

# Head-on PMT

## Photosensor Modules H10492 Series



The H10492 series photosensor modules incorporate a 25-mm (1") diameter head-on photomultiplier tube, a high-voltage power supply circuit and a low noise amplifier. Amplifiers are available with a current-to-voltage conversion factor of 1 V/μA or 0.1 V/μA and a frequency bandwidth of DC to 20 kHz, DC to 200 kHz or DC to 8 MHz. Photomultiplier tubes with different spectral response characteristics are provided for measurement in the visible range or visible to near IR range.

### Product Variations

| Type No.   | Spectral Response | Current-to-Voltage Conversion Factor* | Frequency Bandwidth* | Features                     |
|------------|-------------------|---------------------------------------|----------------------|------------------------------|
| H10492-001 | 300 nm to 650 nm  | 1 V/μA                                | DC to 20 kHz         | For visible range            |
| H10492-011 | 300 nm to 850 nm  |                                       |                      | For visible to near IR range |
| H10492-002 | 300 nm to 650 nm  | 0.1 V/μA                              | DC to 200 kHz        | For visible range            |
| H10492-012 | 300 nm to 850 nm  |                                       |                      | For visible to near IR range |
| H10492-003 | 300 nm to 650 nm  |                                       | DC to 8 MHz          | For visible range            |
| H10492-013 | 300 nm to 850 nm  |                                       |                      | For visible to near IR range |

\* The amplifier specification can be changed upon request. Feel free to contact our sales office.  
This product can't be used at vacuum environment or reduced pressure environment.

### Specifications

(at +25 °C)

| Parameter                                       |  | H10492 Series   |                       | Unit                  |      |
|---|--|---|-----------------------|-----------------------|------|
| Suffix  |  | -001 / -002 / -003  | -011 / -012 / -013    | —                     |      |
| Input Voltage                                   |  | ±11.5 to ±15.5  |                       | V                     |      |
| Max. Input Voltage                              |  | ±18   |                       | V                     |      |
| Max. Input Current *1                           |  | +4 / -1 (-001/-011), +11 / -8 (-002/-012), +24 / -21 (-003/-013)  |                       | mA                    |      |
| Max. Control Voltage                            |  | +1.2 (Input Impedance 1 MΩ)   |                       | V                     |      |
| Recommended Control Voltage Adjustment Range *2 |  | +0.5 to +1.1 (Input Impedance 1 MΩ)   |                       | V                     |      |
| Effective Area                                  |  | φ22   |                       | mm                    |      |
| Peak Sensitivity Wavelength                     |  | 420   |                       | nm                    |      |
| Cathode   | Luminous Sensitivity                               | Min.  | 60                    | 80                    |      |
|   |  | Typ.  | 90                    |                       | 150  |
|   | Blue Sensitivity Index (CS 5-58)                   | Typ.  | 10.5                  | —                     | —    |
|   | Red / White Ratio                                  | Typ.  | —                     | 0.2                   | —    |
| Radiant Sensitivity *3                          |  | Typ.  | 85                    | 64                    | mA/W |
| Suffix (with internal 20 kHz amp)               |  | -001  | -011                  | —                     |      |
| Anode   | Luminous Sensitivity *4                            | Min.  | 4.0 × 10 <sup>7</sup> | 2.0 × 10 <sup>7</sup> | V/lm |
|   |  | Typ.  | 1.8 × 10 <sup>8</sup> | 7.5 × 10 <sup>7</sup> |      |
|   | Radiant Sensitivity *3 *4                          | Typ.  | 170                   | 32                    | V/nW |
|   | Voltage Output Depending on PMT Dark Current *4 *5 | Typ.  | 3                     | 3                     | mV   |
| Max.  |  | 20  | 20                    |                       |      |
| Max. Output Signal Voltage *6                   |  | +10 (Load resistance 10 kΩ)   |                       | V                     |      |
| Current-to-Voltage Conversion Factor            |  | 1   |                       | V/μA                  |      |
| Suffix (with internal 200 kHz / 8 MHz amp)      |  | -002 / -003   | -012 / -013           | —                     |      |
| Anode   | Luminous Sensitivity *4                            | Min.  | 4.0 × 10 <sup>6</sup> | 2.0 × 10 <sup>6</sup> | V/lm |
|   |  | Typ.  | 1.8 × 10 <sup>7</sup> | 7.5 × 10 <sup>6</sup> |      |
|   | Radiant Sensitivity *3 *4                          | Typ.  | 17                    | 3.2                   | V/nW |
|   | Voltage Output Depending on PMT Dark Current *4 *5 | Typ.  | 0.3                   | 0.3                   | mV   |
| Max.  |  | 2   | 2                     |                       |      |
| Max. Output Signal Voltage *6                   |  | -002 / -012: +10 (Load resistance 10 kΩ)<br>-003 / -013: +10 (Load resistance 500 Ω), +5 (Load resistance 50 Ω) |                       | V                     |      |
| Current-to-Voltage Conversion Factor            |  | 0.1   |                       | V/μA                  |      |
| <b>H10492 series</b>                            |  |   |                       |                       |      |
| Output Offset Voltage                           |  | Typ. ±1   |                       | mV                    |      |
| Ripple Noise *4 *7 *8 (peak to peak)            |  | Max. 0.6 (-001 / -002 / -011 / -012), 0.8 (-003 / -013)   |                       | mV                    |      |
| Settling Time *9                                |  | Max. 10   |                       | s                     |      |
| Operating Ambient Temperature *10               |  | +5 to +50   |                       | °C                    |      |
| Storage Temperature *10                         |  | -20 to +50  |                       | °C                    |      |
| Weight  |  | Typ. 170 (-001 / -002 / -003), 180 (-011 / -012 / -013)   |                       | g                     |      |

