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Luster Recognition Sensor

PI-G Series

Features

- Detection unaffected by target color
- Luster differentiation capability
- 1-ms response speed
- Built-in hysteresis adjustment trimmer

Detecting Distance

10 to 25 mm (0.39" to 0.98")



Description

Unique principle of operation

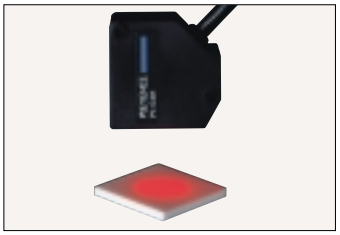
Utilizing our unique optical system, PI-G sensors can provide on-line luster differentiation.

Stable detection unaffected by changes in target color

The PI-G Series detects a change in luster only. Therefore, detection is unaffected by changes in target colors on printed mark, etc.

Visible beam spot simplifies sensor adjustment

Since the PI-G Series employs a visible red LED as the light source, the point of detection can be visually confirmed. This allows the sensor head to be easily aligned with a target.



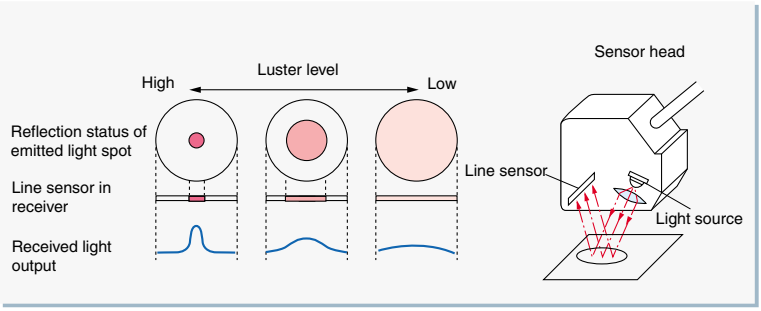
Hysteresis adjusting trimmer

Hysteresis can be adjusted based on target surface conditions (wrinkle, etc.), oscillation or slant.

ON-delay/OFF-delay timer function

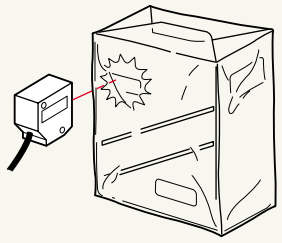
Operating principle

When light hits a surface, the amount of reflection depends on the shinyness of the surface. When the luster level is high (lustrous), the light reflects specularly. When the luster level is low (lusterless), the light reflects diffusely. By detecting this difference with a line sensor in the receiver, luster can be differentiated.

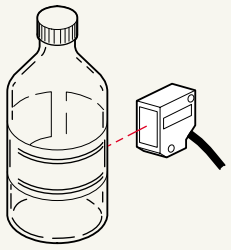


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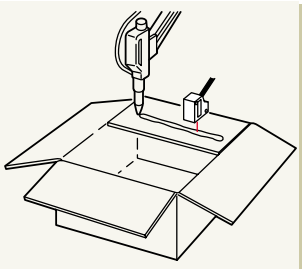
Applications



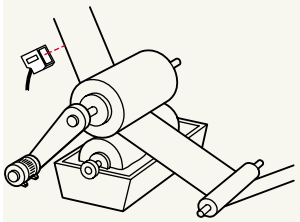
Detection of presence/absence of transparent package film



Detection of transparent seal on transparent bottle



Detection of presence/absence of liquid adhesive



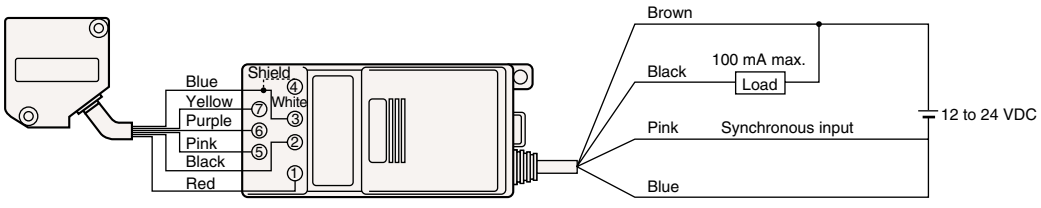
Detection of presence/absence of adhesive

