The H7422 series are photosensor modules with an internal high-voltage power supply circuit and a cooler installed to the metal package photomultiplier tube. Efficient cooling was achieved by placing the cooler near the photomultiplier tube to reduce thermal noise emitted from the photocathode and a high S/N ratio can be obtained even at extremely low light levels. The H7422-40 has high sensitivity in the 300 nm to 720 nm wavelengths. The H7422-50 is sensitive along a wide spectral range from 380 nm to 890 nm. The H7422-01, H7422-02 and H7422-20 have a maximum output current value of 100 µA and so are extremely effective when measurements are needed over a wide dynamic range. The photomultiplier tube is maintained at a constant temperature by monitoring the output from a thermistor installed near the photomultiplier and then regulating the current to the thermoelectric cooler.

### Product Variations

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Spectral Response</th>
<th>Max. Output Signal Current</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>H7422-40</td>
<td>300 nm to 720 nm</td>
<td>2 µA</td>
<td>GaAsP photocathode, QE 40 % at peak wavelength, high gain (P type) For photon counting</td>
</tr>
<tr>
<td>H7422P-40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7422-50</td>
<td>380 nm to 890 nm</td>
<td></td>
<td>GaAs photocathode, QE 12 % at peak wavelength, high gain (P type) For photon counting</td>
</tr>
<tr>
<td>H7422P-50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7422-01</td>
<td>300 nm to 850 nm</td>
<td>100 µA</td>
<td>Multialkali photocathode</td>
</tr>
<tr>
<td>H7422-02</td>
<td>300 nm to 870 nm</td>
<td></td>
<td>Infrared-extended multialkali photocathode</td>
</tr>
<tr>
<td>H7422-20</td>
<td>300 nm to 890 nm</td>
<td></td>
<td>Infrared-extended high-sensitivity multialkali photocathode</td>
</tr>
</tbody>
</table>

### Specifications

#### Parameter | H7422 Series | Unit
---|---|---
Suffx | -40 -50 -01 -02 -20 | —
Input Voltage | +11.5 to +15.5 | V
Max. Input Voltage for Main Unit | +18 | V
Max. Input Current for Main Unit | 62 -30 | mA
Max. Input Voltage for Thermoelectric Cooler | 2.6 | V
Max. Input Current for Thermoelectric Cooler | 2.2 | A
Max. Output Signal Current | 2 -100 | µA
Max. Control Voltage | +0.9 (Input impedance 100 kΩ) | V
Recommended Control Voltage Adjustment Range | +0.5 to +0.8 +0.25 to +0.8 | V
Effective Area | 5 7 | mm
Sensitivity Adjustment Range | 1:50 1:10^4 | —
Peak Sensitivity Wavelength | 580 800 400 500 630 | nm
Radiant Sensitivity | 420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
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550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 -420 nm 108 15 56 40 40 | mA/W
550 nm 176 50 36 56 72 -800 nm -90 -90 -1.2 -6.4 -46 | mA/W
Typ. | 0.4 0.5 0.03 0.08 0.1 | nA
Max. | 1.0 1.3 0.08 0.2 0.25 | nA
Dark Current | 550 nm 1.8 × 10^5 5.0 × 10^4 — — — | A/W
Typ. | 100 125 — — — | nA
Max. | 300 375 — — — | nA
Rise Time | 1.00 0.78 | ns
Ripple Noise | 0.6 | mV
Settling Time | 0.2 | s
Operating Ambient Temperature | +5 to +35 | °C
Storage Temperature | -20 to +50 | °C
Weight | Approx. 400 | g

*1: Control voltage = +0.8 V, PMT setting temperature 0 °C, used with C6137-02 and A7432
*2: After 30 minute storage in darkness
*3: Plateau voltage, PMT setting temperature 0 °C, used with C6137-02 and A7423
*4: Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF
*5: The time required for the output to reach a stable level following a change in the control voltage from +1.0 V to +0.5 V.
**Cooling Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>H7422 Series</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Method</td>
<td>Thermoelectric cooling</td>
<td>—</td>
</tr>
<tr>
<td>Max. Cooling Temperature (ΔT) *6</td>
<td>35</td>
<td>°C</td>
</tr>
<tr>
<td>Cooling Time *6</td>
<td>Approx. 5</td>
<td>min</td>
</tr>
</tbody>
</table>

*6: Input current to thermoelectric cooler=2.0 A

**Characteristics (Cathode radiant sensitivity, Gain)**

**Block Diagram**

**Dimensional Outlines (Unit: mm)**

---

**Current Output Type Photosensor Modules**
**Heatsink with Fan A7423**
The temperature of the H7422 outer case rises due to the thermoelectric cooler housed in the case. The A7423 heatsink efficiently radiates away this heat to prevent a temperature rise in the H7422. The A7423 can be easily installed onto the H7422 with four M3 screws. Apply a heat conductive grease onto the joint surface shared by the H7422 and A7423.

