

High Image Quality, Wide Spectral Response, No Image Distortion
For Scientific Applications

FEATURES

- Compact and lightweight
- No image distortion
- High UV sensitivity 60mA/W at 430nm
- Wide spectral response
- High gain

APPLICATIONS

- Low-light-level multichannel spectrophotometer
(with a linear photodiode array, etc.)
Raman spectroscopy, Emission spectroscopy, etc.
- Low-light-level imaging
(with image sensors such as vidicon, CCD, etc.)
Microscope, Low light level TV, Streak camera, etc.



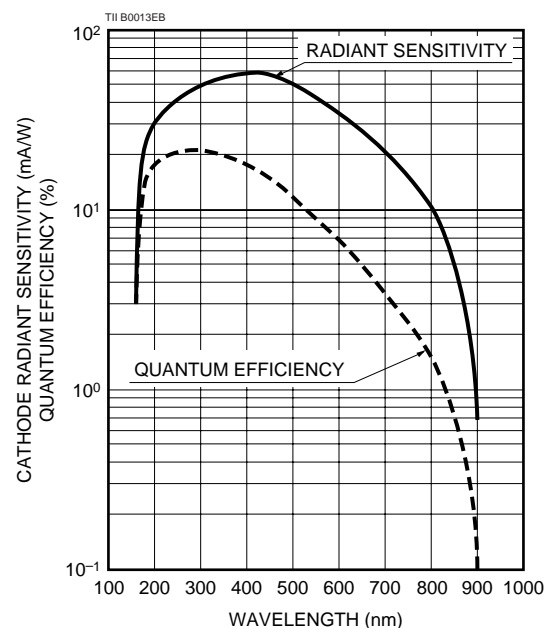
GENERAL

Parameter	Description	Unit
Spectral Response (See Fig. 1)	160 to 900	nm
Wavelength of Maximum Response	430	nm
Photocathode [Ⓐ]		
Material	Multialkali	—
Minimum Effective Diameter	25	mm
Input Window Material	Synthetic silica	—
MCP	Single stage	—
Output Window Material	Fiber optic plate	—
Phosphor Screen Material (See Fig. 8) [Ⓑ]	P-43	—
Case Material	Poly Oxy Methylene (POM)	—
Lead Wire Cover	Teflon	—
Weight	Approx. 120	g

NOTES

- Ⓐ Other photocathode materials may be available upon your request. Please contact our sales office.
- Ⓑ The P-20 model is also available for the above applications. The characteristics are the same except for Fig.8, the phosphor spectral emission.

Figure 1: Typical Spectral Response



PROXIMITY FOCUSED IMAGE INTENSIFIER V3346U

MAXIMUM RATINGS

Parameter	Value	Unit
-----------	-------	------

● Supply Voltage

Photocathode and MCP-In	230	Vdc
MCP-In and MCP-Out ③	700 to 1000	Vdc
MCP-Out and Phosphor Screen	6100	Vdc

● Maximum Light Level

Luminous	0.01	lx
Radiant at 430nm	3×10^{-9}	W/cm ²

● Temperature

Storage	- 55 to +65	°C
Operating	- 20 to +40	°C
Shock	12	°C/min

CHARACTERISTICS (at 25°C)

Parameter	Min.	Typ.	Max.	Unit
-----------	------	------	------	------

● Photocathode Sensitivity

Luminous ②	100	170	—	μA/lm
Radiant at 200nm (See Fig. 1)	—	30	—	mA/W
at 430nm	—	60	—	
at 550nm	—	41	—	
at 700nm	—	22	—	
at 800nm	—	10	—	
Quantum Efficiency at 430nm	—	17	—	%

● Light Gain (See Fig. 5, Fig. 6)

Luminous Gain ⑤	7000	12000	—	lm/m ² /lx ①
Radiant Emittance Gain at 430nm ⑤	—	8700	—	W/m ² /W/m ²

● EBI (Equivalent Background Input) (See Fig. 5) ⑥

Luminous	—	1×10^{-11}	4×10^{-11}	lm/cm ²
Radiant at 430nm	—	3×10^{-14}	—	W/cm ²

Limiting Resolution (See Fig. 4) ④	25	30	—	lp/mm
Magnification	—	1	—	—
Distortion	—	0	—	—

