

# LOW-LIGHT-LEVEL MEASUREMENT IN THE NIR

## THERMOELECTRIC COOLED NIR-PMT MODULE

### H10330A-25/-45/-75

**Wavelength Range: 950 nm to 1200 nm / 950 nm to 1400 nm / 950 nm to 1700 nm,  
TE Cooled, High Speed, Suitable for Photon Counting**



Left: NIR-PMT Module, Right: Controller

## OVER VIEW

The H10330A series is an NIR-PMT module using a compact NIR-PMT (near infrared photomultiplier tube) developed by our advanced photocathode technology. The NIR-PMT is contained in a thermally insulated sealed-off housing evacuated to a high vacuum. The internal thermoelectric cooler eliminates the need for liquid nitrogen and cooling water.

The light input window of these modules use a condenser lens to provide a virtually larger photosensitive area allowing easy optical coupling. Adapters for connection to an optical fiber and monochromator are also available as options.

## APPLICATIONS

- Photoluminescence
- Singlet Oxygen Measurement
- LIDAR
- Raman Spectroscopy
- Cathodoluminescence
- Fluorescence, Fluorescence Life Time

## FEATURES

- Compact and lightweight due to vacuum sealed-off thermal insulation technology
- High Sensitivity (Applicable to Photon Counting)
- Fast Time Response  
Rise Time: 0.9 ns, TTS: 400 ps
- Simple Operation by Air Cooled TE Cooler  
No Liquid Nitrogen, No Cooling Water is Necessary
- Operable in 20 min after Switched ON
- Large Detection Area  
 $\phi$  18 mm for Collimated Light
- HV Power Supply with Interlock Function
- Optional Adapters are Available  
For Optical Fiber  
For Monochromator

# SPECIFICATIONS

## GENERAL

Parameter	H10330A-25	H10330A-45	H10330A-75	Unit
Spectral Response	950 to 1200	950 to 1400	950 to 1700	nm
Photocathode Material	InP/InGaAsP	InP/InGaAsP	InP/InGaAs	—
Detection Area for Collimated Light	$\phi 18$			mm
Effective Area of PMT	$\phi 1.6$			mm
PMT Operating Temperature	-60			°C
PMT Operating Guaranteed Voltage	-500 to -900			V
Operating Ambient Temperature	+5 to +40			°C
Operating Ambient Humidity <sup>①</sup>	Less than 80			%
Storage Temperature	-20 to +50			°C
Storage Humidity <sup>①</sup>	Less than 80			%

① No condensation

## MAXIMUM RATING

Parameter	H10330A-25	H10330A-45	H10330A-75	Unit
PMT Supply Voltage	-900			V
Average PMT Anode Current	1			$\mu$ A

## CHARACTERISTICS (at -800 V, -60 °C)

Parameter	H10330A-25			H10330A-45			H10330A-75			Unit	
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
Cathode Sensitivity <sup>②</sup>	Quantum Efficiency	1	2	—	1	2	—	1	2	—	%
	Radiant	9	18	—	10	21	—	12	24	—	mA/W
Anode sensitivity <sup>②</sup>	Radiant	4500	18000	—	5000	21000	—	6000	24000	—	A/W
Gain	$5 \times 10^5$	$1 \times 10^6$	—	$5 \times 10^5$	$1 \times 10^6$	—	$5 \times 10^5$	$1 \times 10^6$	—	—	—
Anode Dark Current <sup>②③</sup>	—	0.4	1	—	4	10	—	40	100	—	nA
Anode Dark Count <sup>③</sup>	—	$2 \times 10^3$	—	—	$2 \times 10^4$	—	—	$2 \times 10^5$	—	—	s <sup>-1</sup>
Time Response	Anode Pulse Rise Time	—	0.9	—	—	0.9	—	—	0.9	—	ns
	Anode Pulse Fall Time	—	1.7	—	—	1.7	—	—	1.7	—	ns
	Transit Time Spread	—	0.4	—	—	0.4	—	—	0.4	—	ns

② At 1100 nm (H10330A-25), at 1300 nm (H10330A-45), at 1500 nm (H10330A-75)

③ At 30 minutes after high voltage is applied with shutter closed and anode radiant sensitivity = 10000 A/W.

