

NEW

IO-Link Compatible, High-level Self-diagnosis Self-Monitoring Sensor

Digital Fiber Sensor

FX-550L SERIES

Dual Display Digital Pressure Sensor

DP-100L SERIES

CMOS Type Micro Laser Distance Sensor

HG-C1000L SERIES



FX-550L SERIES



DP-100L SERIES



HG-C1000L SERIES

Capable of diagnosing own state
and reporting to the host device

Reduction of the data analysis burden -

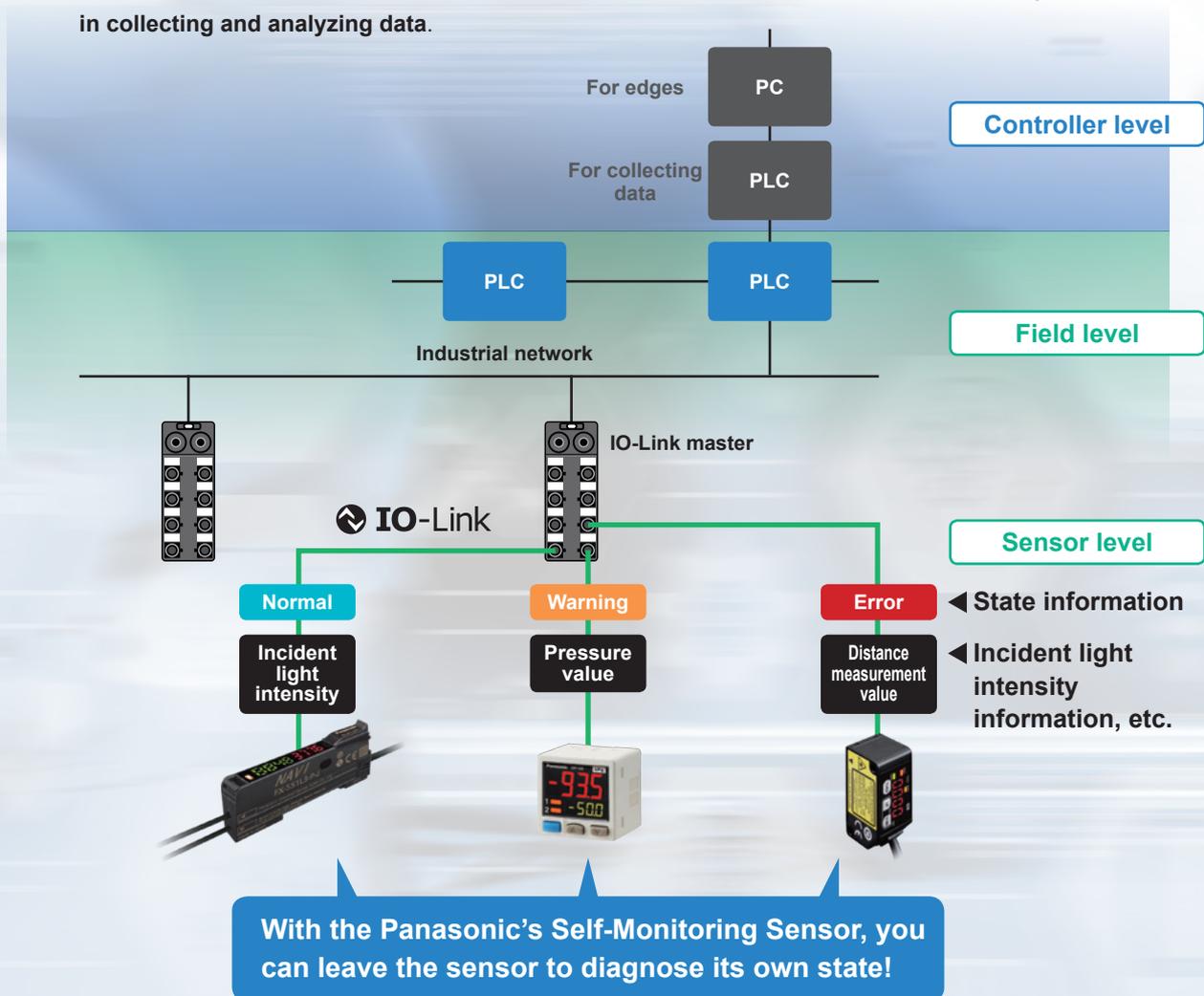
IO-Link compatible

Collecting sensor level data

Field data collected and accumulated for “preventive maintenance” and “operation monitoring”. An analysis of such field data requires high-level know-how and time, causing a burden to people responsible for the production site management.

