Reliable detection in 10 µm precision

Measurement center
- 200 mm 7.874 in type
- 400 mm 15.748 in type
**Measurement center**
- 200 mm 7.874 in type
- 400 mm 15.748 in type

**Reliable detection**
in 10 µm precision

**Measurement center distance**
- 30 mm 1.181 in
- 50 mm 1.969 in
- 100 mm 3.937 in
- 200 mm 7.874 in
- 300 mm 11.811 in
- 400 mm 15.748 in

**Measurement range**
- ±5 mm 0.197 in
- ±15 mm 0.591 in
- ±35 mm 1.378 in
- ±80 mm 3.150 in
- ±200 mm 7.874 in

**Beam diameter**
- Approx. ø50 µm 1.969 mil
- Approx. ø70 µm 2.756 mil
- Approx. ø120 µm 4.724 mil
- Approx. ø300 µm 11.811 mil
- Approx. ø500 µm 19.685 mil

**Repeatability**
- 10 µm (for HG-C1030)
- 30 µm 1.181 mil
- 70 µm 2.756 mil
- 200 µm 7.874 mil

**Dimensions**
- W20 × H44 × D25 mm

**Inflection resistant cable**
Available for all models

**Available Models**
- HG-C1030
- HG-C1050
- HG-C1100
- HG-C1200
- HG-C1400

**Conforming to**
- EMC Directive
- FDA regulations
**Overwhelmingly stable**

Precise measurements on the order of 1/100 mm 0.0003 inch

**Excellent level detection performance**

Repeatability: 10 μm (for HG-C1030)

- Detecting warpage of a circuit board
- Checking for overlapped lead frames
- Judging front or back of cover of electric parts
- Checking for presence of packing
- Checking for presence of O ring
- Detecting a seam (overlap) of functional sheet

Fitted with a precise CMOS image sensor and an original algorithm

Thanks to a precise CMOS image sensor, it is now possible to perform highly precise measurements in the order of 1/100 mm 0.0003 in. The existing adjustable range reflective sensors cannot achieve such accuracy.
Compact

The smallest CMOS laser sensor in the industry*

*Based on research conducted by our company as of May 2015

Indicates real measurements

Compact and light-weight

Long distance measurement

Equipped with 0-5 V analog output

The value can be measured with a distance sensor.

A new optical system with a built-in mirror

In general, more accurate and stable measurements can be obtained by increasing the optical path length between the receptor and the light receiving element (CMOS), but this also increases the sensor depth and the sensor body gets bigger.

The HG-C series sensors incorporating a new optical system with a built-in mirror provides smaller sensor depth as well as higher measurement accuracy equivalent to displacement sensors.

An aluminum die-cast casing protects from strain and heat

A light-weight but strong die-cast aluminum casing has been adopted. A compact, solid body casing reduces the impact of strain and heat on the measurement accuracy.
Useful functions

Teaching & window comparator mode

With an object below the sensor, press the TEACH key to set the valid range for distances via threshold values. There are 3 methods for setting the valid range: 1-point, 2-point, and 3-point teaching.

1-point teaching

Perform 1-point teaching and the threshold range is set for the distance from the reference surface of the sensing object.

2-point teaching

Press TEACH once for the lower (first point) and once for the upper limit (second point). Useful for sensing objects at different distances.

3-point teaching

This is the method to set the threshold range by conducting the teaching at 3 points (sensing object A, B and C). After teaching, the reference points are automatically sorted in ascending order (reference point 1, 2 and 3). The thresholds are set at the midpoints between reference point 1 and 2, and 2 and 3, respectively. Useful for sensing objects at different distances.

Timer setting function

The time mode options are “off-delay timer,” “on-delay timer,” “one-shot timer” and “no timer.” The counting time is fixed to 5 ms.

Off-delay timer

Function: Extends output signals by 5 ms.
Usage: Appropriate in case a connected device is slow to respond and ON time is required to extend.

On-delay timer

Function: Overrides output signals for 5 ms after detection.
Usage: Convenient way to override temporary signals and control with a time lag.