## MODULE, CONTROLLER

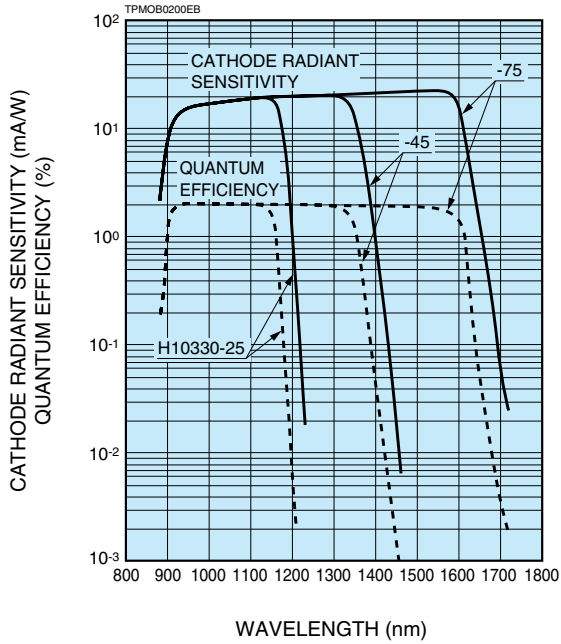
Parameter	Value / Description	Unit
Cooling Method	Thermoelectric (Forced Air Cooling)	—
Condenser Lens Material	BK7 AR Coating ( $\lambda$ 900 nm to 1700 nm)	—
Diameter of the Condenser Lens (Effective Area)	$\phi 20$ ( $\phi 18$ )	mm
F Number of the Condenser Lens (Focal length) <sup>④</sup>	1.4 (f=25.7)	—
Cooling Time Required for Operation	Approx. 20	min
Protection Function	High Voltage Interlock for Inappropriate Temperature	—
Input Voltage (AC)	100 to 240 ( $\pm 10$ %) (50 Hz / 60 Hz)	V
Dimensions (W × H × D) <sup>⑤</sup>	Module	100 × 186 × 150
	Controller	102 × 131 × 279.5
Weight	Module	Approx. 2.1
	Controller	Approx. 2.0

④ At 1300 nm

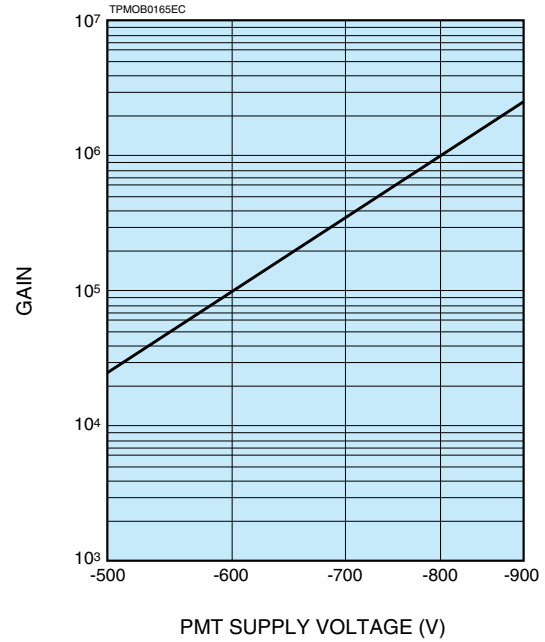
⑤ Excluding projections.