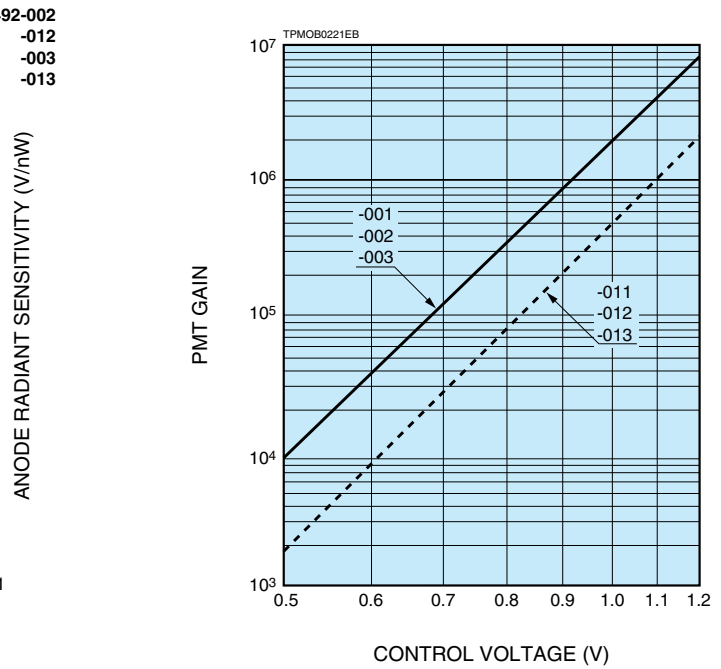
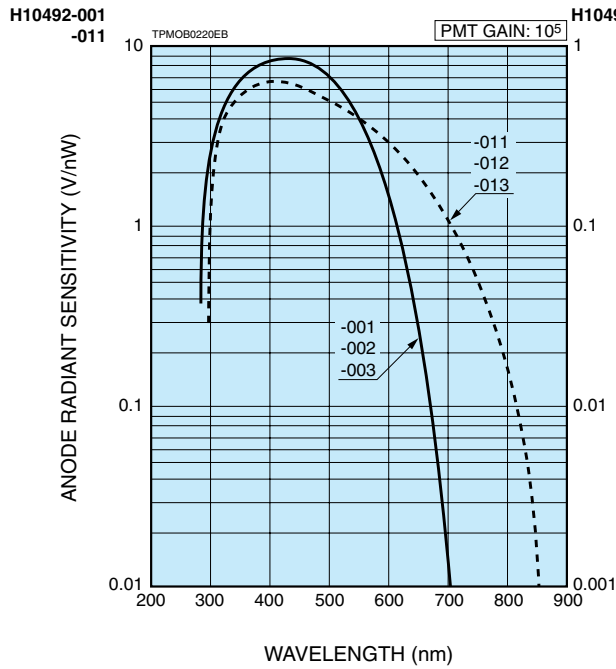
\*1: At ±15 V input voltage, +1.0 V control voltage, and output current equal to dark current \*2: DAC (I<sup>2</sup>C interface) can be installed in the module, please specify when ordering. \*3: Measured at the peak sensitivity wavelength \*4: Control voltage = +1.0 V \*5: After 30 minutes storage in darkness.

