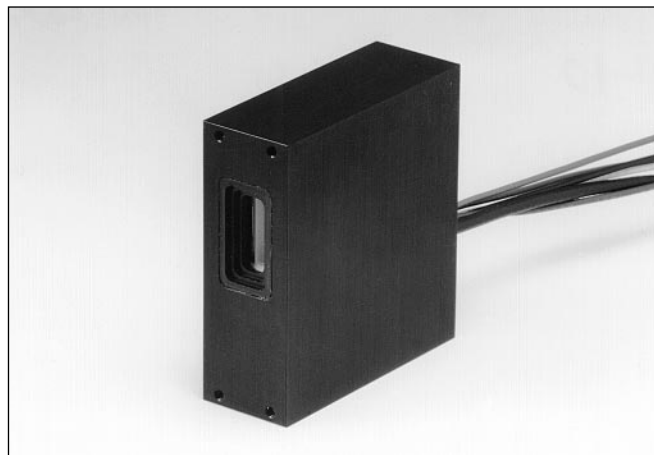


Integrated Photomultiplier Modules Including High Voltage Power Supply and Amplifier

The H7710, H7711 and H7712 series are photomultiplier tube (PMT) based integrated photosensor modules. All the models in these series comprise a 13 mm (1/2 inch) diameter side-on photomultiplier tube and a Cockcroft-Walton type high voltage power supply assembled in a compact aluminum housing. They feature very high sensitivity, excellent output linearity, and power consumption which is low enough to enable battery-powered operations.

The H7710 series outputs current signal direct from the photomultiplier tube anode.

The H7711 and H7712 series employ a current to voltage converter which eliminates the need for an external amplifier. The H7711 series includes a high gain 20 kHz BW amplifier, and the H7712 series includes a low gain 200 kHz BW amplifier.



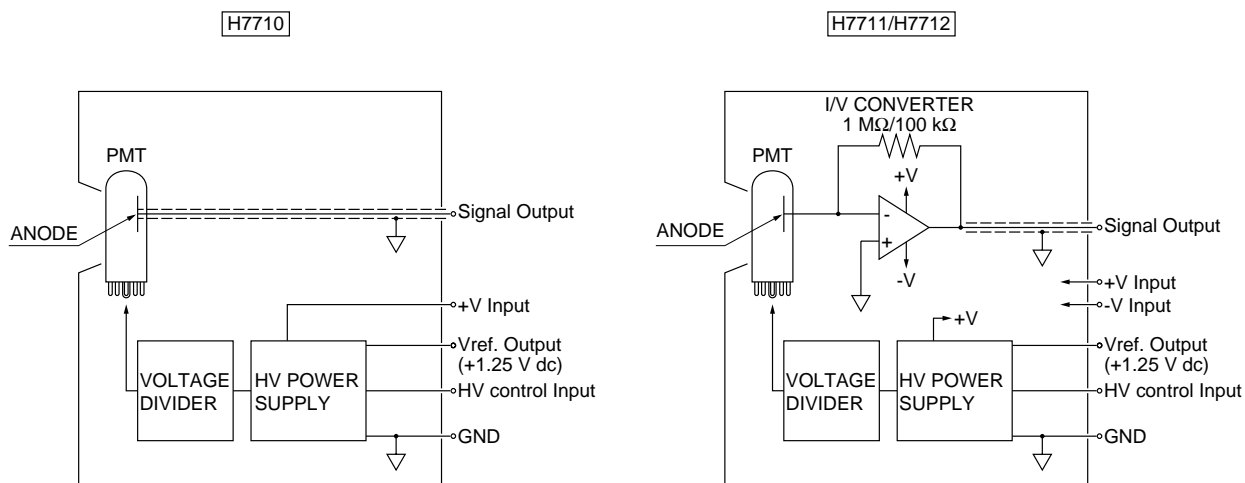
FEATURES

- Easy to Use
- Compact Size
- Integrated Package
- Low Power Consumption
- High Sensitivity
- Excellent Output Linearity
- No Exposed High Voltage

APPLICATIONS

- O/E Conversion
- Transmission/Absorption/Reflection Detection
- Emission/Fluorescence Detection
- Other Low Light Level Detection