One-shot timer

Function: Sends output signals for only 5 ms after detection.
Usage: Useful when the signal duration needs to be constant to meet inputs from a connected device. This mode is also used to extend temporary signals by a desired length of time.
**Zero set function**

This function compulsorily sets the measured value to “zero.” The zero point can be set at a desired value. It is useful when measuring steps or tolerance with reference to the height of a sensing object.

Keep pressing both keys for 3 seconds.

* The zero set indicator (yellow) will turn ON while the zero set is valid.
* When the zero set function is executed while the peak hold function or the bottom hold function is valid, the held measurement value is reset.
* When the display setting is set to offset, the zero set function cannot be set.

**Examply: HG-C1050**

<table>
<thead>
<tr>
<th>Display setting</th>
<th>Outside the measuring range</th>
<th>Measuring near point</th>
<th>Measurement center</th>
<th>Measuring far point</th>
<th>Outside the measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>500</td>
<td>1500</td>
<td>000</td>
<td>-1500</td>
<td>500</td>
</tr>
<tr>
<td>Invert</td>
<td>-500</td>
<td>-1500</td>
<td>000</td>
<td>1500</td>
<td>-500</td>
</tr>
<tr>
<td>Offset</td>
<td>3000</td>
<td>1500</td>
<td>000</td>
<td>000</td>
<td>3000</td>
</tr>
</tbody>
</table>

**Display setting function**

How to indicate measured values of the moving sensed object can be chosen from three options, “Normal,” “Invert” and “Offset.”

**Peak and bottom hold functions**

The peak hold function holds the maximum measured value which is output and displayed. The bottom hold function holds the minimum measured value which is output and displayed.

* The peak hold function and the bottom hold function cannot be set at the same time.
* When the zero set function is executed while the peak hold function or the bottom hold function is valid, the held measurement value is reset.

**Threshold value fine adjustment function**

Fine adjustment of threshold values can be performed while measurement is proceeding on the display, and even after teaching.

* For other functions and procedures for setting the functions, see “PRO Mode Setting” from page 10.
### ORDER GUIDE

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Measurement center distance and measurement range</th>
<th>Repeatability</th>
<th>Beam diameter (Note)</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement center 30mm type</td>
<td></td>
<td>30 ± 5 mm (1.181 \pm 0.197 \text{ in}) (1.969 \pm 0.391 \text{ in})</td>
<td>10 μm</td>
<td>Approx. ø50 μm</td>
<td>HG-C1030 HG-C1030-P</td>
</tr>
<tr>
<td>Measurement center 50mm type</td>
<td></td>
<td>50 ± 15 mm (1.969 \pm 0.591 \text{ in}) (3.937 \pm 1.329 \text{ in})</td>
<td>30 μm</td>
<td>Approx. ø70 μm</td>
<td>HG-C1050 HG-C1050-P</td>
</tr>
<tr>
<td>Measurement center 100mm type</td>
<td></td>
<td>100 ± 35 mm (3.937 \pm 1.329 \text{ in}) (7.874 \pm 2.756 \text{ in})</td>
<td>70 μm</td>
<td>Approx. ø120 μm</td>
<td>HG-C1100 HG-C1100-P</td>
</tr>
<tr>
<td>Measurement center 200mm type</td>
<td></td>
<td>200 ± 80 mm (7.874 \pm 2.756 \text{ in}) (15.748 \pm 5.747 \text{ in})</td>
<td>200 μm</td>
<td>Approx. ø300 μm</td>
<td>HG-C1200 HG-C1200-P</td>
</tr>
<tr>
<td>Measurement center 400mm type</td>
<td></td>
<td>400 ± 200 mm (15.748 \pm 5.747 \text{ in}) (31.496 \pm 11.811 \text{ in})</td>
<td>300 μm</td>
<td>Approx. ø500 μm</td>
<td>HG-C1400 HG-C1400-P</td>
</tr>
</tbody>
</table>

