

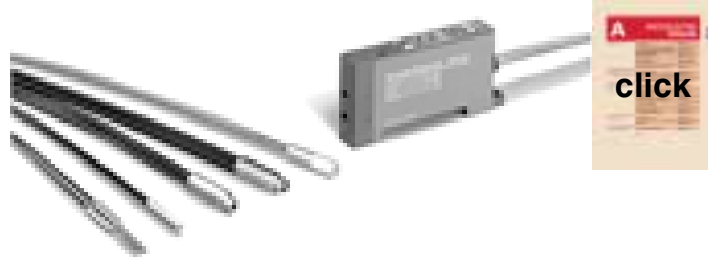
HPX Series

General-use/High Function Fiber Optic Photoelectric Sensors

FEATURES

High Sensitivity over a Long Scanning Distance of 800mm (Thru Scan Model), Easy-to-Use Functions/Structure, and High Reliability.

- A long scanning distance of 800mm. (with fiber **HPF-T001**)
- Quick response (50 μ s) plus mark detection.
- Low profile (10mm), DIN rail attachable at a single touch.
- Free-cut optical fiber unit attachable and detachable with single-touch, snap action lever.
- Furnished cable adapter allows ease-of-use with small diameter cables.
- Self-diagnostic LEDs plus self-diagnostic output.
- Fine-tuning of sensitivity using multi-turn potentiometer with indicator.
- PNP output model also standard.



ORDER GUIDE FOR AMPLIFIER UNIT

Model	Shape	Supply voltage	Output mode	Operation mode	Sensitivity adjustment	Stability indication	Self-diagnostic indication	Self-diagnostic output	Timer function	Catalog listing
High sensitivity		10 to 30Vdc	NPN open collector	Light ON/ Dark ON, selectable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-H1
			PNP open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-H2
Low hysteresis			NPN open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-A1
			PNP open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-A2
Fast detection			NPN open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-F1
			PNP open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-F2
Mark detection			NPN open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-V1
			PNP open collector		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	HPX-V2

CATALOG LISTINGS

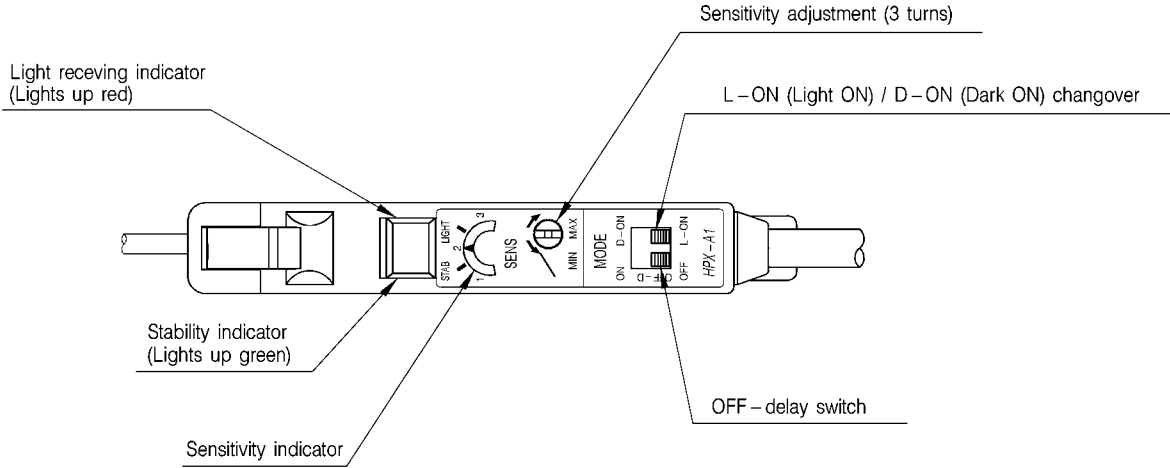
- HPX-□□
- Output: 1 : NPN transistor output
2 : PNP transistor output
 - Model: H : High sensitivity
A : Low hysteresis
F : High speed response
V : Mark detection (green light)

