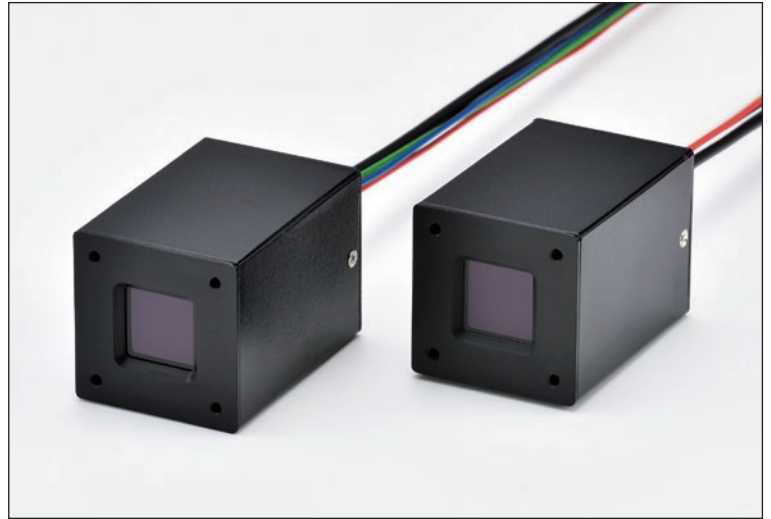


FEATURES

- High quantum efficiency: GaAsP photocathode
- Large effective area: □14 mm
- H15460 SERIES: Voltage output
- H15461 SERIES: Current output



Left: H15460 Series, Right: H15461 Series

SELECTION GUIDE

Parameter		H15460-40	H15460-40-01	H15461-40	H15461-40-01
Built-in features	PMT	●	●	●	●
	Divider circuit	●	●	●	●
	High voltage power supply	●	●	●	●
	Pre amplifier	●	●	—	—
	Signal cable with BNC-P plug connector	—	●	—	●

Figure 1: Spectral response

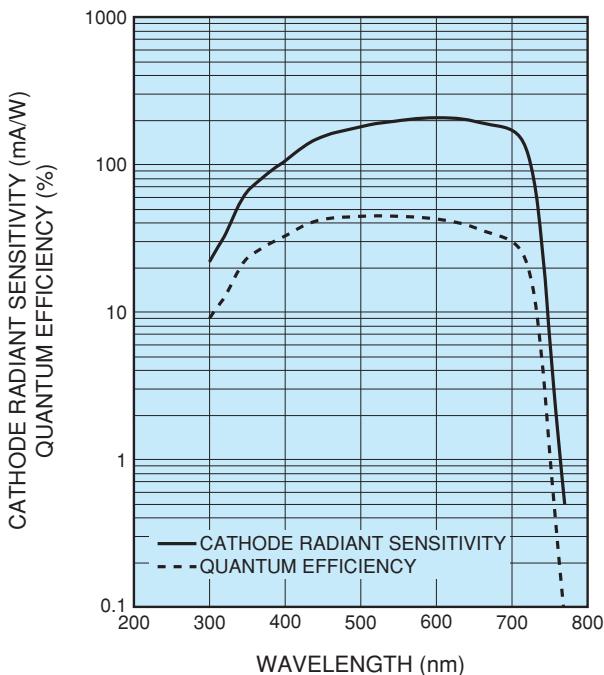
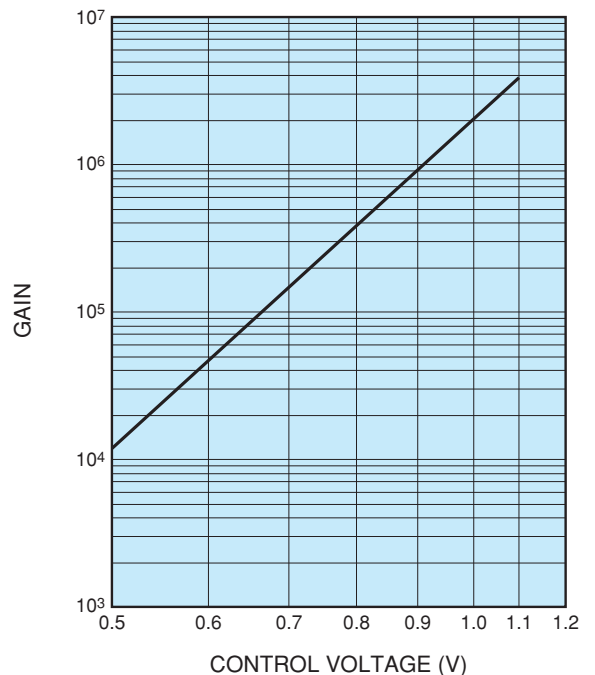


