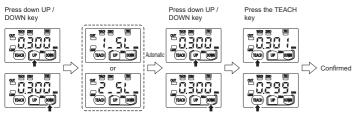


### <Window comparator mode>

• When the sensing output is set to window comparator mode, the display of " 1.51 " and " 2.51 " can be changed by pressing the TEACH key for 1 second.



• When performing a fine adjustment of the threshold of " ; 5; " or 2,5; ", press the UP key or DOWN key. After " 1.51 " or " 2.51 " is displayed, the fine adjustment of the threshold can be performed.

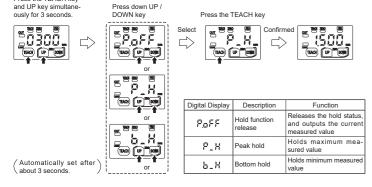


### (Automatically set after about 3 seconds.)

### 9 PEAK / BOTTOM HOLD FUNCTION

Press the TEACH key

The peak / bottom hold function, is for displaying the peak value and bottom value.
When the zero set function is executed while the peak / bottom hold function is set to "Peak hold" or "Bottom hold", the held measured value will be reset.



### **10 ZERO SET FUNCTION**

- The zero set function is the function to compulsorily set the measured value to "zero"
- The zero set indicator (yellow) will turn ON when the zero set is valid.
- When the zero set function is executed while the peak / bottom hold function is valid, the held measured value will be reset.
- When the display setting is set to Offset, the zero set function cannot be set.

### <Zero set setting>

Press the LIP key and DOWN key



#### <Zero set release>

Press the UP key and DOWN key



• The setting or releasing of the zero set from an external input operates as in the following figure.



- When the power is turned ON again, zero set from external input can be released. At this time, the zero set will not be saved.
- Even when the zero set is set in the sensor, the zero set can be set or released from an external input. However, when the power is turned ON again, the zero set set in the sensor will be displayed.

### **11** KEY LOCK FUNCTION

- . The key lock function is to prevent acceptance of key operations, so that the conditions set in each setting mode are not changed accidentally
- When key operation is performed after the key lock is set, "Loc" will be displayed. on the digital display.

### <Key lock setting>

Press the TEACH key and DOWN



### <Key lock release>

Press the TEACH key and DOWN









### **12 PRO MODE SETTING**

# PRO indicator (Yellow)





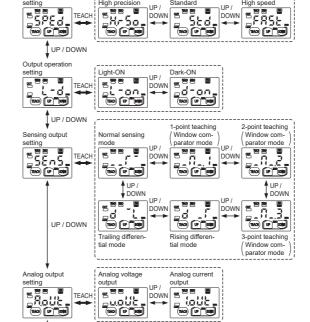
### → : Press UP key or DOWN key → : Press DOWN kev

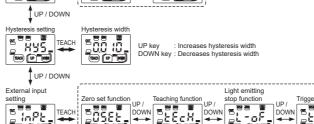
# ned) \underset \

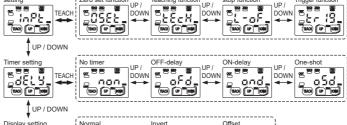
### • The PRO indicator (yellow) will turn ON when the PRO mode is set. • When the DOWN key is pressed for 3 seconds or more in the middle of the PRO MODE setting, the display returns to the measurement display.