Figure 1: Schematic Diagrams



TPMOC0132EA

PHOTOSENSOR MODULES H7710/H7711/H7712 SERIES

STANDARD PHOTODIODE MODULES

Type No.	Spectral Range	Amplifier Section	
		Current to Voltage Conversion Factor	Bandwidth
H7710-01	185 nm to 750 nm	—	—
H7710-02	185 nm to 900 nm	—	—
H7710-03	185 nm to 900 nm	—	—
H7710-04	185 nm to 830 nm	—	—
H7711-01	185 nm to 750 nm	1 V/μA (1 MΩ)	DC to 20 kHz
H7711-02	185 nm to 900 nm	1 V/μA (1 MΩ)	DC to 20 kHz
H7711-03	185 nm to 900 nm	1V/μA (1 MΩ)	DC to 20 kHz
H7711-04	185 nm to 830 nm	1V/μA (1 MΩ)	DC to 20 kHz
H7712-01	185 nm to 750 nm	0.1 V/μA (100 kΩ)	DC to 200 kHz
H7712-02	185 nm to 900 nm	0.1 V/μA (100 kΩ)	DC to 200 kHz
H7712-03	185 nm to 900 nm	0.1 V/μA (100 kΩ)	DC to 200 kHz
H7712-04	185 nm to 830 nm	0.1 V/μA (100 kΩ)	DC to 200 kHz

SPECIFICATIONS

● TYPICAL CHARACTERISTICS (Control Voltage: +1 V dc, Ta: 25 °C)

Parameter	Type No.	Value	Unit
Luminous Sensitivity (with 2856K light source)	H7710-01	700	A/lm
	H7710-02	2500	A/lm
	H7710-03	2000	A/lm
	H7710-04	700	A/lm
	H7711-01	7.0×10^8	V/lm
	H7711-02	2.5×10^9	V/lm
	H7711-03	2.0×10^9	V/lm
	H7711-04	7.0×10^8	V/lm
	H7712-01	7.0×10^7	V/lm
	H7712-02	2.5×10^8	V/lm
	H7712-03	2.0×10^8	V/lm
	H7712-04	7.0×10^7	V/lm
Radiant Sensitivity at Maximum Response -01: at 420 nm -02: at 600 nm -03: at 450 nm -04: at 530 nm	H7710-01	5.2×10^5	A/W
	H7710-02	6.0×10^5	A/W
	H7710-03	4.2×10^5	A/W
	H7710-04	2.5×10^5	A/W
	H7711-01	5.2×10^{11}	V/W
	H7711-02	6.0×10^{11}	V/W
	H7711-03	4.2×10^{11}	V/W
	H7711-04	2.5×10^{11}	V/W
	H7712-01	5.2×10^{10}	V/W
	H7712-02	6.0×10^{10}	V/W
	H7712-03	4.2×10^{10}	V/W
	H7712-04	2.5×10^{10}	V/W
Dark Current	H7710-01	1	nA
	H7710-02	1	nA
	H7710-03	2	nA
	H7710-04	0.1	nA
Offset Voltage	H7711	±3	mV
	H7712	±3	mV
Induced Ripple in Signal *1	H7710	1	mV
	H7711	4	mV
	H7712	4	mV
Linearity *2		±0.5	%

*1: Measured across 1 MΩ/22 pF

*2: PMT Output Current at 10 μA (DC Mode)

●GENERAL

Parameter		Value	Unit
Recommended	H7710	+11.5 to +15.5	V dc
Supply Voltage Range	H7711, H7712	±11.5 to ±15.5	V dc
Supply Current (MAX.)	H7710 +15 V	7	mA
(No Signal Input, Control Voltage: +1 V)	H7711, H7712 +15 V/-15 V	7/1	mA
Control Voltage to PMT Applied Voltage Ratio		1: 10 ³	—
Sensitivity Adjustable Range (Relative Sensitivity)		1: 10 ⁴	—
Settling Time (Sensitivity Control) (MAX.)		2*	s
Photosensitive Area		3.7 × 13.0	mm
Overall Dimensions		19.0 × 50.8 × 53.2	mm
Weight		Approx. 100	g

* Against HV control voltage change of +1.0 V to +0.5 V.