Figure 2: Typical gain



PHOTOMULTIPLIER TUBE MODULES

H15460 SERIES / H15461 SERIES

SPECIFICATIONS

H15460-40 SERIES (Voltage output)

(at 25 °C)

Parameter			H15460-40	H15460-40-01	Unit
Input voltage range			±4.5 to ±5.5		V
Max. input voltage			±5.5		V
Max. input current ^①			+26.5 / -23		mA
Max. output signal voltage ^②			+2		V
Max. control voltage ^③			+1.1		V
Recommended control voltage adjustment range ^③			+0.5 to +1.0		V
Effective area			14 × 14		mm
Spectral response range			300 to 740		nm
Peak quantum efficiency wavelength			520		nm
Cathode	Quantum efficiency ^④	Min.	40		%
		Typ.	45		
	Radiant sensitivity ^④	Min.	168		mA/W
		Typ.	189		
Luminous sensitivity	Typ.	850		μA/lm	
	Min.	3.4		V/nW	
Radiant sensitivity ^④	Typ.	7.5			
	Luminous sensitivity	Typ.	3.4 × 10 ⁷		V/lm
Voltage output in darkness ^⑥		Typ.	0.2		mV
	Max.	1			
Gain	Typ.	2.0 × 10 ⁶		—	
	Frequency bandwidth (-3 dB)			DC to 30 MHz	
Current-to-voltage conversion factor			0.02		V/μA
Output offset voltage			±5		mV
Ripple noise (peak to peak) ^{⑤⑦}			0.5		mV
Settling time ^⑧			10		s
Operating ambient temperature ^⑨			+5 to +50		°C
Storage temperature ^⑨			-20 to +50		°C
Weight			98	110	g

NOTE: ① At ±5 V input voltage and +1.0 V control voltage in darkness.

② At ±5 V input voltage, Averaged over any interval of 30 s maximum, Load resistance = 10 kΩ, Max pulse output signal voltage = +2 V.

③ Input impedance = 1 MΩ ④ Measured at the peak sensitivity wavelength ⑤ Control voltage = +1.0 V

⑥ After 30 min storage in darkness. The actual output value in darkness is the sum of dark current and offset voltage.