The actual output value in darkness is the sum of dark current and offset voltage. \*6: At ±15 V input voltage

\*7: Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF \*8: -003, -013 Amplifier noise = 8 mV typ. (peak to peak)

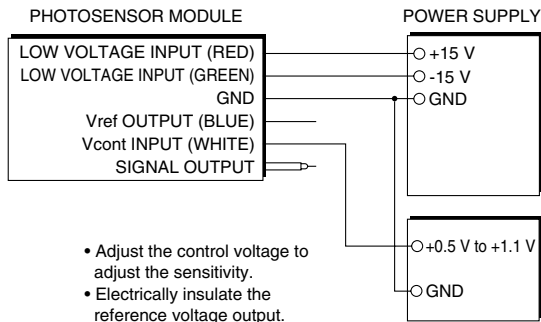
\*9: The time required for the output to reach a stable level following a change in the control voltage from +1.0 V to +0.5 V. \*10: No condensation.

## Characteristics (Cathode radiant sensitivity, PMT gain)

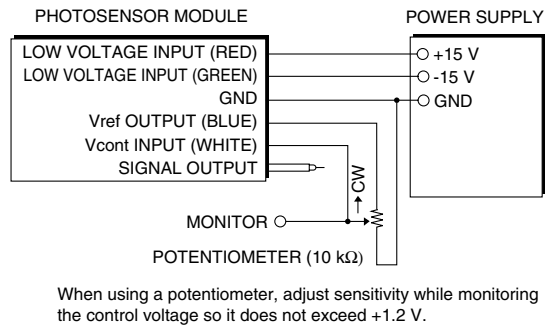


## Sensitivity Adjustment Method

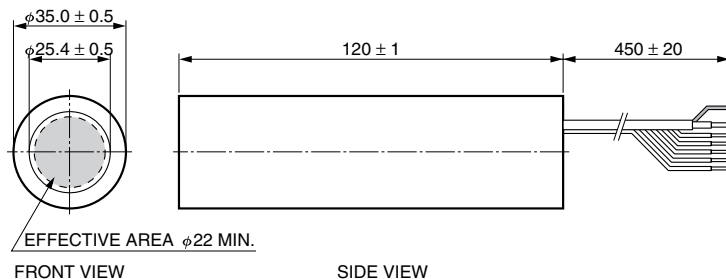
### VOLTAGE PROGRAMMING



### RESISTANCE PROGRAMMING



## Dimensional Outlines (Unit: mm)



LOW VOLTAGE INPUT (+15 V) : AWG26 (RED)  
 LOW VOLTAGE INPUT (-15 V) : AWG26 (GREEN)  
 GND : AWG26 (BLACK)  
 Vref OUTPUT (+1.2 V) : AWG26 (BLUE)  
 Vcont INPUT (+0.5 V to +1.1 V) : AWG26 (WHITE)  
 SIGNAL OUTPUT : RG-174/U

TPMOA0059EA