●MAXIMUM RATINGS (Absolute Maximum Values)

Parameter		Value	Unit
Supply Voltage	H7710	+18	V dc
	H7711, H7712	±18	V dc
Control Voltage		+1.2	V dc
Output Current	H7710	-10	μA
Output Voltage (In DC mode)	H7711	+10	V
	H7712	+1	V
Operating Temperature		+5 to +50	°C
Storage Temperature		-20 to +50	°C
Operating/Storage Humidity		90*	% RH

* With no moisture condensation

Figure 2: Typical Spectral Responses (H7710)

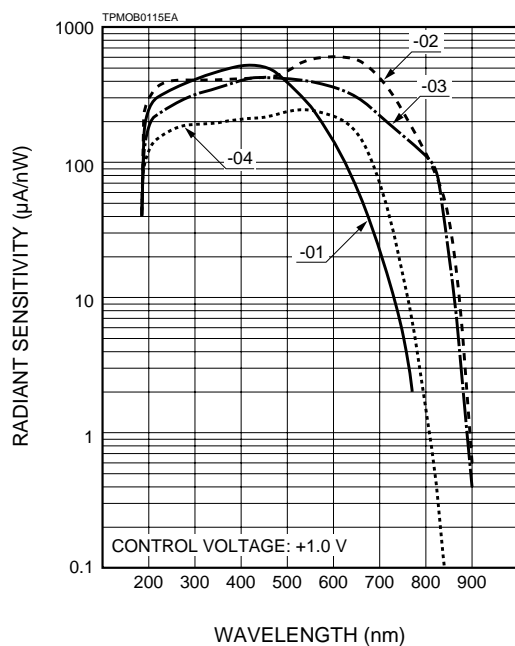


Figure 3: Typical Spectral Responses (H7711/H7712)

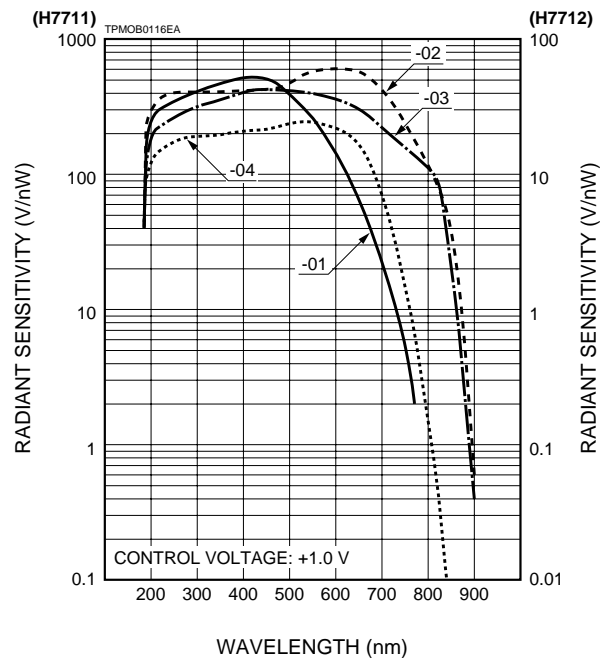


Figure 4: Sensitivity Adjusting Characteristics (H7710)

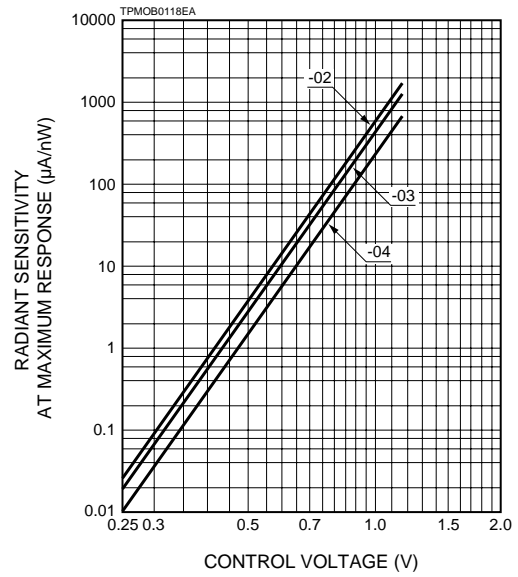
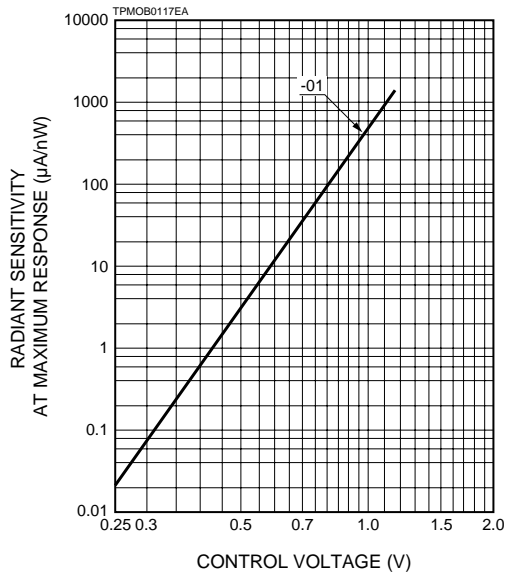