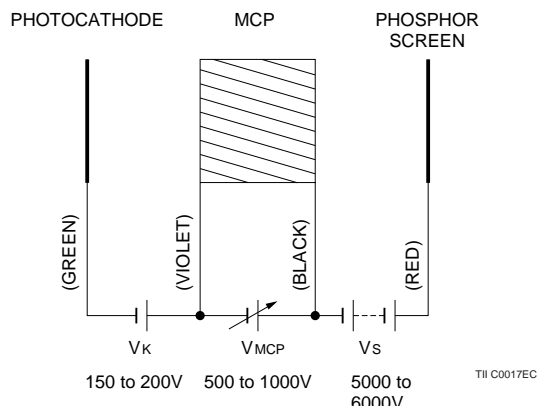
RECOMMENDED OPERATION

Parameter	Value	Unit
-----------	-------	------

● Supply Voltage

Photocathode and MCP-In (Vk)	150 to 200	Vdc
MCP-In and MCP-Out (Vmcp) ③	500 to 1000	Vdc
MCP-Out and Phosphor Screen (Vs)	5000 to 6000	Vdc

Figure 2: Operating Diagram (example)



NOTE: • GND potential can be assigned to any electrode.
• A separate power supply can be supplied on request.

NOTES

- ③: The maximum supply voltage and recommended supply voltage for the MCP-In and MCP-Out are noted on the test data sheet when the product is delivered. Please refer to the test data sheet for these values.
- ④: The light source is a tungsten filament lamp operated at a distribution temperature of 2856 K.
Supply voltage is 200 volts between the photocathode and all other electrodes (MCP-In, MCP-Out, Phosphor Screen) connected together as anode.
- ⑤: The luminous gain has relation to the screen luminance L_o (cd/m²) and the illuminance E_i (lx) incident on the photocathode, and expressed by:

$$\text{Luminous Gain} = \pi \cdot \frac{L_o}{E_i}$$

The supply voltages are as follows.

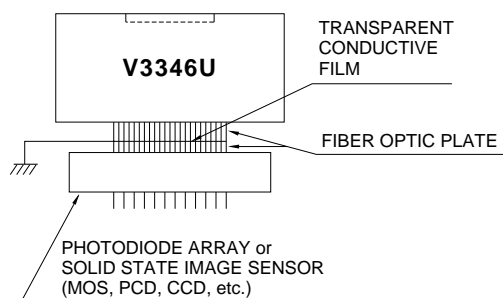
Photocathode and MCP-In 200 Vdc

MCP-In and MCP-Out 500 to 1000 Vdc

MCP-Out and Phosphor Screen .. 6000 Vdc

- ⑥: The ratio of the phosphor screen radiant emittance in watts per square meter (W/m²) to the irradiance (W/m²) on the photocathode. The supply voltages are the same as ⑤.
- ⑦: The inherent background noise of an image intensifier is normally specified as the input illuminance (or irradiance) required to produce a luminous emittance from the phosphor screen, equal to that obtained when the input illuminance is zero.
This indicates the lower limit of detectable illuminance of an image intensifier.
- ⑧: The measure of the ability to detect white and black stripes in an image formed at the photocathode, in terms of line pairs (lp) (one black and one white stripe) per millimeter. This is the value at an MTF (Modulation Transfer Function) of 5%.
- ①: 1 lm/m² = 0.0929 ft-L
1 lx = 0.0929 ft-c
1 lm/m²/lx = 1 ft-L/ft-c

Figure 3: Example of Coupling to Imaging Device



NOTE: The transparent conductive film (NESA coating) is required on the output FOP of the tube or the coupling FOP to prevent the induction of noise if the tube will be operated by other than ground potential at the screen.