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

### SPECIFICATIONS

#### Type

<table>
<thead>
<tr>
<th>Item</th>
<th>Measurement center 30mm type</th>
<th>Measurement center 50mm type</th>
<th>Measurement center 100mm type</th>
<th>Measurement center 200mm type</th>
<th>Measurement center 400mm type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPN output</td>
<td>HG-C1030</td>
<td>HG-C1050</td>
<td>HG-C1100</td>
<td>HG-C1200</td>
<td>HG-C1400</td>
</tr>
<tr>
<td>PNP output</td>
<td>HG-C1030-P</td>
<td>HG-C1050-P</td>
<td>HG-C1100-P</td>
<td>HG-C1200-P</td>
<td>HG-C1400-P</td>
</tr>
</tbody>
</table>

**Applicable standard**
- EMC Directive Compliance, FDA Standard

**Measurement center distance**
- 30 mm \(1.181 \text{ in}\)
- 50 mm \(1.969 \text{ in}\)
- 100 mm \(3.937 \text{ in}\)
- 200 mm \(7.874 \text{ in}\)
- 400 mm \(15.748 \text{ in}\)

**Measurement range**
- ±5 mm \(0.197 \text{ in}\)
- ±15 mm \(0.591 \text{ in}\)
- ±35 mm \(1.329 \text{ in}\)
- ±80 mm \(2.756 \text{ in}\)
- ±200 mm \(7.874 \text{ in}\)

**Repeatability**
- 10 μm
- 30 μm
- 70 μm
- 200 μm

**Emission**
- Red semiconductor laser Class 2 \(\text{JIS/IEC/GB/FDA (Note 2)}\)
- Maximum output: 1 mW
- Emission peak wavelength: 655 nm

**Temperature characteristic**
- ±0.1 % F.S.
- ±0.2 % F.S.

**Beam diameter**
- Approx. ø50 μm
- Approx. ø70 μm
- Approx. ø120 μm
- Approx. ø300 μm
- Approx. ø500 μm

**Linearity**
- ±0.3 % F.S.
- ±0.1 % F.S.

**Temperature characteristics**
- 0.03 % F.S./°C

**Light source**
- Red semiconductor laser Class 2 \(\text{JIS/IEC/GB/FDA (Note 2)}\)

**Beam diameter (Note 3)**
- 30 μm
- 70 μm
- 10 μm

**Power consumption**
- 40 mA or less (at 24 V DC supply voltage), 60 mA 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)

**Output operation**
- Either Light-On or Dark-ON

**Short-circuit protection**
- Incorporated (Auto reset type)

**Analog output**
- Output range: 0 to 5 V (at alarm: +5.2 V)
- Output impedance: 100 Ω

**Response time**
- Switchable between 1.5 ms / 5 ms / 10 ms

**External input**
- NPN non-contact input
- Input conditions
  - Valid: +8 V to +V DC or Open
  - Valid: 0 to +0.6 V DC or Open
  - Input impedance: Approx. 10 kΩ

**Degree of pollution**
- 2

**Operating altitude**
- 2,000 m 6561.680 ft or less

**Protection**
- IP67 (IEC)

**Ambient temperature**
- -10 to +45 °C \(-14 to 113 °F\) (No dew condensation or icing allowed), Storage: -20 to +60 °C \(-4 to 140 °F\)

**Ambient humidity**
- 35 to 85 % RH, Storage: 35 to 85 % RH

**Ambient illumination**
- Incandescent lamp: Acceptance surface illuminance 3,000 lx or less

**Vibration resistance**
- 10 to 55 Hz (period: 1 min.) frequency, 1.5 mm \(0.059 \text{ in}\) amplitude in X, Y and Z directions for two hours each