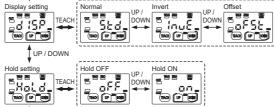
Item	Default setting	Description		
Response speed setting	X-50	Set the response time.  " Mr 5a": High precision 10ms, " 5bd": Standard 5ms " FR5b": High speed 1.5ms		
Output operation setting	L-on	Select the control output operation mode. "¿-on": Light-ON, "d-on": Dark-ON		
Sensing output setting	5-	Set the sensing output.  "f": Normal sensing mode  "_f,_f": Normal sensing (Window comparator mode)  "_f,_g": 2-point teaching (Window comparator mode)  "_f,_g": 3-point teaching (Window comparator mode)  "_f,_g": Trailing differential mode  "_g": Trailing differential mode		
Analog output setting	ადასხ	Sets the output operation of analog output setting. " ພຸດປີ દ ": Analog voltage output (0 to +5 V) " ໄດປີ ເ ": Analog current output (4 to 20 mA)		
Hysteresis setting	HG-C1030> HG-C1050> 0.0 10 10 10 10 10 10 10 10 10 10 10 10 10	Set the hysteresis width. HG-C1030: 0.001 to 5.00 mm HG-C1050: 0.01 to 15.00 mm HG-C1100: 0.02 to 35.00 mm HG-C1200: 0.1 to 80.0 mm HG-C1400: 0.2 to 200.0 mm		
External input setting	0588	Set the external input. " 35 \( \xi \) Zero set function, " \( \xi \xi \xi \) ": Teaching function " \( \xi \- \alpha \xi \): Trigger function		
Timer setting	ngn	Set the timer operation. The timer time is fixed at 5 ms.  " non": No timer, " oFd": OFF-delay timer  " ond": ON-delay timer, " o5d": One-shot timer		
Display setting	56d	The display of the measured value can be changed.  " \$\frac{1}{2} \text{ Normal, " } \frac{1}{10} \text{ E ": Invert, " } \frac{1}{0} \text{F St ": Offset}		
Hold setting	oFF	Set the control output and the analog output operation when a measurement error occurs (insufficient light intensity, saturation of light intensity, out of measurement range).  " oFF": Hold OFF, " on": Hold ON		
ECO Setting	oFF	The digital display can be set to go OFF when key operation is no performed for 30 seconds. Current consumption can be reduced.  " oFF ": ECO OFF, " on ": ECO ON		
Reset setting	no	Return to the default setting (factory setting). " ng ": Reset NG, " 985": Reset OK		

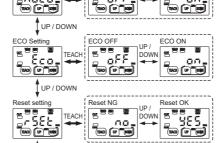












UP / DOW

### 13 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is OFF before starting the wiring. • If the wiring is performed incorrectly, it will cause a failure.
- 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.
- 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.
- If noise generating devices (switching regulators, inverter motors, etc.) are used around the sensor mounting area, make sure to connect the frame ground (FG) terminal of the device.
- . Do not use this product during the transient state when the power supply is turned ON.

- The overall length of the cable can be extended to 10 m maximum with a cable size of 0.3 mm<sup>2</sup> or more.
- · Make sure that stress by forcible bend or pulling is not applied to the sensor cable joint.
- . When wiring a sensor that is fixed in place, do not pull the cable with a force of
- Although it depends on the type, light from rapid start type or high frequency lighting type fluorescent lights, sunlight and etc. may affect the sensing, therefore make sure to prevent direct incident light.
- This product is suitable for indoor use only.
- · Keep water, oil, fingerprints and etc. which reflect light, or dust, particles or etc. which interrupts the light, away from the emitting / receiving surfaces of this product. If contaminants adhere to the surface, wipe off with a dust-free soft cloth, or lens cleaning paper.
- . Do not use the sensor in locations where there is excessive vapor, dust or etc. or in an atmosphere where corrosive gases, etc. is generated.
- Take care that the product does not come in contact with oil, grease, organic solvents such as thinner, etc., strong acid or alkaline.
- Make sure to turn OFF the power supply, before cleaning the light emitting / receiving windows of the sensor head.
- There is a certain deviation in the directionality of this product. Install the product using a mounting bracket or similar fitting to allow the adjustment of optical axis.
- The internal memory (nonvolatile) of this product has a service life. Settings cannot be configured more than 100,000 times.

### **14 ERROR INDICATION**

• In case of errors, attempt the following measures.

Error indication	Description	Remedy
<hold off=""> <hold on=""> Measured value blinks</hold></hold>	Insufficient amount of reflected light. The sensing object is out of the sensing range.	Confirm that the sensing distance is within the specification range. Adjust the installation angle of the sensor.
E-01	Flash memory is damaged or passed its life expectancy.	Please contact our office.
Er 11	Load of the sensing output is short-circuited causing an over-current to flow.	Turn OFF the power and check the load.
8-21	The semiconductor laser is damaged or passed its life expectancy.	Please contact our office.
Er31	When zero set is set, the measurement is not performed normally.     Since the display setting is set to "Offset", the zero set function can not be used.	Confirm that the sensing distance is within the specification range.     Set the display to any setting except "Offset."
E-41	During teaching, the measurement is not per- formed normally.	Confirm that the sensing distance is within the specification range.
6-83 6-85 6-8 : 6-80	System error	Please contact our office.