The **Self-Monitoring Sensor** manufactured by Panasonic is capable of reporting sensor data and its own state to the host device through the I/O Link master.

With the Self-Monitoring Sensor, you can immediately judge the state of the sensor and easily identify the cause of failure. Thus, this sensor contributes to the **reduction of the burden experienced by the client in collecting and analyzing data.**



What is “IO-Link”?



IO-Link is an open communication technology according to IEC 61131-9 for the 1:1 bidirectional communication between the IO-Link device (sensor or actuator) and the IO-Link master.

Self-Monitoring Sensor

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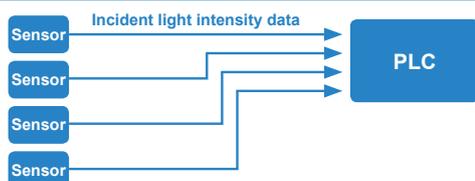
HG-C1000L SERIES

one small step towards IoT.

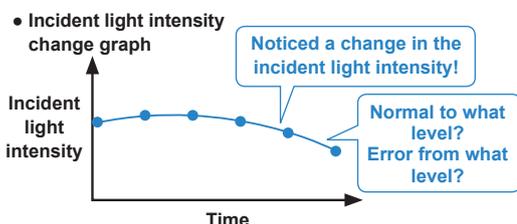
Incorporated high-level self-diagnosis function

With the Panasonic's Self-Monitoring Sensor, you can get high-level solutions!

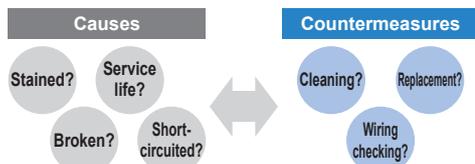
The introduction of IoT requires collection of the incident light intensity data and presents the following problems.



Previously only ON/OFF data was required. But, due to an addition of the incident light intensity data, the PLC processing burden has increased.



We noticed a change in the incident light intensity. However, because there is no judgment criteria, we cannot tell whether the incident light status is normal or not.

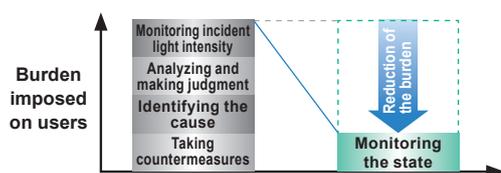


Unless we identify the cause of changes in the incident light intensity, we cannot optimize countermeasures targeting the sensors.

Problems are solved by the high-level self-diagnosis.

		Judgement of the state	
Normal	Notification	Operation is normal.	
		Check the settings. Detected state is faulty.	* Recover to the normal state through checking installation and settings. Reduction in the incident light intensity.
Warning		Getting close to the end of service life. Reached the state where the device should be replaced.	* Limitation in the writing frequency into the memory or in the operation hours, etc.
Error		Short-circuited or broken. Reached the state where it is impossible to control as a device.	* Short-circuited output, damaged EEPROM, etc.

Easy use of IoT



“Predictive maintenance” can be easily achieved through monitoring the state of the Self-Monitoring Sensor.