⑦ Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF

⑧ 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. ⑨ No condensation

Figure 3: Typical output characteristics

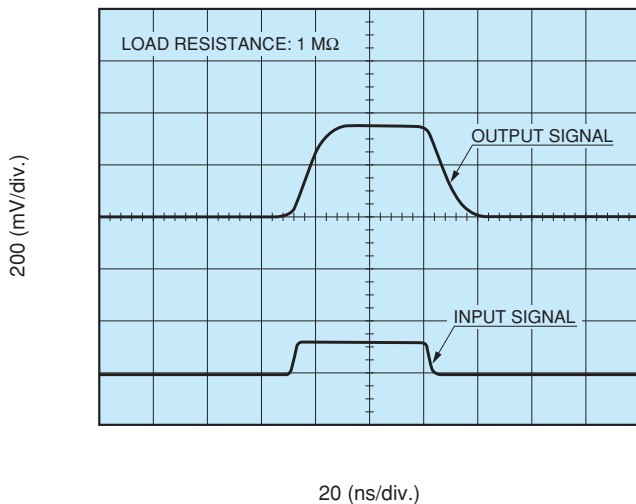
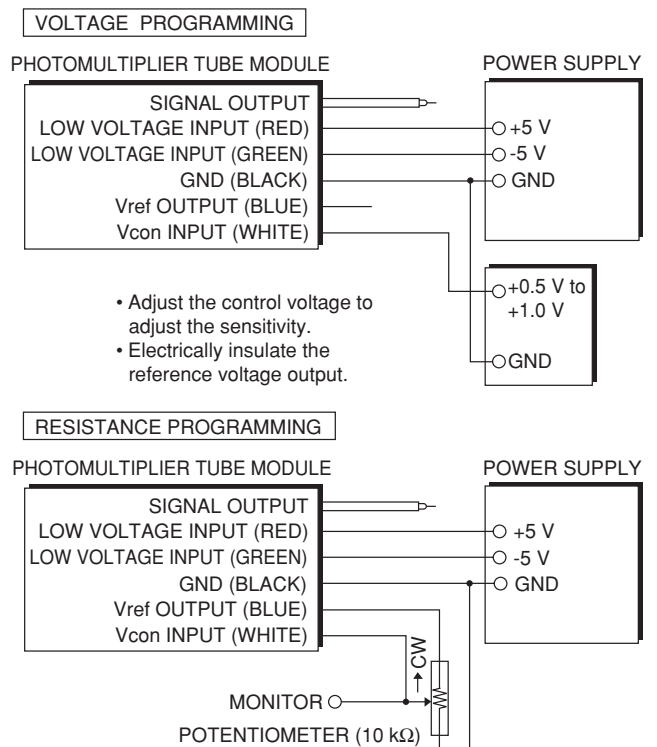


Figure 4: Sensitivity adjustment method



* When using a potentiometer, adjust sensitivity while monitoring the control voltage so it does not exceed +1.1 V.

* When input voltage is +4 V or less, please set resistance of potentiometer to 100 kΩ.

H15461-40 SERIES (Current output)

(at 25 °C)

Parameter		H15461-40	H15461-40-01	Unit	
Input voltage range		+4.5 to +5.5		V	
Max. input voltage		+5.5		V	
Max. input current ^①		+3.5		mA	
Max. output signal current ^②		100		μA	
Max. control voltage ^③		+1.1		V	
Recommended control voltage adjustment range ^③		+0.5 to +1.0		V	
Effective area		14 × 14		mm	
Spectral response range		300 to 740		nm	
Peak quantum efficiency wavelength		520		nm	
Cathode	Quantum efficiency ^④	Min.	40	%	
		Typ.	45		
	Radiant sensitivity ^④	Min.	168	mA/W	
		Typ.	189		
Luminous sensitivity		Typ.		μA/lm	
Anode ^⑤	Radiant sensitivity ^④	Min.	1.7 × 10 ⁵	A/W	
		Typ.	3.8 × 10 ⁵		
	Luminous sensitivity		Typ.		A/lm
	Dark current ^⑥	Typ.	10	nA	
		Max.	50		
Gain		Typ.		—	
Rise time		Typ.		ns	
T.T.S.		Typ.		ns	
Ripple noise (peak to peak) ^{⑤,⑦}		Max.		mV	
Settling time ^⑧		Max.		s	
Operating ambient temperature ^⑨		+5 to +50		°C	
Storage temperature ^⑨		-20 to +50		°C	
Weight		93	105	g	

- NOTE:** ①At +5 V input voltage and +1.0 V control voltage in darkness.
 ②At +5 V input voltage, Maximum output signal current = 0.1 mA, Averaged over any interval of 30 s maximum.
 ③Input impedance = 1 MΩ ④Measured at the peak sensitivity wavelength ⑤Control voltage = +1.0 V
 ⑥After 30 min storage in darkness.
 ⑦Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF
 ⑧The 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. ⑨No condensation

