Digital Fiber-Optic Switches

Model HPX-EG00/01: Standard
Model HPX-EG50/51: Long-distance

Sensing Satisfaction
— Freedom from Frequent Adjustments —

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Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

Digital Fiber-Optic Switches
Fiber-optic switches that offer **reliable detection** and **simple operation**.

These switches are designed for **ease of use** at the worksite.

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**Long-distance models are now available**

In addition to HPX-EG00/01, the long-distance HPX-EG50 and HPX-EG51 models have been added to the lineup. These models can be installed at a distance and used in applications with thin fiber-optic cables.

<table>
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<th>Long-distance models</th>
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<td>HPX-EG00: Standard distance, standard tuning</td>
</tr>
<tr>
<td>HPX-EG01</td>
<td>HPX-EG01: Standard distance, remote tuning</td>
</tr>
<tr>
<td>HPX-EG50/51</td>
<td>HPX-EG50: Long-distance, standard tuning</td>
</tr>
<tr>
<td>HPX-EG51</td>
<td>HPX-EG51: Long-distance, remote tuning</td>
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**FEATURE**

<table>
<thead>
<tr>
<th>Model HPX-EG00/01</th>
<th>Model HPX-EG50/51</th>
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**BASIC OPERATION**

- **Preset value**
- **Output indicator**
- **Received light level**
- **+ button**
- **- button**
- **Function selection button**
  - Provides an easy-to-understand menu for functions such as the LD/DO switch, key lock, and timer setting.
- **Auto-tuning button**
  - Just two presses of the button and auto-tuning is complete.

Threshold values can be adjusted directly.
**FEATURE 01** Fuss-free adjustment

Auto sensitivity switch function
This function automatically optimizes the sensitivity setting during auto tuning, affording easy operation while delivering the highest detection performance.

STA (Self Threshold Adjustment) function
This function allows the level of received light to be set as a reference point, enabling the detection threshold to be automatically adjusted by a given ratio in an updating cycle. This ensures the stable detection of target objects, eliminating the effect of fluctuations in the received light level due to environmental changes.

**FEATURE 02** Easy operation

Easy-to-understand excess gain indication
The excess gain indication varies from 0% (dark) to 999% (light), with a preset value of 100%. Variations in the received light indication can be eliminated in the same application.

**FEATURE 03** Performance

Three selectable sensing modes
Three sensing modes can be selected by the desired response speed and sensitivity, according to what is best for your application.

High accuracy detection
Note: Numerical values assume optimum conditions

<table>
<thead>
<tr>
<th>Sensing mode</th>
<th>Response time</th>
<th>Display maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP (high power)</td>
<td>5ms</td>
<td>1000%</td>
</tr>
<tr>
<td>NL (normal)</td>
<td>1ms</td>
<td>100%</td>
</tr>
<tr>
<td>SF (semi-fast)</td>
<td>500μs</td>
<td>100%</td>
</tr>
<tr>
<td>FT (fast)</td>
<td>250μs</td>
<td>100%</td>
</tr>
</tbody>
</table>

**FEATURE 04** Superior auto-tuning

Incorporates not only standard 2-point tuning, but also BGS tuning (without a target object), percent tuning and full auto-tuning.

2-point tuning

- With a target object
- Without a target object

BGS tuning

- No target object
- Background

Percent tuning

- No target object

Formula for excess gain indication: received light level / preset value × 100

Note for excess gain indication: received light level / preset value × 100

High high limit sensor

- Without liquid
- With liquid

High limit sensor

- Without liquid
- With liquid

- Without liquid

Light level with liquid

- 270
- 2035
- 3800

Light level without liquid

- Margin

- 13%
- 100%
- 187%
**Remote tuning models** (Model HPX-EG01/HPX-EG51)

Tuning can be done remotely from a connected device. Tuning automatically sets the sensor to the optimal sensitivity.

**FEATURE 06**
Reduced wiring

Up to 16 units, including a main unit (with power cable) and expansion units (without power cable) can be connected together. It goes without saying that Model HPX-EG can be used in conjunction. Since power to the expansion units is supplied via connectors from the main unit, only a single wire is required for each expansion unit.

* Only HPX-EG00 and HPX-EG01 offer reduced wiring.