IoT Examples at FA Sites

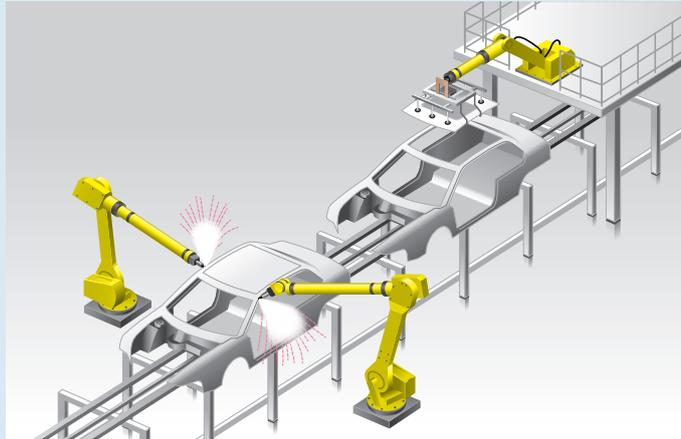
Before the introduction of Self-Monitoring Sensors

Preventive maintenance

- We want to avoid production line stoppage that might occur due to unexpected sensor failure.

Line stoppage hours × (manufacturing unit cost / hour) = Loss

- We want to minimize the production line down time to almost zero.

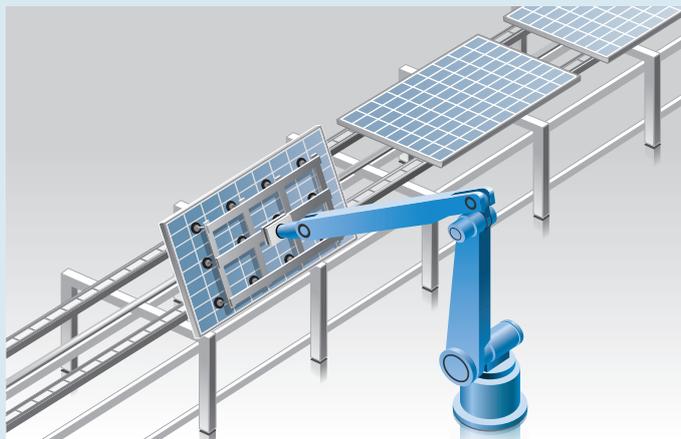


Problems

- ◆ The amount of data to be collected is large and this may lower the PLC processing capacity.
- ◆ The burden of data analysis is large. ◆ Resetting the replaced sensors is troublesome.

Remote controlling and batch settings

- We want to place sensors close to sensing points as much as possible. However, it is often difficult to make settings, particularly when there are many sensors to install.
- We want to send predetermined parameter values in a batch file for a repeater, etc.
- We want to confirm that required sensors are properly connected at the startup of the system.



Problems

- ◆ It takes time to set sensors.
- ◆ We want to avoid mistakes in setting sensors or wiring.

Self-Monitoring Sensor

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After the introduction of Self-Monitoring Sensors

From preventive maintenance
to predictive maintenance

Leave the sensor diagnosis to the sensor itself.

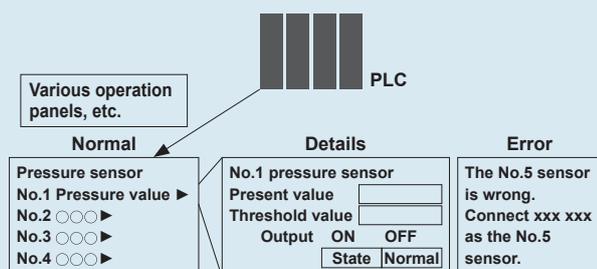
- All you need to do is to monitor the sensor state.
- PLC can be used exclusively for controlling devices.
- Possible to check detail information at a desired timing.

Leave the resetting for replaced sensors to the higher-level master

- Automatically written from the connected master.
- Possible not only to save time but also to prevent human errors.

Fully utilize the advantages of the IO-Link output.

- Possible to read or write set values through external interface.
- Possible to set multiple sensors in a batch process.
- Possible to save the set parameters in an external medium.
- Possible to recognize and discriminate individual information.



What is “IO-Link”?



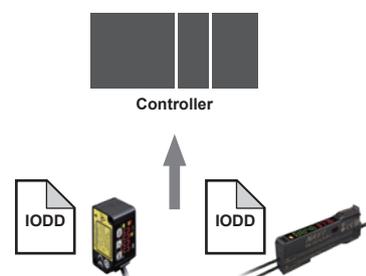
FAST & SMART

Depending on the I/O-Link device, communication is performed at one of the three baud rates: COM1 (= 4.8 kbps), COM2 (= 38.4 kbps), and COM3 (= 230.4 kbps). The I/O-Link master reads the baud rate of the connected device and sets it automatically.