# CHARACTERISTICS

## ● Spectral Response

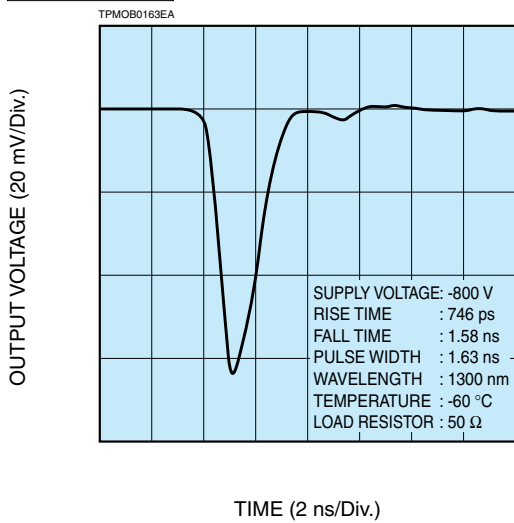


## ● Typical Gain

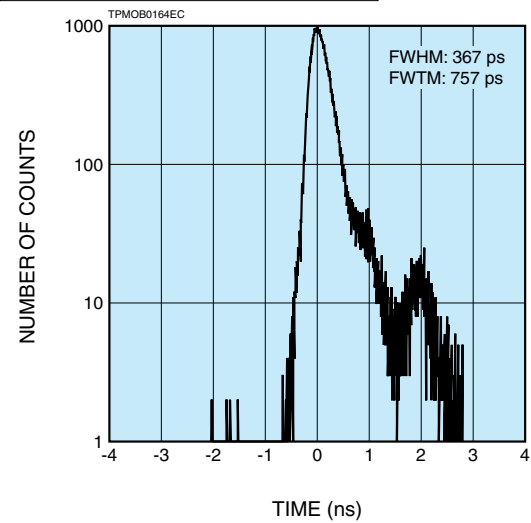


## ● Timing Properties

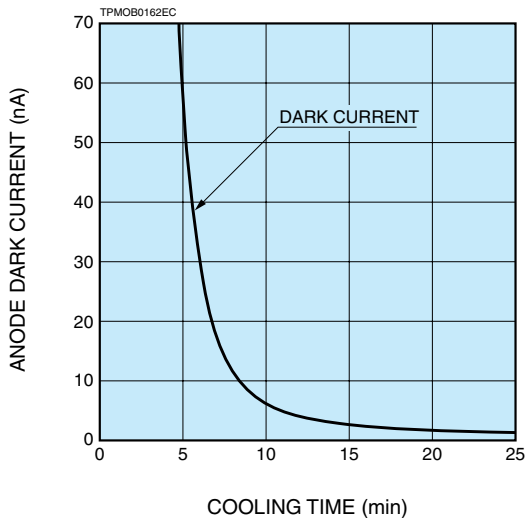
### Waveform



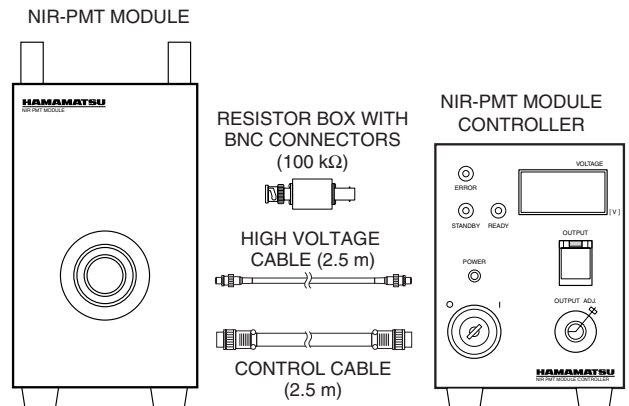
### Transit Time Spread (TTS)