**Shock resistance**
- 500 m/s² acceleration \((50 \text{ G approx.})\) in X, Y and Z directions for three times each

**Cable**
- 5-core composite cable, 2 m \(6.5617 \text{ ft}\) long

**Cable extension**
- Extension up to total 10 m \(39.3701 \text{ ft}\) is possible with 0.3 mm², or more, cable.

**Material**
- Enclosure: Aluminum die-cast, Front cover: Acrylic

**Weight**
- Net weight: approx. 35 g (without cable), approx. 85 g (including cable)

**Notes:**
1. Supply voltage: 24 V DC, ambient temperature: ±20 °C ±68 °F, response time: 10 ms, and analog output value of measurement center distance are used for unspecified measurement conditions. The subject is white ceramics.
2. This is the size in the measurement center distance. These values were defined by using \(1/e\) (approx. 13.5%) of the center light intensity. Due to leak light outside the specified area, the reflectance around the detecting point may be higher than at the point and this may affect the measurement value.
3. Degree of pollution: 2, or more, cable.
OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple mounting bracket</td>
<td>MS-HG-01</td>
<td>Foot angled mounting bracket</td>
</tr>
</tbody>
</table>

Note: Due to the simple mounting bracket, the sensing characteristics may not be held depending on the installation condition, in case of the purposes for acquiring the displacement data and a fine detecting.

I/O CIRCUIT DIAGRAMS

NPN output type

<table>
<thead>
<tr>
<th>Color code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Brown) +V</td>
<td>12 to 24 V DC ±10 %</td>
</tr>
<tr>
<td>(Pink)</td>
<td>External input</td>
</tr>
<tr>
<td>(Black)</td>
<td>Control output</td>
</tr>
<tr>
<td>(Blue) 0 V</td>
<td>0 to +5 V (Gray) Analog voltage output</td>
</tr>
<tr>
<td>(Shield) AGND</td>
<td>(AGND) ANALOG GROUND (ANALOG GROUND)</td>
</tr>
</tbody>
</table>

PNP output type

<table>
<thead>
<tr>
<th>Color code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Brown) +V</td>
<td>12 to 24 V DC ±10 %</td>
</tr>
<tr>
<td>(Pink)</td>
<td>External input</td>
</tr>
<tr>
<td>(Black)</td>
<td>Control output</td>
</tr>
<tr>
<td>(Blue) 0 V</td>
<td>0 to +5 V (Gray) Analog voltage output</td>
</tr>
<tr>
<td>(Shield) AGND</td>
<td>(AGND) ANALOG GROUND (ANALOG GROUND)</td>
</tr>
</tbody>
</table>

SENSEING CHARACTERISTICS (TYPICAL)

Linearity

Non-voltage contact or NPN open-collector transistor

- External input
  - Invalid: +8 to +V DC or open
  - Valid: 0 to +1.2 V DC

Non-voltage contact or PNP open-collector transistor

- External input
  - Invalid: 0 to +0.6 V DC or open
  - Valid: +4 to +V DC

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-C1030(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-C1050(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-C1100(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-C1200(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-C1400(-P)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OPTIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple mounting bracket</td>
<td>MS-HG-01</td>
<td>Foot angled mounting bracket</td>
</tr>
</tbody>
</table>

Material: Stainless steel (SUS304)

Two M3 (length 25 mm 0.984 in) screws with washers (SPCC) are attached.
**PRECAUTIONS FOR PROPER USE**

- This catalog is only provided to help choose a product and the user’s guide attached to the product must be read before use.
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- Do not operate products using methods other than the ones described in the instruction manual included with each product. Control or adjustment through procedures other than the ones specified may cause hazardous laser radiation exposure.
- This product is classified as a Class 2 Laser Product under JIS / IEC / GB standards and FDA * regulations. Do not look at the laser beam directly or through an optical system such as a lens.
- The warning label (English) is attached to the product. Handle the product according to the instruction given on the warning label. (The warning labels in Japanese and Chinese are packed with the sensor.)