Various parameters set in the device are automatically saved in the IO-Link master. When the device is replaced with a new one of the same model, the saved parameters are automatically written into the new device.

EASY & GLOBAL

Each IO-Link device has an IODD (IO Device Description) file that contains individual information such as the manufacturer's name and model name. Since the IODD file is globally common, by reading the IODD file, the IO-Link device can be easily set and can be used regardless of the manufacturer of the IO-Link master.



* An IODD file of the Self-Monitoring Sensor can be downloaded from our website.

ORDER GUIDE

Type	Appearance	Measurement center distance and measurement range	Repeatability	Beam diameter (Note)	Model No.	Control output
Discrete wire type		Measurement center 30 mm 1.181 in type	30 ±5 mm 1.181 ±0.197 in	10 μm 0.394 mil	ø50 μm 1.969 mil approx.	HG-C1030L3-P
		Measurement center 50 mm 1.969 in type	50 ±15 mm 1.969 ±0.591 in	30 μm 1.181 mil	ø70 μm 2.756 mil approx.	HG-C1050L3-P
		Measurement center 100 mm 3.937 in type	100 ±35 mm 3.937 ±1.328 in	70 μm 2.756 mil	ø120 μm 4.724 mil approx.	HG-C1100L3-P
		Measurement center 200 mm 7.874 in type	200 ±80 mm 7.874 ±3.150 in	200 μm 7.874 mil	ø300 μm 11.811 mil approx.	HG-C1200L3-P
		Measurement center 400 mm 15.748 in type	400 ±200 mm 15.748 ±7.874 in	300 μm 11.811 mil (Measuring distance 200 to 400 mm 7.874 to 15.748 in) 800 μm 31.496 mil (Measuring distance 400 to 600 mm 15.748 to 23.622 in)	ø500 μm 19.685 mil approx.	HG-C1400L3-P
M12 connector type	 Supports Smartclick (Note 2)	Measurement center 30 mm 1.181 in type	30 ±5 mm 1.181 ±0.197 in	10 μm 0.394 mil	ø50 μm 1.969 mil approx.	HG-C1030L3-P-J
		Measurement center 50 mm 1.969 in type	50 ±15 mm 1.969 ±0.591 in	30 μm 1.181 mil	ø70 μm 2.756 mil approx.	HG-C1050L3-P-J
		Measurement center 100 mm 3.937 in type	100 ±35 mm 3.937 ±1.328 in	70 μm 2.756 mil	ø120 μm 4.724 mil approx.	HG-C1100L3-P-J
		Measurement center 200 mm 7.874 in type	200 ±80 mm 7.874 ±3.150 in	200 μm 7.874 mil	ø300 μm 11.811 mil approx.	HG-C1200L3-P-J
		Measurement center 400 mm 15.748 in type	400 ±200 mm 15.748 ±7.874 in	300 μm 11.811 mil (Measuring distance 200 to 400 mm 7.874 to 15.748 in) 800 μm 31.496 mil (Measuring distance 400 to 600 mm 15.748 to 23.622 in)	ø500 μm 19.685 mil approx.	HG-C1400L3-P-J

PNP open-collector transistor

Notes: 1) This is the size in the measurement center distance. These values were defined by using $1/e^2$ (13.5% approx.) 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.

2) Smartclick is a registered trademark of OMRON Corporation.

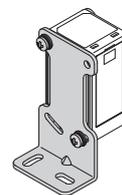
OPTIONS

Designation	Model No.	Description
Simple mounting bracket (Note)	MS-HG-01	Foot angled mounting bracket

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

Simple mounting bracket

• MS-HG-01



Material: Stainless steel (SUS304)

Two M3 (length 25 mm 0.984 in) screws with washers (SPCC) are attached.