Figure 5: Sensitivity Adjusting Characteristics (H7711/H7712)

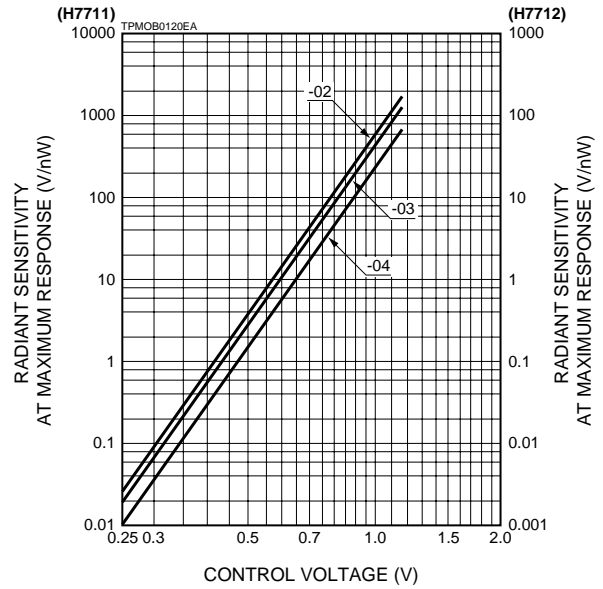
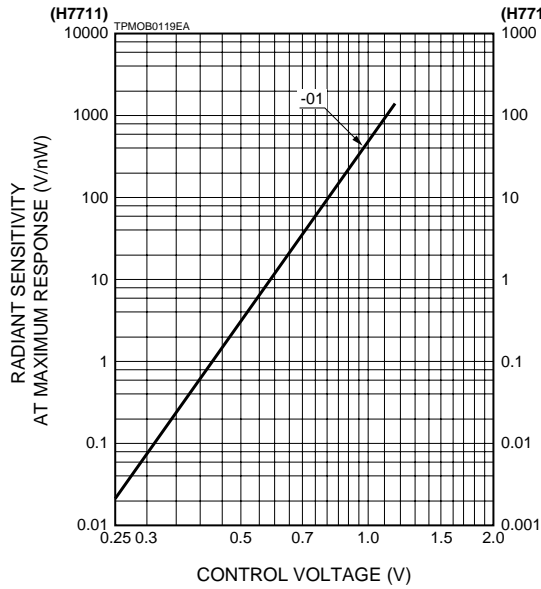


Figure 6: DC Linearity of PMT Output (H7710)

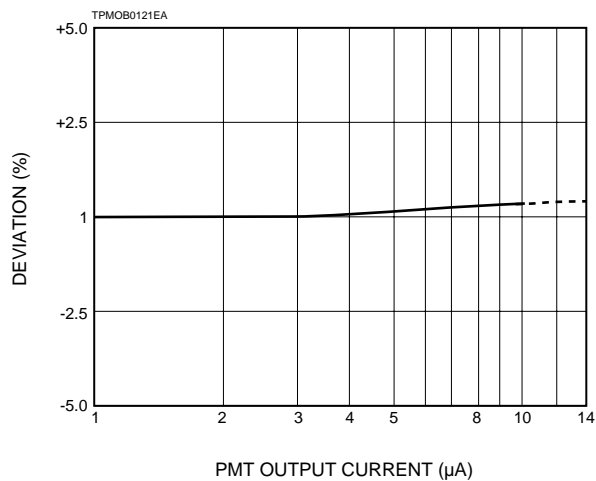
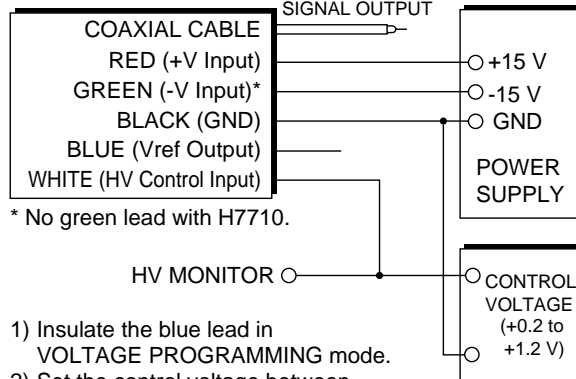