### 15 SPECIFICATIONS

Туре		Measurement center 30 mm type	Measurement center 50 mm type	Measurement cen- ter 100 mm type	Measurement cen- ter 200 mm type	Measurement cen- ter 400 mm type	
Model No.	NPN output	HG-C1030	HG-C1050	HG-C1100	HG-C1200	HG-C1400	
	PNP output	HG-C1030-P	HG-C1050-P	HG-C1100-P	HG-C1200-P	HG-C1400-P	
Measurement center distance		30 mm	50 mm	100 mm	200 mm	400 mm	
Measurement	range	±5 mm	±15 mm	±35 mm	±80 mm	±200 mm	
Repeatability		10 µm	30 µm	70 µm	200 μm	300 µm (measurement distance 200 to 400 mm 800 µm (measurement distance 400 to 600 mm)	
Linearity		±0.1 %F.S.			±0.2 %F.S.	±0.2 %F.S. (measurement distance 200 to 400 mm) ±0.3 %F.S. (measurement distance 400 to 600 mm)	
Temperature (	characteristic			0.03 %F.S./°C			
Light source		N.	/lax. output: 1mW	, Emission peak v	EC / GB / FDA (N vavelength: 655ni	m ´²	
Beam diamete	er (Note 3)	Approx. ø50 µm	Approx. ø70 µm	Approx. ø120 µm	Approx. ø300 µm	Approx. ø500 µm	
Supply voltag				±10 %, Ripple P			
Power consur	nption	40 mA or less (a			or less (at 12 V DC	supply voltage)	
Control output		NPN open-collector transistor  • Maximum sink current: 50 mA  • Applied voltage: 30 V DC or less (Between control output to 0V)  • Residual voltage: 1.5 V or less (At 50 mA sink current)  • Leakage current: 0.1 mA or less  • Leakage current: 0.1 mA or less					
Output ope	ration	Switchable either Light-ON or Dark-ON					
Short-circu		Incorporated (Auto reset type)					
Analog output	Analog voltage output	Output range: 0 to +5 V (at alarm: +5.2 V) Output impedance: 100 Ω					
Arialog output	Analog current output		Output range: 4 to 20 mA (at alarm: 0 mA) Load impedance: 300 Ω or less				
Response tim	е		Switchable	between 1.5ms /	5ms / 10ms		
External input		<npn output="" type=""> NPN non-contact input • Input conditions Invalid: +8 to +V DC or Open Valid: 0 to +1.2 V DC • Input impedance: Approx. 10 kΩ • Input impedance: Approx. 10 kΩ • Input impedance: Approx. 10 kΩ</npn>				DC or Open	
Protection	-	IP67 (IEC)					
Degree of pol	lution	2					
Ambient temperature -10 to +45 °C (No dew condensation or icing allowed),			lowed), Storage: -	-20 to +60 °C			
Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH					
Ambient illuminance		Incandescent lamp: Acceptance surface illuminance 3,000 & or less					
Operating altitude		2,000 m or less					
Cable		0.2 mm <sup>2</sup> 5-core composite cable, 2 m long					
Material		Enclosure: Aluminum die-cast, Front cover: Acrylic Approx. 35 g (without cable), approx. 85 g (including cable)					
Material							

nent center distance are used for unspecified measurement conditions. The subject is white ceramics

2) This is based on the FDA Standard, according to Laser Notice No. 50 of the FDA Standard

3) This is the size in the measurement center distance. These values were defined by using 1/e2 (approx. 13.5 %) of the center light intensity. Due to leak light outside the specified area, the reflectance around the de point may be higher than at the point and this may affect the measurement value.

## Panasonic Industry Co., Ltd. Panasonic Industrial Devices SUNX Co., Ltd.

https://panasonic.net/id/pidsx/global

Please visit our website for inquiries and about our sales network

Panasonic Industrial Devices SUNX Co., Ltd. 2023

PRINTED IN JAPAN