Specifications

Model	Sensor head		PI-G01
	Amplifier	NPN	PI-G70
Detecting distance (standard target)			10 to 25 mm 0.39" x 0.98" (30 x 30 mm 1.18" x 1.18" glass plate, t = 1 mm 0.04")
Light source			Red LED
Detectable object			Transparent or opaque, glossy object
Smallest detectable object			3 mm 0.12" dia. colorless, transparent glass plate
Minimum spot diameter			4 mm 0.16" dia. [1]
Hysteresis adjustment			1-turn trimmer (240°)
Sensitivity adjustment			3-turn trimmer
Response time			1 ms max.
Operation mode			LIGHT-ON/DARK-ON (switch-selectable)
Indicators			Output: Red LED, Synchronous input: Yellow LED
Timer			ON-delay/OFF-delay/Timer-OFF selectable (10 ms to 1 s) adjustable by trimmer
Synchronous input			Non-voltage input (solid-state)
Control output [2]			NPN: 100 mA max. (40 V max.), Residual voltage: 1V max.
Protection circuit			Reversed polarity, short-circuit protection, surge absorber
Power supply			12 to 24 VDC +10%
Current consumption			75 mA max.
Ambient light			Fluorescent lamp: 10000 lux max., Sunlight or incandescent lamp: 500 lux max.
Ambient temperature			-10 to + 50°C
Housing			Sensor head: Glass-reinforced resin, Amplifier: polycarbonate
Weight (including 2-m 6.6' cable)			Sensor head: Approx. 97 g, Amplifier: Approx. 155 g

1. Visible spot diameter is 20 mm 0.79" or less at a distance of 20 mm 0.79".
2. NPN output can easily be converted to PNP output by connecting the optional OP-5148 PNP Output Converter.

Connections

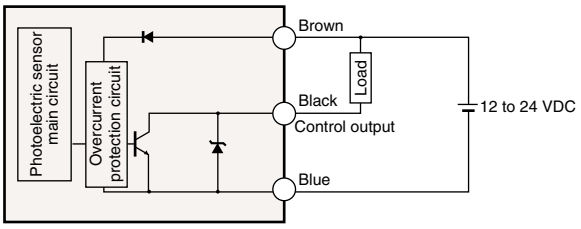


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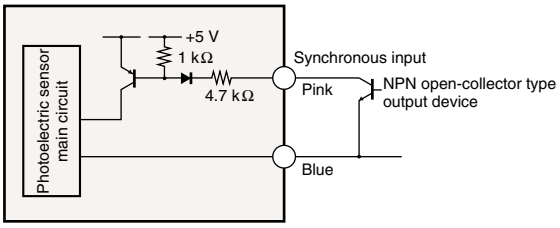
PI-G Luster Recognition Sensor

Input/Output Circuits

Output circuit



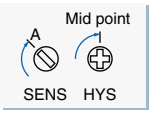
Synchronous input circuit diagram



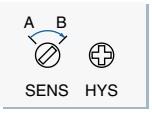
- Use an input signal of 0.3 ms or more.
- Use an input signal from an NPN open-collector device. Residual voltage should not exceed 1 V.

Adjustment

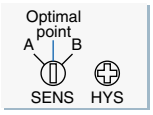
LIGHT-ON mode
(When DARK-ON mode is specified, refer to words in parentheses.)



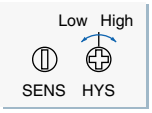
1. Turn the hysteresis adjustment trimmer clockwise and set it to the mid-point. With a shiny object in place, turn the sensitivity adjustment trimmer clockwise until the red LED lights (turns off). – Point A



2. With lusterless object in place, turn the sensitivity adjustment trimmer further clockwise until the red LED lights (turns off). – Point B



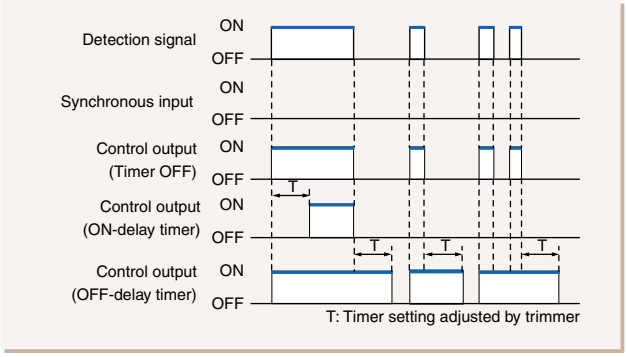
3. Set the sensitivity adjustment trimmer midway between A and B. Check sensor operation.



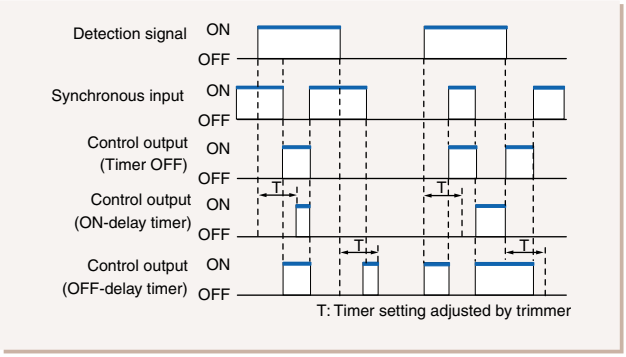
4. To increase hysteresis, turn the trimmer clockwise. To decrease hysteresis, turn the trimmer counterclockwise.