**Signal Cable E1168-05**
This signal cable is terminated with a BNC connector for easily connecting the H7422 to external equipment.

**Optical Fiber Adapter (FC Type) A7412**
The A7412 is an FC type optical fiber connector that attaches to the light input window of the H7422. The A7412 can easily be secured in place with four M2 screws.

**C-Mount Adapter A7413**
The A7413 mount adapter is used when a C-mount lens protruding 4 mm or more from the flange-back must be installed onto the H7422.

**Power Supply Unit with Temperature Control C8137-02**
The C8137-02 is a power supply unit with a temperature control function. Just connecting to an AC source of 100 V to 240 V generates the output voltages for the thermoelectric cooler and the A7423 fan, needed for operating the H7422. The photomultiplier tube temperature can be maintained to 0 °C by monitoring the thermistor and regulating the output current for the thermoelectric cooler. Control voltage can be varied by a knob on the front panel.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Input Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During Lock</td>
<td>140</td>
<td>mA</td>
</tr>
<tr>
<td>During Operation</td>
<td>90</td>
<td>mA</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>10.2 to 13.8</td>
<td>V</td>
</tr>
<tr>
<td>Weight</td>
<td>120</td>
<td>g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Cooling Temperature (ΔT)</td>
<td>35</td>
<td>°C</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Max. Input Current</td>
<td>1.2</td>
<td>A</td>
</tr>
<tr>
<td>Max. Power Consumption</td>
<td>15.8</td>
<td>V·A</td>
</tr>
<tr>
<td>Main Circuit Output Voltage</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Max. Output Current for Thermoelectric Cooler</td>
<td>2.2</td>
<td>A</td>
</tr>
<tr>
<td>Output Voltage for Fan</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Max. Control Output Voltage</td>
<td>1.26</td>
<td>V</td>
</tr>
<tr>
<td>Max. Control Input Voltage</td>
<td>0.9</td>
<td>V</td>
</tr>
<tr>
<td>Control Signal</td>
<td></td>
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</tr>
<tr>
<td>PMT Non-insulated TTL level input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Non-insulated TTL level input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error Signal Output Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermoelectric Cooler Non-insulated TTL level output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMT Non-insulated TTL level output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMT Non-insulated TTL level output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Setting Cooling Temperature</td>
<td>0</td>
<td>°C</td>
</tr>
<tr>
<td>Weight (excluding cables)</td>
<td>120</td>
<td>g</td>
</tr>
</tbody>
</table>

**Parameter** | **Value** | **Unit**
---|---|---
Max. Cooling Temperature (ΔT) | 35 | °C
Setting Cooling Temperature (preset at factory) | 0 | °C
Input Voltage | AC 100 to AC 240 | V
Input Voltage Frequency | 50/60 | Hz
Power Consumption | 30 | V·A
Main Circuit Output Voltage | +15 | V
Max. Current for Thermoelectric Cooler | 2.2 | A
Output Voltage for Fan | 12 | V
Control Voltage Adjustment Range | 0 to +0.9 | V
Weight | 1.1 | kg
Current Output Type Photosensor Modules H7422 Series

Options (Unit: mm)

1. Heatsink with Fan  A7423
   - Lead Length 50 ± 10
   - Top View
   - Side View

2. Power Supply Unit with Temperature Control  M9012
   - Fan Cable 1500 ± 50
   - Module Cable 1500 ± 50
   - Power Cable 1000 ± 50
   - External I/O Cable 1000 ± 50
   - External I/O Housing

3. Signal Cable  E1168-05
   - BNC-P Cable 1500 ± 50

4. Optical Fiber Adapter (FC Type)  A7412
   - Front View
   - Side View

5. C-Mount Adapter  A7413
   - Front View
   - Side View

6. Power Supply Unit with Temperature Control  C8137-02
   - Front View
   - Side View

Heatsink with Fan  A7423
- Top View
- Side View
- JST XMR-02V

Power Supply Unit with Temperature Control  M9012
- Fan Cable
- Module Cable
- Power Cable
- External I/O Cable
- External I/O Housing

Signal Cable  E1168-05
- BNC-P Cable

Optical Fiber Adapter (FC Type)  A7412
- Front View
- Side View

C-Mount Adapter  A7413
- Front View
- Side View

Power Supply Unit with Temperature Control  C8137-02
- Front View
- Side View

Heatsink with Fan  A7423
- Top View
- Side View

Power Supply Unit with Temperature Control  M9012
- Fan Cable
- Module Cable
- Power Cable
- External I/O Cable
- External I/O Housing

Signal Cable  E1168-05
- BNC-P Cable

Optical Fiber Adapter (FC Type)  A7412
- Front View
- Side View

C-Mount Adapter  A7413
- Front View
- Side View

Power Supply Unit with Temperature Control  C8137-02
- Front View
- Side View