### Part description

- **Zero set indicator (Yellow)**
- **Teaching indicator (Yellow)**
- **Output operation indicator (Orange)**
- **Laser emission indicator (Green)**

### PRO mode setting

#### Part description

- **PRO indicator (Yellow)**
- **DOWN key (Select)**
- **UP key (Select)**
- **TEACH key (Confirmed)**

#### PRO mode setting table

<table>
<thead>
<tr>
<th>Item</th>
<th>Default setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response speed setting</td>
<td>H-50</td>
<td>Set the response time. &quot;H-50&quot; : High precision 10ms, &quot;Std&quot; : Standard 5ms,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;FPP&quot; : High speed 1.5ms</td>
</tr>
<tr>
<td>Output operation setting</td>
<td>L-on</td>
<td>Select the control output operation mode. &quot;L-on&quot; : Light-ON, &quot;d-on&quot; : Dark-ON</td>
</tr>
<tr>
<td>Sensing output setting</td>
<td>&quot;r&quot;</td>
<td>Set the sensing output. &quot;r&quot; : Normal sensing mode</td>
</tr>
<tr>
<td></td>
<td>&quot;n-1&quot;</td>
<td>1-point teaching (Window comparator mode)</td>
</tr>
<tr>
<td></td>
<td>&quot;n-2&quot;</td>
<td>2-point teaching (Window comparator mode)</td>
</tr>
<tr>
<td></td>
<td>&quot;n-3&quot;</td>
<td>3-point teaching (Window comparator mode)</td>
</tr>
<tr>
<td></td>
<td>&quot;d-r&quot;</td>
<td>Rising differential mode</td>
</tr>
<tr>
<td></td>
<td>&quot;d-l&quot;</td>
<td>Trailing differential mode</td>
</tr>
<tr>
<td>Hysteresis setting</td>
<td>(HG-C1030) 0.003</td>
<td>Set the hysteresis width. HG-C1030: 0.001 to 5.00 mm 0.00004 to 0.197 in</td>
</tr>
<tr>
<td></td>
<td>(HG-C1050) 0.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(HG-C1100) 0.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(HG-C1200) 0.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(HG-C1400) 0.8</td>
<td></td>
</tr>
<tr>
<td>External input setting</td>
<td>OSEb</td>
<td>Set the external input. &quot;b&quot; : Zero set function, &quot;Ec&quot; : Teaching function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;r&quot; : Light emitting stop function, &quot;d-r&quot; : Trigger function</td>
</tr>
<tr>
<td>Timer setting</td>
<td>non</td>
<td>Set the timer operation. The timer time is fixed at 5ms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;non&quot; : No timer, &quot;f-f&quot; : OFF-delay timer, &quot;g-d&quot; : ON-delay timer, &quot;f-d&quot; :</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One-shot timer</td>
</tr>
<tr>
<td>Display setting</td>
<td>Std</td>
<td>The display of the measured value can be changed. &quot;Std&quot; : Normal, &quot;Inv&quot; :</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Invert, &quot;fSt&quot; : Offset</td>
</tr>
<tr>
<td>Hold setting</td>
<td>off</td>
<td>Set the control output and the analogue output operation when a measurement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>error occurs (insufficient light intensity, saturation of light intensity,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>out of measurement range). &quot;off&quot; : Hold OFF, &quot;on&quot; : Hold ON</td>
</tr>
<tr>
<td>ECO Setting</td>
<td>off</td>
<td>The digital display can be set to go OFF when key operation is not performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for 30 seconds. Current consumption can be reduced. &quot;off&quot; : ECO OFF, &quot;on&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>: ECO ON</td>
</tr>
<tr>
<td>Reset setting</td>
<td>no</td>
<td>Return to the default setting (factory setting). &quot;no&quot; : Reset NG, &quot;yes&quot; :</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reset OK</td>
</tr>
</tbody>
</table>

---

* The product complies with the FDA regulations and satisfies requirements of the FDA’s Laser Notice No. 50.
Precautions for Proper Use

Procedure

Measurement display

Response time setting

Output operation setting

Sensing output setting

Hysteresis setting

External input setting

Timer setting

Display setting

Hold setting

ECO Setting

Reset setting

Response time setting

<Arrow description in figures>

- Press the TEACH key
- Press UP key or DOWN key
- Press DOWN key

Response time setting

Output operation setting

Sensing output setting

Hysteresis setting

External input setting

Timer setting

Display setting

Hold setting

ECO Setting

Reset setting

Response time setting

PRECAUTIONS FOR PROPER USE
Mounting

- When mounting this product, use M3 screws. The tightening torque should be 0.5 N·m. Please prepare M3 screws separately.