Figure 4: Typical MTF

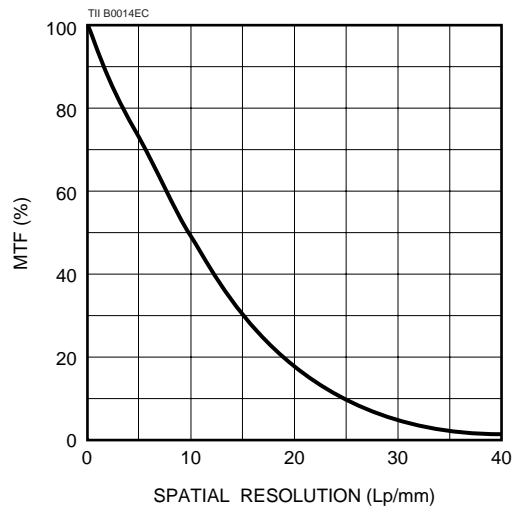


Figure 5: Typical Luminous Gain and EBI vs. MCP Voltage

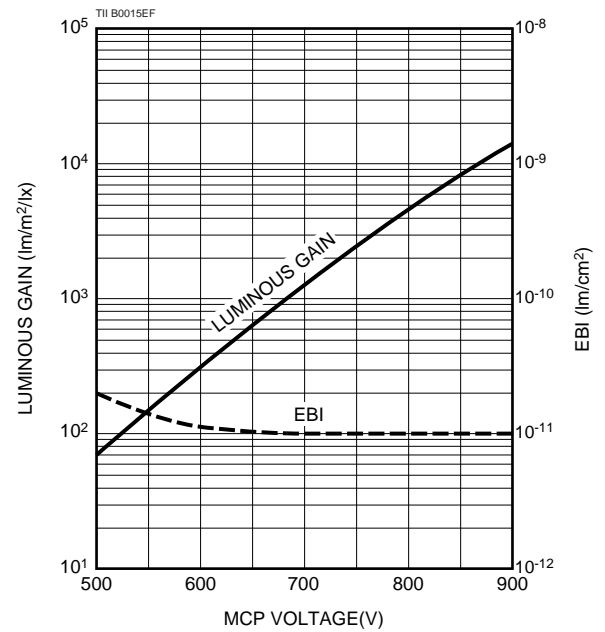


Figure 6: Radiant Emittance Gain vs. Wavelength

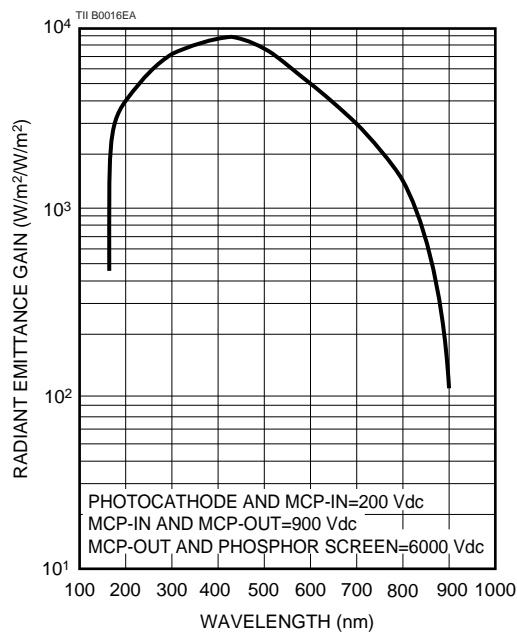
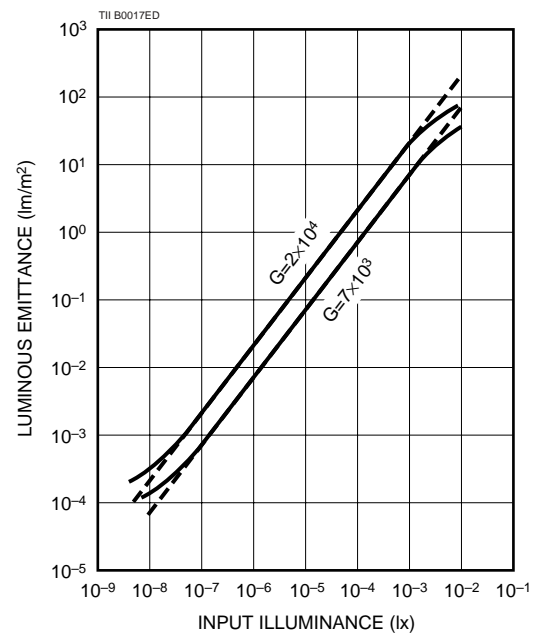


Figure 7: Typical Photocathode Illuminance vs. Phosphor Screen Luminous Emittance



NOTE: Radiant Emittance Gain based on the emittance energy of phosphor screen P-43: 1cd/m²=6.4×10⁻³W/m².