AMPLIFIER UNIT SPECIFICATIONS

Model	High sensitivity	Low hysteresis	Fast response	Mark detection
Catalog listing	HPX-H□	HPX-A□	HPX-F□	HPX-V□
Supply voltage	10 to 30Vdc (Ripple 10% max.)			
Current consumption	Max. 35mA			
Operating mode	Light operated/Dark operated, switch selectable			
Output form	NPN or PNP transistor open collector			
Control output	Output switching current: Max. 100mA (resistive load), output dielectric strength: Max. 30V, residual voltage: Max. 1V (at 100mA switching current), with output short-circuit protection circuit			
Self-diagnostic output	Output switching current: Max. 50mA (resistive load), output dielectric strength: Max. 30V, residual voltage: Max. 1V (at 50mA switching current), with output short-circuit protection circuit			
Response time	Max. 500 μ s for operation and recovery		Max. 50 μ s for operation, Max. 70 μ s for reset	Max. 500 μ s for operation and reset
Sensitivity adjustment	3-turn potentiometer with indicator			
Light Emitter	Red LED			Green LED
Indicator	Light-operated (LO) indicator: Red (ON during LO), Stability indicator: Green (ON during stable LO or DO (dark-operated): blinking during self-diagnostics)			
Timer function	OFF delay 40ms/instantaneous switch selectable			
Ambient light immunity	Incandescent Lamp: Max. 5,000lx, Sun light: Max. 20,000lx			
Operating temperature range	- 20 to +60°C (If gang mounted, max. operating temperature is 50°C)			
Storage temperature range	- 40 to +70°C			
Humidity range	35 to 85%RH (non-condensing)			
Insulation resistance	Min. 20M Ω (500Vdc megger)			
Dielectric strength	1,000Vac 50/60Hz for 1 min. between case and all electrically live metals			
Vibration	10 to 55Hz, 1.5mm peak-to-peak amplitude, 2 hours each in X, Y, and Z directions			
Shock	500m/s ² repeated 3 times in X, Y, and Z directions			
Wiring method	Pre-leaded			
Weight	About 55g (body only, with 2 m cable)			
Others	Equipped with a reverse connection protection circuit and power on/off malfunction prevention circuit (about 100ms)			

- Installation Instructions No.: CP-UM-3099E

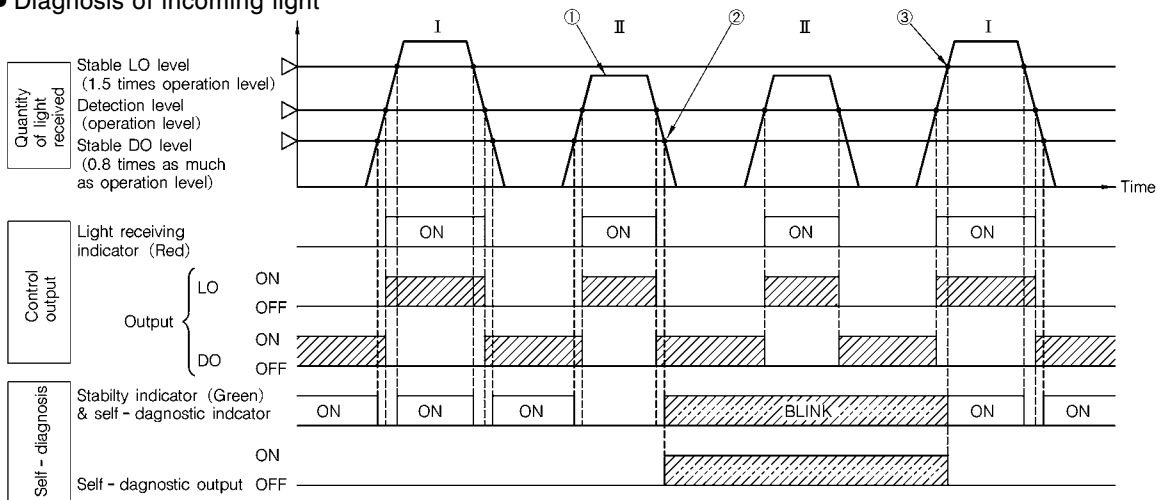
DETAILS OF FRONT PANEL



OPERATIONAL TIMING CHARTS OF OUTPUT AND INDICATORS

The **HPX's** self-diagnostic output and indicators latch when there is insufficient incoming light. Latches in the DARK ON (D-ON) mode or in the LIGHT ON (L-ON) mode.

• Diagnosis of incoming light



I : The incoming light is sufficient for correct operation.

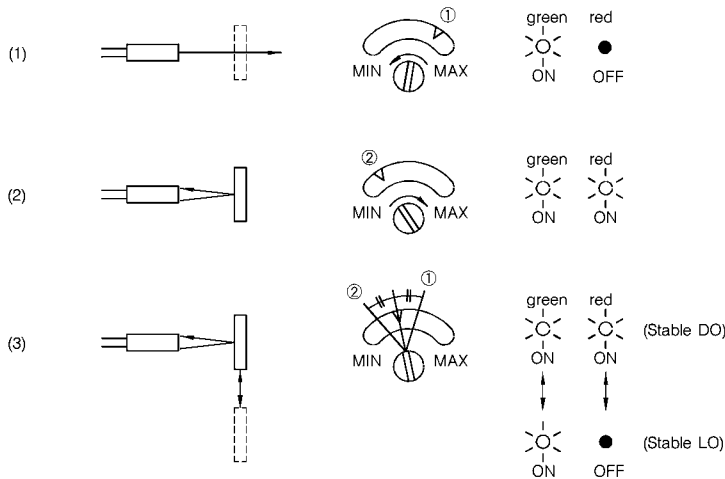
II : The incoming light is insufficient, making the self-diagnostic output and indicator go ON.