Timing Chart

When no synchronous signal is input:



When synchronous signals are input:



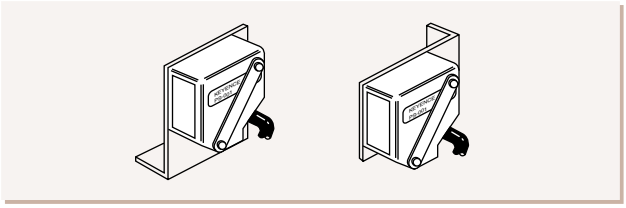
* Priority is given to synchronous input.

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Hints on Correct Use

Mounting sensor head

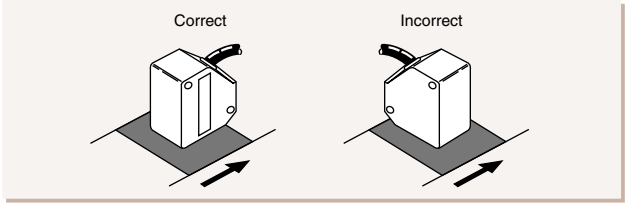
- Mount the sensor head, with the supplied bracket, to suit the installation site. Mounting 2 or more sensor heads in close proximity will not cause interference.



- If ambient light enters directly through the emitter/receiver face, the PI-G may malfunction. Always mount the sensor head with this side down.

- When mounting the sensor head, tighten the screws with a torque of 0.5 N•m or less.

- When detecting traveling targets, mount the sensor head as shown right. (Pay special attention to the orientation of the sensor head and direction of the target.)



Wiring

- Do not extend the cable more than 100 m 328.1'.
- The sensor head cable can be extended up to 5 m 16.4'.
- When not using synchronous input, cut the synchronous input wire at the base.
- The PI-G Series requires a startup time of about 300 ms before being ready to begin operation.

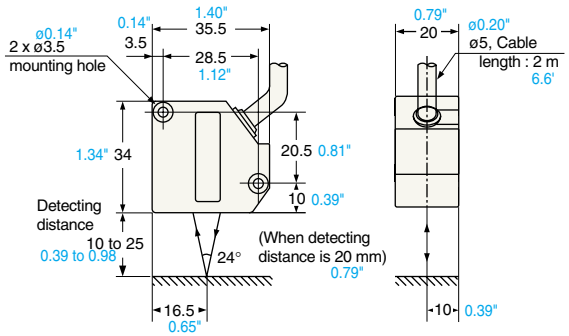
Dimensions

CAD

Unit: mm Inch

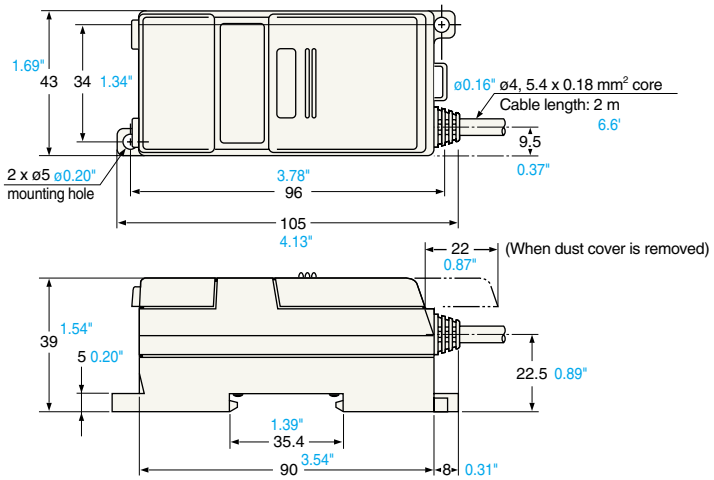
Sensor head

PI-G01

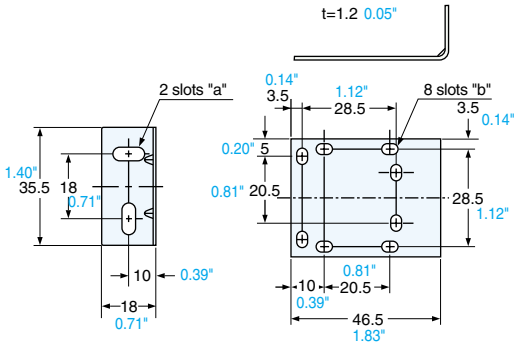


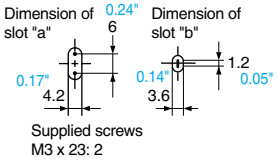
Amplifier

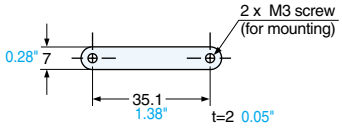
PI-G70



Sensor head mounting bracket (accessory for PI-G01)







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