## ● Dark Current vs. Cooling Time (H10330A-45)

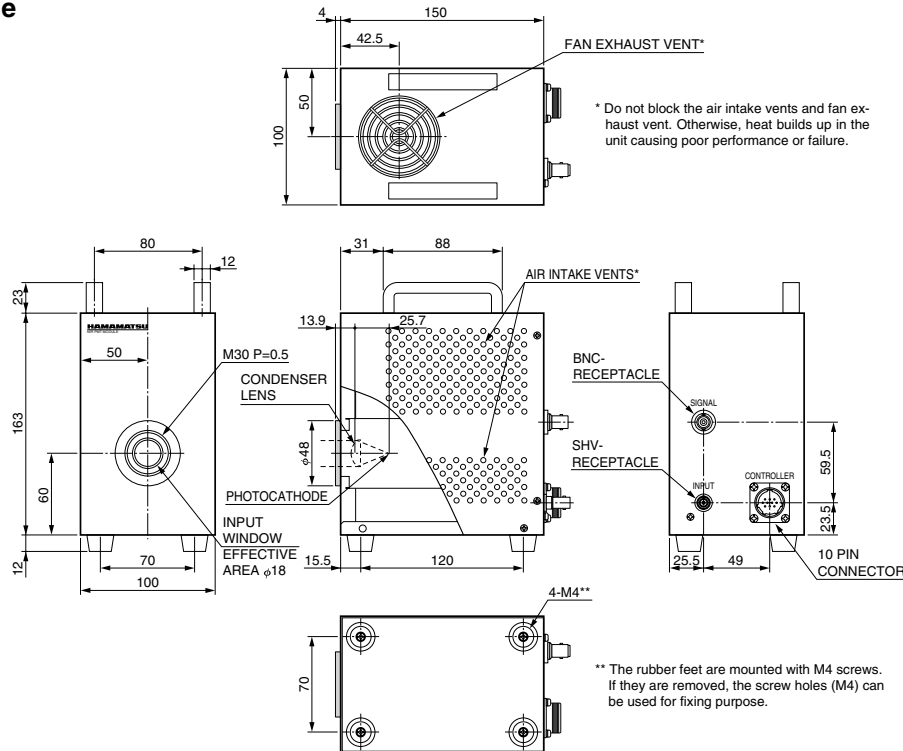


## SYSTEM CONFIGURATION (CONNECTION DIAGRAM)



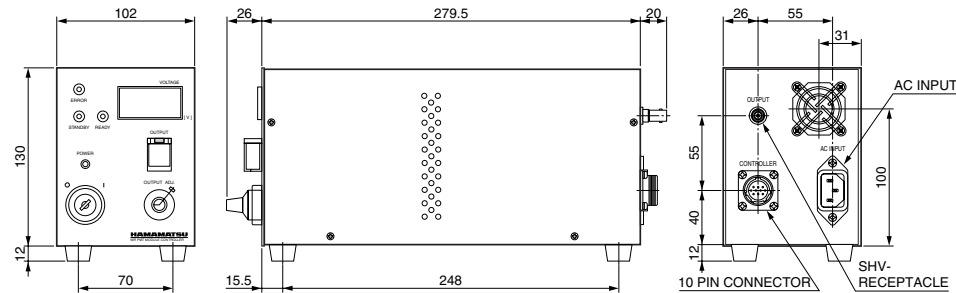
# DIMENSIONAL OUTLINES (Unit: mm)

## ●NIR-PMT Module



TPMOA0040EB

## ●NIR-PMT Module Controller



TPMOA0041EB

# OPTIONS (sold separately)

Adapters to match optical fiber connectors or monochromators are available.

### ●Optical Fiber Adapters

These adapters allow light from an optical fiber to efficiently enter the PMT. Specify an FC type or SMA type adapter when ordering.

### ●Monochromator Adapter

The adapter collects light from a monochromator efficiently. Please inform us of the type of the monochromator.

### ●Mechanical Shutter

### ●Resistor Box with BNC Connectors

A 50 Ω resistor box with BNC connectors is available.

Use the 100 kΩ resistor box (supplied with H10330A) for use with a lock-in amplifier.

\*Please contact your local Hamamatsu office for any assistance.

Subject to local technical requirements and regulations, availability of products included in this promotional material may vary. Please consult with our sales office. Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2011 Hamamatsu Photonics K.K.

## HAMAMATSU PHOTONICS K.K. [www.hamamatsu.com](http://www.hamamatsu.com)

HAMAMATSU PHOTONICS K.K., 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, P. O. Box 6910, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: [usa@hamamatsu.com](mailto:usa@hamamatsu.com)

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658 E-mail: [info@hamamatsu.de](mailto: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: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road Welwyn Garden City Hertfordshire AL7 1BW, United Kingdom, Telephone: 44-(0)1707-294888, Fax: 44(0)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 SOLNA, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: Hamamatsu Photonics Italia: S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

TPMO1042E02  
MAY, 2011 IP