Recommended extension cables for M12 connector type

Manufactured by OMRON Corporation

Extension cable with connectors on both ends XS5W series

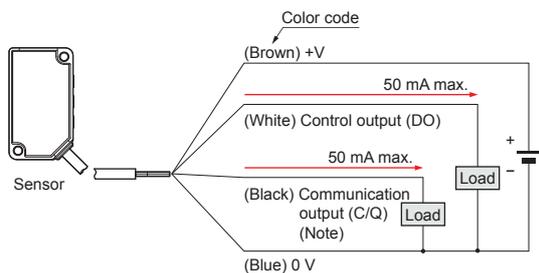
* Smartclick is a registered trademark of OMRON Corporation. Contact the manufacturer for details of the recommended products.

WIRING DIAGRAMS

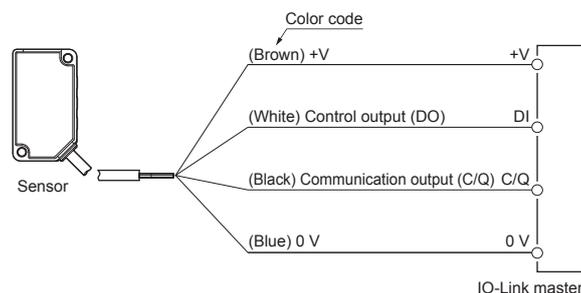
HG-C□L3-P

Discrete wire type

<When using as an ordinary sensor>



<When connecting to the IO-Link master>

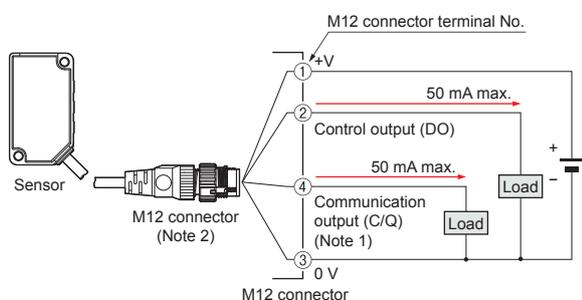


Note: When the sensor is used as an ordinary sensor, the communication output (C/Q) provides the same output operation as the control output (DO).

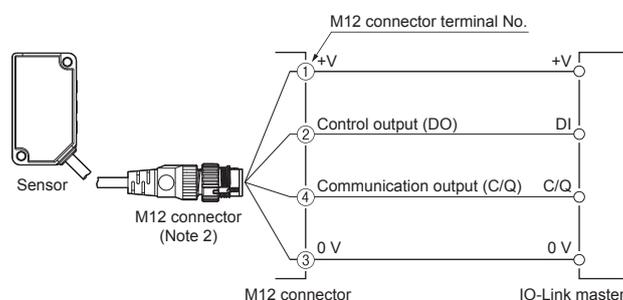
HG-C□L3-P-J

M12 connector type

<When using as an ordinary sensor>

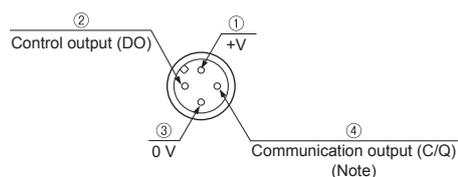


<When connecting to the IO-Link master>



Notes: 1) When the sensor is used as an ordinary sensor, the communication output (C/Q) provides the same output operation as the control output (DO).
2) When wiring with the discrete wire or extending the cable from the M12 connector, separately prepare commercially available M12 connector cable.

M12 connector terminal arrangement diagram



Terminal No.	Designation
①	+V
②	Control output (DO)
③	0 V
④	Communication output (C/Q) (Note)

Note: When the sensor is used as an ordinary sensor, the communication output (C/Q) provides the same output operation as the control output (DO).