**FEATURE 07**
Global standards compliance

Models complying with CE, UL and S-mark standards are available for safe use in export units.

* Only HPX-EG00 and HPX-EG01 are UL-listed and have the S Mark.

**FEATURE 08**
Eco-friendly measures

"Shorter cables can do the job" and "Cut cables only end up in the garbage!" In response to comments like these from our customers, we came to the decision that 1 m cables were sufficient for standard Model HPX-EGs. This reduces the quantity of waste generated, contributing to the protection of our natural environment.

* Only HPX-EG00 and HPX-EG01 are UL-listed and have the S Mark.

**Model number selection**

<table>
<thead>
<tr>
<th>Basic model No.</th>
<th>Model</th>
<th>Output</th>
<th>Cord</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPX-EG</td>
<td>00</td>
<td>Standard - Standard Sensitivity -</td>
<td>-S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>01</td>
<td>Remote tuning - Standard Sensitivity -</td>
<td>-2S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>Standard - High Sensitivity</td>
<td>-L02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>Remote tuning - High Sensitivity</td>
<td>-CT</td>
<td></td>
</tr>
</tbody>
</table>

Cable lead-out:
- Blank: 1m cable (standard)
- -LS: 2m cable
- -L05: 5m cable
- -CT: M8 connector

**Amplifier unit accessories**

- **Dedicated mounting bracket 1 pcs**: This dedicated bracket can be used instead of a DIN rail to mount a single amplifier. It is not included with the amplifier.
  - HPX-PW04

- **End plates 2 pcs**: End plates used when mounting on a DIN rail. They are not included with the amplifier.
  - HPX-PW03

**SAMPLE USE**

Substrate detection with a rail width change
When there is a change in the rail width or type of substrate, using remote tuning reduces the setup time required.

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**FEATURE 05**

"Shorter cables can do the job" and "Cut cables only end up in the garbage!"

In response to comments like these from our customers, we came to the decision that 1 m cables were sufficient for standard Model HPX-EGs. This reduces the quantity of waste generated, contributing to the protection of our natural environment.
Detailed View of the Operating Panel

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard Sensitivity</th>
<th>High Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPX-EG0</td>
<td>HPX-EG0-1S</td>
<td>HPX-EG0-1S</td>
</tr>
<tr>
<td>HPX-EG2</td>
<td>HPX-EG2-1S</td>
<td>HPX-EG2-1S</td>
</tr>
<tr>
<td>HPX-EG0</td>
<td>HPX-EG0-2S</td>
<td>HPX-EG0-2S</td>
</tr>
<tr>
<td>HPX-EG2</td>
<td>HPX-EG2-2S</td>
<td>HPX-EG2-2S</td>
</tr>
</tbody>
</table>

Light emitter
Red four-element LED (630nm)

Red four-element LED (660nm)

Power
12 to 24V DC +10% to -15% (ripple: 10% max.)

Current consumption
750mW max. (30mA max. at 24 VDC)

Output type
NPN open collector
PNP open collector
NPN open collector
PNP open collector

Control output
Switching current
Reduced wiring type: 50mA max.

Residual voltage
2V max.
2V max.
2V max.
2V max.

External input
0 to 2VDC
7.2 to 26.4VDC
0 to 2VDC
7.2 to 26.4VDC

Response time
200µs (max.)/1ms (max.)
200µs (max.)/1ms (max.)

Mutual interference prevention
2 units (at 5F mode, 4L mode)

Expansion unit addition
Up to 15 expansion units can be connected

Indicator
Output indicator (Turn on with output on)

Sealing
IP64 (IEC standard)

Ambient light immunity
Incandescent light: 5,000 lx max.
Sunlight: 20,000 lx max.