- When mounting the simple mounting bracket (optional) on this product, the tightening torque should be 0.5 N·m or less.

Note: Due to the simple mounting bracket, the sensing characteristics may not be held depending on the installation condition, in case of the purposes for acquiring the displacement data and a fine detecting.

Direction to a movable body

<When there are differences in material and color>

- 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 recesses, mount the product so that optical path from the light-emitting part to light-receiving part is not interrupted.

- When mounting the product on a wall

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

Others

- 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 10m maximum with a cable size of 0.3mm² or more.
- Make sure that stress by forcible bend or pulling is not applied to the sensor cable joint.
- 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.
PRECAUTIONS FOR PROPER USE

Error indication

• In case of errors, attempt the following measures.

<table>
<thead>
<tr>
<th>Error indication</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Hold OFF&gt;</td>
<td>Insufficient amount of reflected light. The sensing object is out of the sensing range.</td>
<td>Confirm that the sensing distance is within the specification range. Adjust the installation angle of the sensor.</td>
</tr>
<tr>
<td>Measured value blinks</td>
<td>FLASH memory is damaged or is past its life expectancy.</td>
<td>Please contact our office.</td>
</tr>
<tr>
<td>$\textbf{E}r0$</td>
<td>Load of the sensing output is short-circuited causing an over-current to flow.</td>
<td>Turn OFF the power and check the load.</td>
</tr>
<tr>
<td>$\textbf{E}r2$</td>
<td>The semiconductor laser is damaged or is past its life expectancy.</td>
<td>Please contact our office.</td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
<td>• Confirm that the sensing distance is within the specification range. • Set the display to any setting except “Offset.”</td>
</tr>
<tr>
<td>$\textbf{E}r3$</td>
<td>During teaching, the measurement is not performed normally.</td>
<td>Confirm that the sensing distance is within the specification range.</td>
</tr>
</tbody>
</table>

System error

Please contact our office.

DIMENSIONS (Unit: mm in)

CAD data can be downloaded from our website.

Model No. | Measurement center distance (L) | $\theta$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-C1030(-P)</td>
<td>30 1.181</td>
<td>30°</td>
</tr>
<tr>
<td>HG-C1050(-P)</td>
<td>50 1.969</td>
<td>22.5°</td>
</tr>
<tr>
<td>HG-C1100(-P)</td>
<td>100 3.937</td>
<td>12.5°</td>
</tr>
<tr>
<td>HG-C1200(-P)</td>
<td>200 7.874</td>
<td>6.3°</td>
</tr>
<tr>
<td>HG-C1400(-P)</td>
<td>400 15.748</td>
<td>3.2°</td>
</tr>
</tbody>
</table>
### Laser Displacement Sensor

**Compact HL-G1 SERIES**

- High-precision measurement is achieved at a resolution of 0.5 μm (0.02 mil) (HL-G103□).
- Easy to embed in machines and production lines thanks to a built-in controller.

Full lineup! 10 models of diffuse reflection type (class 2) and 6 models of specular reflection type (class 1) are available. They accommodate a variety of applications.

### Digital Laser Sensor

**Amplifier-separated LS-500 SERIES**

- Industry’s smallest* laser sensor head, fastest response time* 60 μs.
- * As of September 2013, as amplifier-separated type laser sensor amplifier, based on research conducted by us.

Engineered for maximum compatibility with fiber sensors in every aspect of its design, form and operability. The LS-500 delivers an environment that makes it easy to choose a class 1 laser sensor.

**Please contact:**

Panasonic Industrial Devices SUNX Co., Ltd.

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panasonic.net/id/pidsx/global

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**DIMENSIONS**

(Unit: mm in)

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**Simple mounting bracket (Optional)**

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**MS-HG-01**

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**CAD data can be downloaded from our website.**