SPECIFICATIONS

HG-C1000L SERIES

Item	Model No.	Type	Measurement center 30 mm 1.181 in type	Measurement center 50 mm 1.969 in type	Measurement center 100 mm 3.937 in type	Measurement center 200 mm 7.874 in type	Measurement center 400 mm 15.748 in type
		Discrete wire	HG-C1030L3-P	HG-C1050L3-P	HG-C1100L3-P	HG-C1200L3-P	HG-C1400L3-P
		M12 connector	HG-C1030L3-P-J	HG-C1050L3-P-J	HG-C1100L3-P-J	HG-C1200L3-P-J	HG-C1400L3-P-J
Regulatory compliance and certification		EMC Directive, RoHS Directive, FDA Regulations, UL/c-UL Certification					
Measurement center distance		30 mm 1.181 in	50 mm 1.969 in	100 mm 3.937 in	200 mm 7.874 in	400 mm 15.748 in	
Measurement range		±5 mm 0.197 in	±15 mm 0.591 in	±35 mm 1.328 in	±80 mm 3.150 in	±200 mm 7.874 in	
Repeatability		10 μm 0.394 mil	30 μm 1.181 mil	70 μm 2.756 mil	200 μm 7.874 mil	300 μm 11.811 mil (Measuring distance 200 to 400 mm 7.874 to 15.748 in) 800 μm 31.496 mil (Measuring distance 400 to 600 mm 15.748 to 23.622 in)	
Linearity		±0.1 % F.S.			±0.2 % F.S.		±0.2 % F.S. (Measuring distance 200 to 400 mm 7.874 to 15.748 in) ±0.3 % F.S. (Measuring distance 400 to 600 mm 15.748 to 23.622 in)
Temperature characteristic		0.03 % F.S./°C					
Light source		Red semiconductor laser Class 2 [IEC / JIS / GB / FDA (Note 2)] Max. output: 1 mW, emission peak wavelength: 655 nm 0.026 mil					
Beam diameter (Note 3)		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 approx.	
Supply voltage		24 V DC ±10 % Ripple P-P 10 %					
Power consumption		40 mA or less (at 24 V DC supply voltage)					
Communication output (C/Q) (Note 4)		IO-Link communication IO-Link Specification V1.1					
		Baud rate COM3 (230.4 kbps)					
		Process data 4 byte					
		Minimum cycle time 1.0 ms					
Control output (DO)		PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (Between control output to +V) • Residual voltage: 1.5 V or less (at 50 mA source current) • Leakage current: 0.1 mA or less					
Output operation		Switchable between either Light-ON or Dark-ON					
Short-circuit protection		Incorporated (auto reset type)					
Response time		Switchable between 1.5 ms / 5 ms / 10 ms					
Pollution degree		2					
Ambient altitude		2,000 m 6561.680 ft or less					
Environmental resistance		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 illuminance Incandescent light: 3,000 lx or less at the light-receiving face					
		Vibration resistance 10 to 55 Hz (period: 1 min.) frequency, 1.5 mm 0.059 in double amplitude in X, Y and Z directions for two hours each					
		Shock resistance 500 m/s ² acceleration (50 G approx.) in X, Y and Z directions three times each					
Cable		Discrete wire type: 0.2 mm ² 4-core PVC cable, 2 m 6.562 ft long M12 connector type: 0.2 mm ² 4-core PVC cable with connector, 0.3 m 0.984 ft long					
Cable extension		Extension up to total 20 m 65.617 ft is possible with 0.3 mm ² , or more, cable.					
Material		Enclosure: Aluminum die-cast, Front cover: Acrylic					
Weight		Discrete wire type: 30 g approx. (without cable), 80 g approx. (including cable) M12 connector type: 30 g approx. (without cable), 50 g approx. (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 product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by the FDA (Food and Drug Administration).
 3) This is the size in the measurement center distance. These values were defined by using 1/e² (13.5% approx.) 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.
 4) When the sensor is used as an ordinary sensor, the communication output (C/Q) provides the same output operation as the control output (DO).

PRECAUTIONS FOR PROPER USE

- This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its 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.



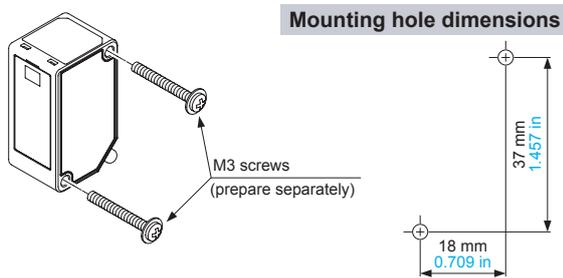
- This product is classified as a Class 2 Laser Product under IEC / JIS / GB standards and FDA* regulations. Do not look at the laser beam directly or through an optical system such as a lens.
- The warning label (English) is attached to the product. Handle the product according to the instruction given on the warning label. (The warning labels in Japanese and Chinese are packed with the sensor.)