Operation temperature
-10 to +55°C (10°C to 11°C)

Operation humidity
35 to 85%RH (without condensation)

Vibration resistance
10 to 55 Hz, 1.5mm double amplitude, 2 hours in each direction of X, Y, Z

Shock resistance
500m/s², 3 times in each direction of X, Y, Z

Protection circuits
False pulse protection (200ms typ.)
Reverse polarity protection

Case material
Body: PC resin (black)
Cover: PC resin (clear gray)

Mass (only sensor with cable 1m)
Cable lead-out type (Model HPX-EG0-1S/-2S): Approx. 45g
Reduced wiring type (Model HPX-EG0-3S/-4S): Approx. 45g
Reduced wiring type (Model HPX-EG0-5S/-6S): Approx. 30g
Reduced wiring type (Model HPX-EG0-7S/-8S): Approx. 45g

Wiring diagram for the amplifier

Model HPX-EG0

NPN open collector output

Model HPX-EG1

NPN open collector output

Model HPX-EG2

NPN open collector output

Model HPX-EG5

NPN open collector output

NPN open collector output

External dimensions

1. Mounting bracket sold separately (pasting listing: Model HPX-PA04).

2. Models other than the above (Diameter: 2.0; insulator diameter: 1.2; nominal cross-section: 0.2 mm²)

3. The reduced wiring type expansion unit has a connector structure (male) for attaching additional units.

*1. The temperature varies depending on the number of gang-mounted sensor units as fellows.

- 1 or 2 units: -20 to +55°C
- 3 units: -20 to +50°C
- 4 or 5 units: -20 to +45°C
- 6 units: -20 to +40°C

*2. Models HPX-EG00-5S/6S

Outer diameter: 2.6;
Insulator diameter: 1.2;
Nominal cross-section: 0.2 mm²

*3. The reduced wiring type expansion unit has a connector structure (male) for attaching additional units.

*1. Mounting bracket sold separately (pasting listing: Model HPX-PA04).

*2. Model HPX-EG00-5S/6S

Outer diameter: 2.0;
Insulator diameter: 1.2;
Nominal cross-section: 0.2 mm²
## Characteristics of Scanning Distance

### Thru scan

<table>
<thead>
<tr>
<th>Fiber unit (Model No.)</th>
<th>Amplifiers (Model No.)</th>
<th>HP (Sms)</th>
<th>RL (1ms)</th>
<th>SF (50μm)</th>
<th>PL (250μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard fiber</td>
<td>HPX-E200/01</td>
<td>—</td>
<td>150</td>
<td>130</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>HPX-E250/11</td>
<td>350</td>
<td>300</td>
<td>240</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>HPX-E200/01</td>
<td>—</td>
<td>22</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>HPX-E250/11</td>
<td>160</td>
<td>180</td>
<td>140</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>HPX-E250/11</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>HPX-E250/11</td>
<td>85</td>
<td>85</td>
<td>80</td>
<td>43</td>
</tr>
</tbody>
</table>

### Diffuse scan

<table>
<thead>
<tr>
<th>Fiber unit (Model No.)</th>
<th>Amplifiers (Model No.)</th>
<th>HP (Sms)</th>
<th>RL (1ms)</th>
<th>SF (50μm)</th>
<th>PL (250μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard fiber</td>
<td>HPX-D200</td>
<td>—</td>
<td>150</td>
<td>130</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>HPX-D250/11</td>
<td>350</td>
<td>300</td>
<td>240</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>HPX-D200</td>
<td>—</td>
<td>22</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td></td>
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<td>160</td>
<td>180</td>
<td>140</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>HPX-D250/11</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>HPX-D250/11</td>
<td>85</td>
<td>85</td>
<td>80</td>
<td>43</td>
</tr>
</tbody>
</table>

## Operation

### Sensing type

- **Normal**: Full range
- **High Power (HP)**: High range
- **Semi Fast**: Semi range
- **Fast**: Fast range

### Timer type

- **Off-delay**: Timer starts when input is high
- **On-delay**: Timer starts when input is low
- **No timer**: No timer operation

### Indication type

- **Freezing display**: Indication stops
- **Display inversion**: Display is inverted

### Emitter frequency switching

- **Sender frequency switching**: Frequency can be switched

### Self Threshold Adjustment (STA)

- **Enable**: STA is enabled
- **Disable**: STA is disabled

### Monitor sleep mode

- **Enable monitor**: Monitor sleep mode is enabled
- **Disable monitor**: Monitor sleep mode is disabled

### Display inversion

- **Invert**: Display is inverted
- **Not invert**: Display is not inverted

### Initialization

- **Initialize**: ST is initialized
- **Do not initialize**: ST is not initialized

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*Unit: mm*