Figure 7: Wiring Examples

EXTERNAL VOLTAGE CONTROL

PHOTOSENSOR
MODULE

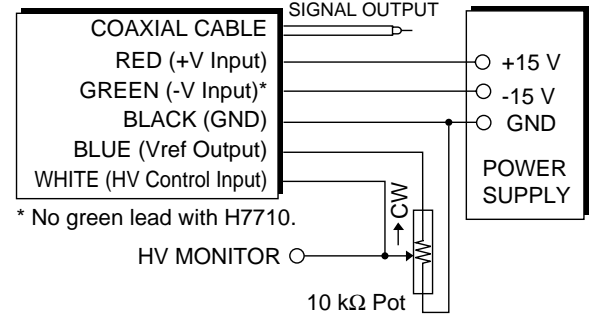


* No green lead with H7710.

- 1) Insulate the blue lead in VOLTAGE PROGRAMMING mode.
- 2) Set the control voltage between +0.2 and +1.2 volts for gain adjustment.
- 3) Making the HV control voltage 0 V de-energizes the PMT.
- 4) The input impedance of "HV Control Input" is 100 kΩ.

RESISTANCE CONTROL

PHOTOSENSOR
MODULE

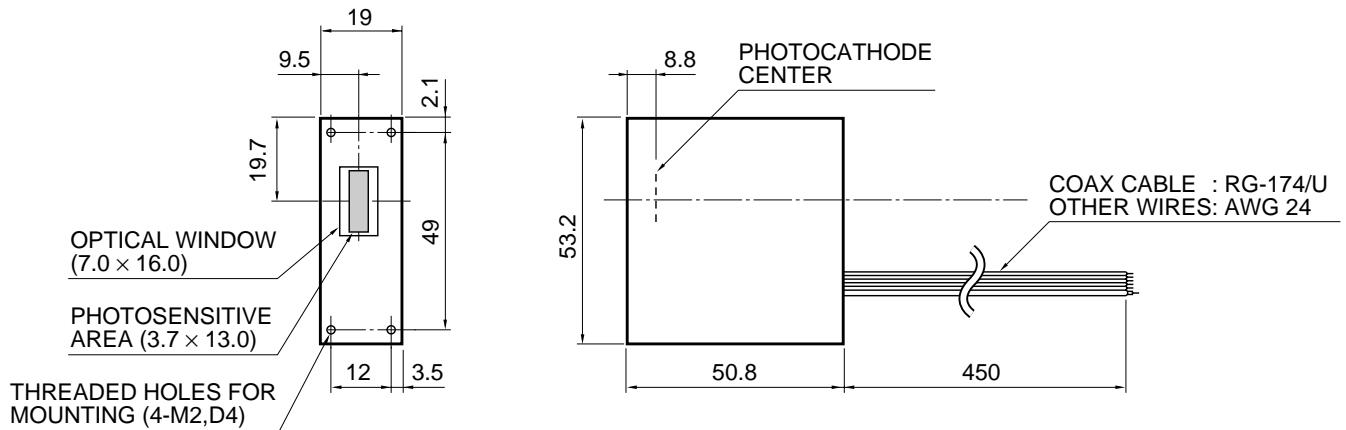


* No green lead with H7710.

- 1) Turning the potentiometer clockwise (CW) increases the module sensitivity.

TPMOC0133EA

Figure 8: Dimensional Outline (Unit: mm)



TPMOA00133EA

PHOTOSENSOR MODULES H7710/H7711/H7712 SERIES

HAMAMATSU

Homepage URL <http://www.hamamatsu.com>

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