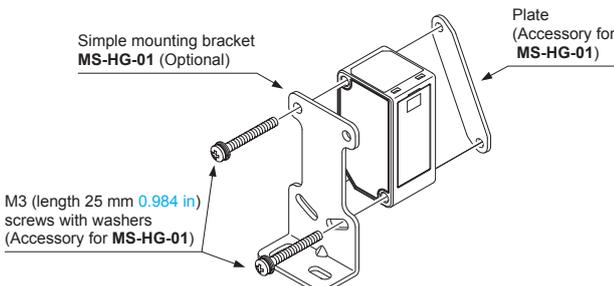
*This product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by CDRH (Center for Devices and Radiological Health) under the FDA (Food and Drug Administration).

Mounting

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



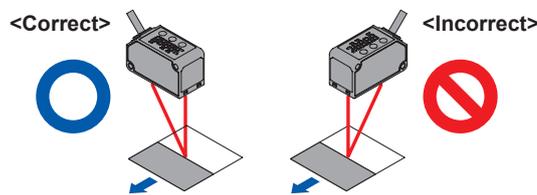
- When mounting the simple mounting bracket (optional) on this product, the tightening torque should be 0.5 N·m or less.



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

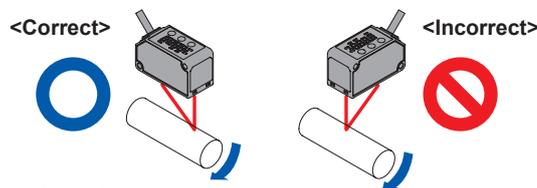
Mounting direction

- 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.



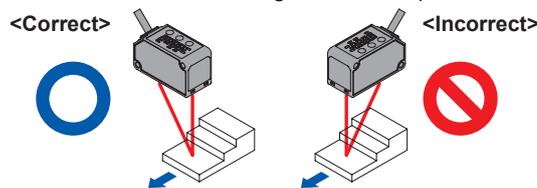
<Measurement of rotating objects>

- 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.



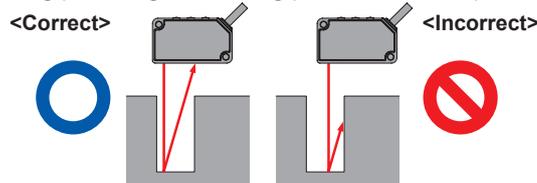
<When there is a step>

- 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.



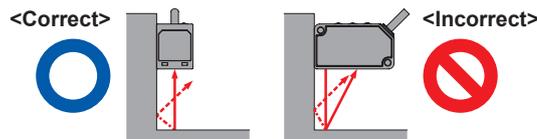
• Measuring of narrow locations and recesses

- When measuring in narrow locations or inside holes, 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

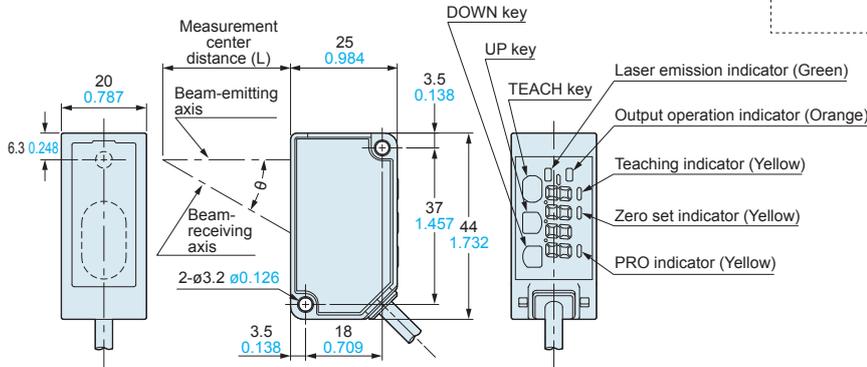
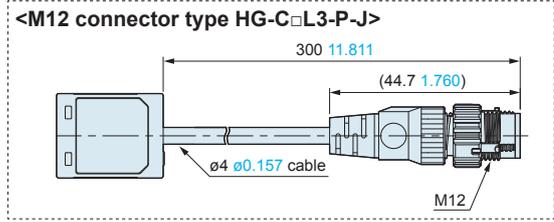
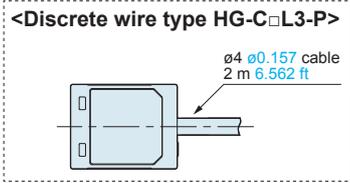
- This product has been developed / produced for industrial use only.
- There is a certain deviation in the directionality of this product. Install the product using a mounting bracket or similar fitting to allow the adjustment of optical axis.
- The internal memory (nonvolatile) of this product has a service life. Settings cannot be configured more than 100,000 times.

DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from the website.

HG-C□L3-P(-J)

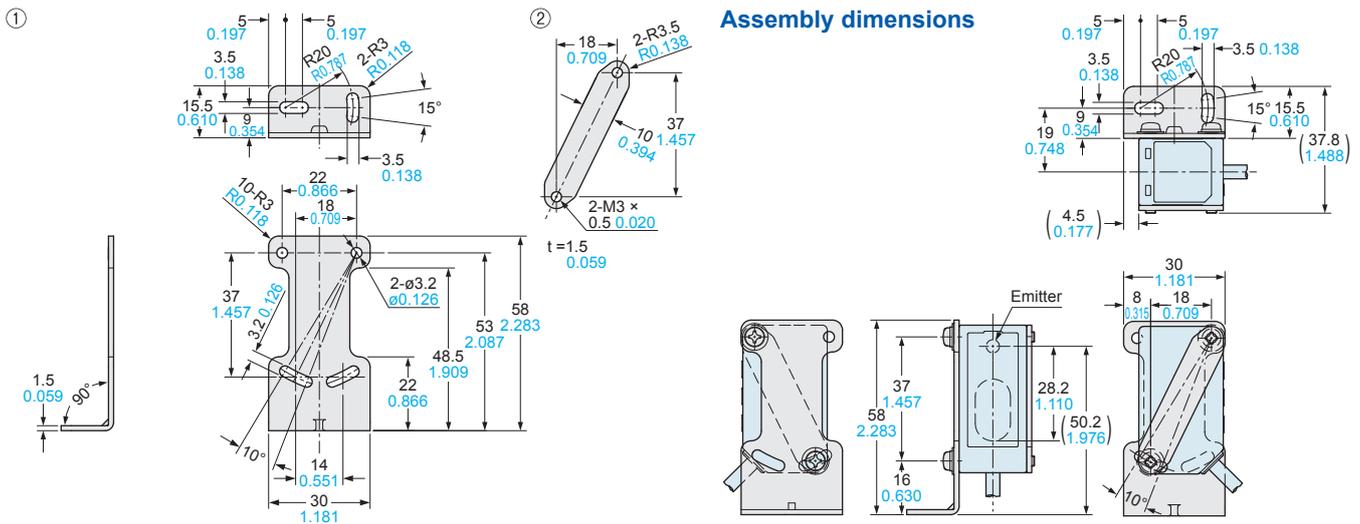
Sensor



Model No.	Measurement center distance (L)	θ
HG-C1030L3-P(-J)	30 1.181	30°
HG-C1050L3-P(-J)	50 1.969	22.5°
HG-C1100L3-P(-J)	100 3.937	12.5°
HG-C1200L3-P(-J)	200 7.874	6.3°
HG-C1400L3-P(-J)	400 15.748	3.2°

MS-HG-01

Simple mounting bracket (Optional)



Material: Stainless steel (SUS304)
 Two M3 (length 25 mm 0.984 in) screws with washers
 [cold rolled carbon steel (SPCC)] are attached.

Disclaimer

The applications described in the catalog are all intended for examples only. The purchase of our products described in the catalog shall not be regarded as granting of a license to use our products in the described applications. We do NOT warrant that we have obtained some intellectual properties, such as patent rights, with respect to such applications, or that the described applications may not infringe any intellectual property rights, such as patent rights, of a third party.

Please contact

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