Figure 5: Output waveform

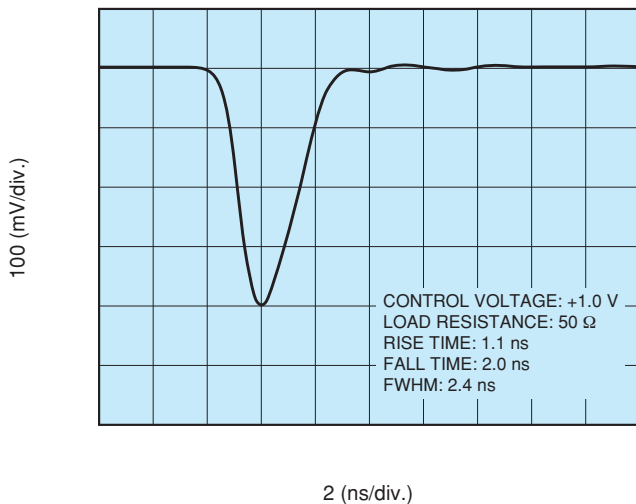
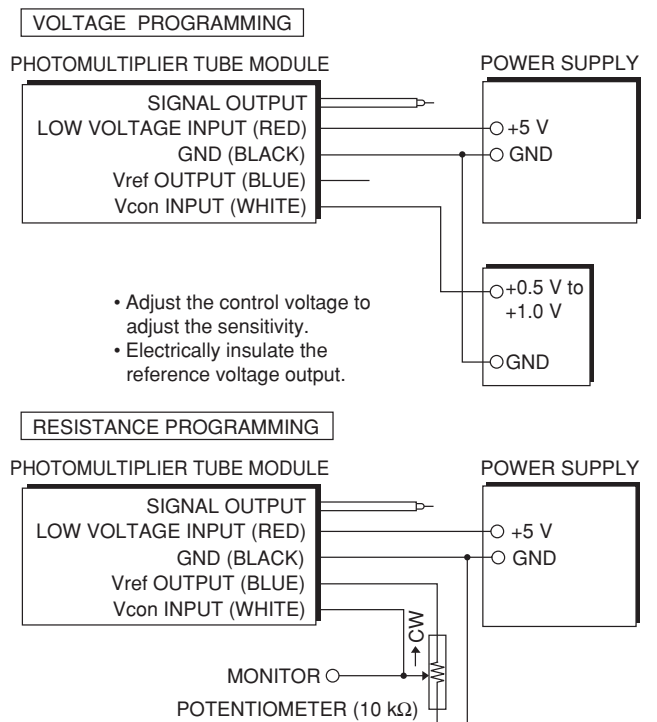


Figure 6: Sensitivity adjustment method

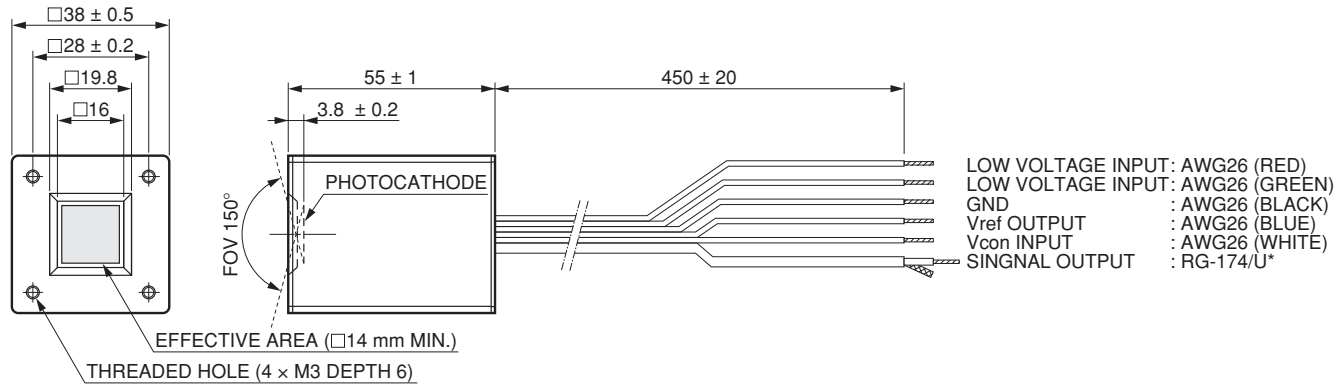


- * When using a potentiometer, adjust sensitivity while monitoring the control voltage so it does not exceed +1.1 V.
- * When input voltage is +4 V or less, please set resistance of potentiometer to 100 kΩ.