PROXIMITY FOCUSED IMAGE INTENSIFIER V3346U

Figure 8: Typical Phosphor Spectral Emission

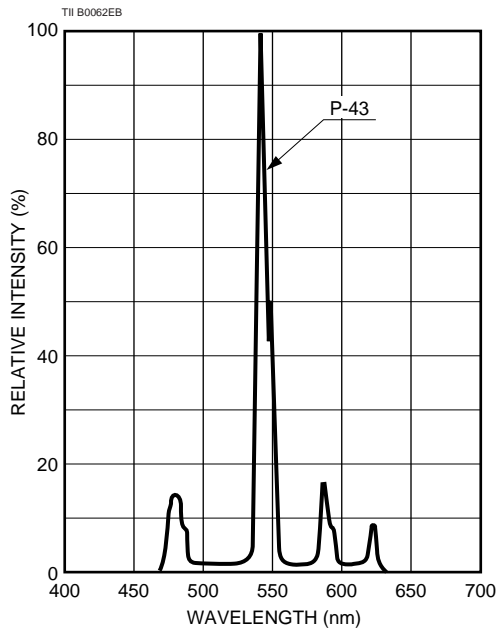
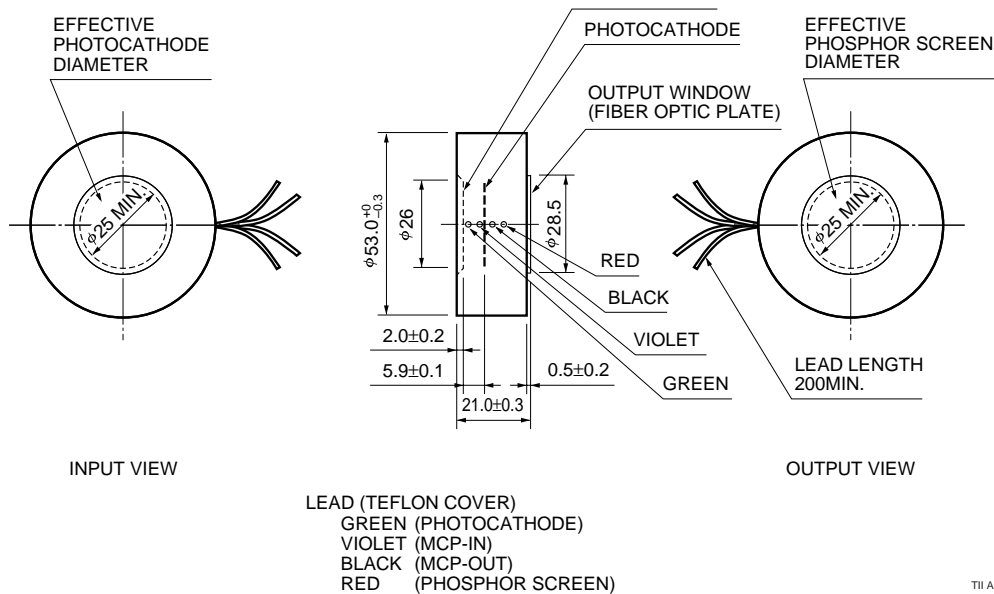


Figure 9: Dimensional Outline (Unit: mm)



TII A0018EB

Warning – Personal Safety Hazards

Electrical Shock – Operating voltages applied to this device present a shock hazard.

- ★ A high-speed gated image intensifier (V3347U) is also available in the same configuration.
- ★ Case is insulated from other electrodes. Withstand voltage of package and leads is more than 10kV. When fixing the V3346U, use a material which withstands a voltage sufficiently higher than a voltage is applied to the tube.

HAMAMATSU

HAMAMATSU PHOTONICS K.K., Electron Tube Center

314-5, Shimokanzo, Toyooka-village, Iwata-gun, Shizuoka-ken, 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658

France: Hamamatsu Photonics France S.A.R.L.: 8, 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

United Kingdom: Hamamatsu Photonics UK Limited: Lough Point, 2 Gladbeck Way, Windmill Hill, Enfield, Middlesex EN2 7JA, United Kingdom, Telephone: (44)181-367-3560, Fax: (44)181-367-6384

North Europe: Hamamatsu Photonics Norden AB: Färögatan 7, S-164-40 Kista, Sweden, Telephone: (46)8-703-29-50, Fax: (46)8-750-58-95

Italy: Hamamatsu Photonics Italia S.R.L.: Via Della Moia, 1/E 20020 Arese, (Milano), Italy, Telephone: (39)2-935 81 733, Fax: (39)2-935 81 741

TII 1018E03
MAR. 1998 SI
Printed in Japan (300)