Explanation of timing charts:

1. If the photoelectric sensor returns to the stable DO level ② without reaching the stable LO state after the photoelectric sensor operates ①, the self-diagnostic output will go ON and latch high when the stability indicator starts blinking.
2. The self-diagnostic output will go OFF and latch low when the quantity of light received reaches the stable LO level ③ and the stability indicator finishes blinking.

SENSITIVITY POTENTIOMETER ADJUSTMENT METHOD

• Diffuse scan models



Adjustment method

With no target object present, turn the potentiometer counterclockwise from the maximum until the red indicator goes off. This may be maximum setting. This is point ①.

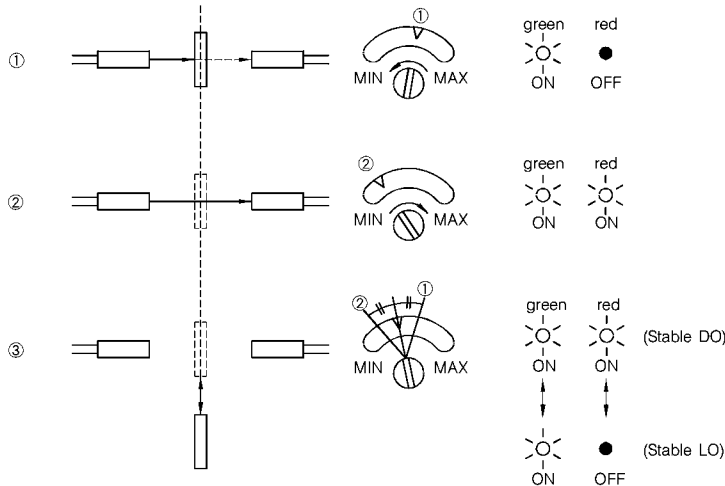
With the target in position, slowly turn the potentiometer clockwise from the minimum until the red indicator turns on. This is point ②.

Set the sensitivity potentiometer to the center of positions ① and ②. This is the optimal setting.

Note: If green stability light is not on at this optimal position, continue turning clockwise until green comes on. When using the diagnostic output, this will be required. If better light to dark contrast is needed, darken the background to minimize the reflectance when target object not present.

• Thru scan models

1) When an incompletely solid object is scanned



Adjustment method

With the target in position, slowly turn the potentiometer clockwise from the minimum to find point ① where the red indicator turns on.

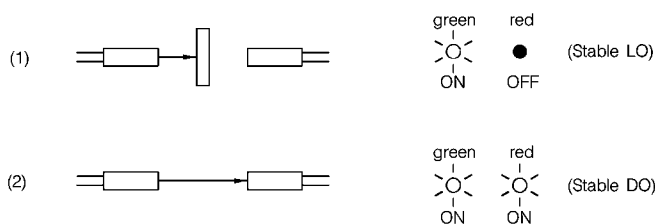
With no target object present, turn the potentiometer counterclockwise from the maximum until the red indicator goes off. This may be maximum setting. This is point ②.

Set the sensitivity potentiometer to the center of positions ① and ②. This is the optimal setting.

Note: If green stability light is not on at this optimal position, continue turning clockwise until green comes on. When using the diagnostic output, this will be required. If better light to dark contrast is needed, darken the background to minimize the reflectance when target object not present.

2) When a completely solid target object is scanned

Under the following two conditions, adjust the optical axis and the sensitivity so that the indicators are set to the states below:

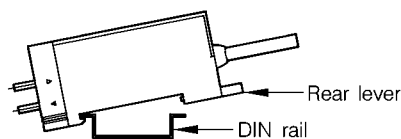


MOUNTING

The single-touch DIN-mounting system allows the **HPX** to be mounted onto a DIN rail without using any tools.

● How to mount/dismount the main body on/from the DIN rail

- Hook the front part of the amplifier over the DIN rail.



- Push down the rear part of the amplifier onto the rail.
- When dismantling the main body from the rail, simply pull out the rear lever with a flathead screwdriver.

● When a DIN rail is not used

When a DIN rail is not used, use the mounting bracket supplied. To attach the bracket to the DIN rail, follow the same procedure described above.

BASIC PRECAUTIONS

● Wiring

- Make sure you connect a photoelectric sensor to the power supply and load correctly.
- If a high-voltage or power cable exists near a photoelectric sensor lead, isolate the photoelectric sensor's lead or lay in another conduit to prevent surge and noise influence.
- Connect the lead securely to the connector using crimp terminal.
- Use a lead of at least 0.3mm² in cross-sectional area for extensions. The lead length should not be over 100m. Consider the influence of noise due to lead extension.
- If a switching power supply is used, ground its frame.
- If capacitive load is used, connect a current limiting resistor so as to limit the rush current to max. 100mA.

● Handling

- Do not swing a photoelectric sensor by its lead.
- Do not impact or damage the sensing head.
- Do not pull the lead of a photoelectric sensor with excessive force. The tensile strength is about 49N at 50cm from the end of the conduit.



RESTRICIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

YAMATAKE

Specifications are subject to change without notice.

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