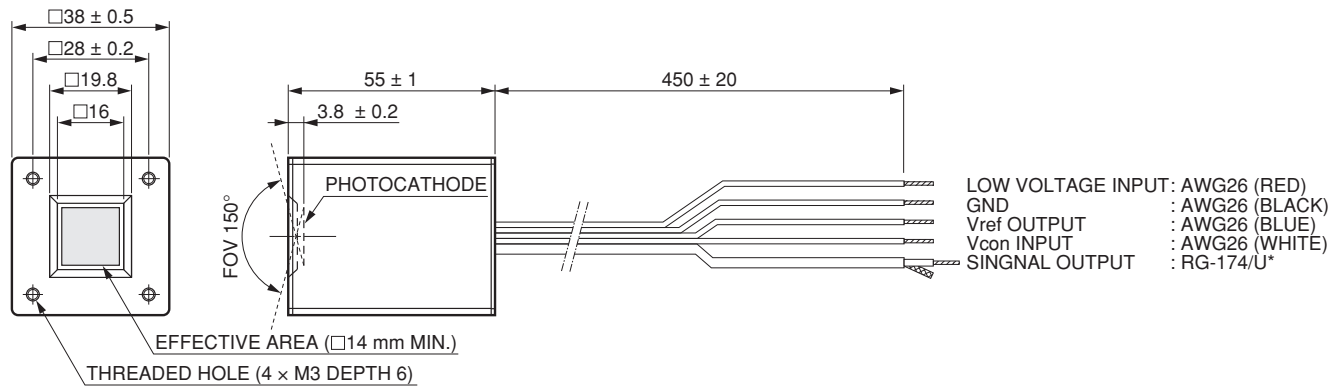
PHOTOMULTIPLIER TUBE MODULES H15460 SERIES / H15461 SERIES

Figure 7: Dimensional outline (Unit: mm)

H15460-40



H15461-40



*H15460-40-01, H15461-40-01: with BNC-P plug connector

RELATED PRODUCT

POWER SUPPLY FOR PHOTOMULTIPLIER TUBE MODULES C10709

The C10709 is the power supply for photomultiplier tube modules which have ± 5 V or +5 V input voltage.

This unit can provide both the input voltage and the control voltage (for the photomultiplier tube modules.). This feature enables users to operate the modules easily.



Parameter	Description / Value	Unit
Output voltage	± 5	V
Output current	Max. 2.0 (+5 V), 0.2 (-5 V)	A
Control voltage ① (variable voltage range)	+0.25 to +1.8	V
Input voltage	AC100 to AC240	V

NOTE: ① Adjust within the recommended control voltage range for the photomultiplier tube module being used.

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

Electron Tube Division

314-5, Shimokanzo, Iwata City, Shizuoka Pref., 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205

U.S.A.: HAMAMATSU CORPORATION: 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com

Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH.: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: info@hamamatsu.de

France: HAMAMATSU PHOTONICS FRANCE S.A.R.L.: 19 Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: info@hamamatsu.fr

United Kingdom: HAMAMATSU PHOTONICS UK LIMITED: 2 Howard Court, 10 Twyn Road, Welwyn Garden City, Hertfordshire, AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: info@hamamatsu.co.uk

North Europe: HAMAMATSU PHOTONICS NORDEN AB: Torshamnsgatan 35, 16440 Kista, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: info@hamamatsu.se

Italy: HAMAMATSU PHOTONICS ITALIA S.R.L.: Strada della Moia, 1 int. 6 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: info@hamamatsu.it

China: HAMAMATSU PHOTONICS (CHINA) CO., LTD.: 1201, Tower B, Jiaming Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn

Taiwan: HAMAMATSU PHOTONICS TAIWAN CO., LTD.: 8F-3, No. 158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0060, Fax: (886)3-659-0061 E-mail: info@hamamatsu.com.tw

TPMO1096E04
MAR. 2023 IP