Photon counting heads
H10682 / H17712 series

H10682 series (Standard type)
H17712 series (High count linearity type)

H10682-110W (Lens integration type)

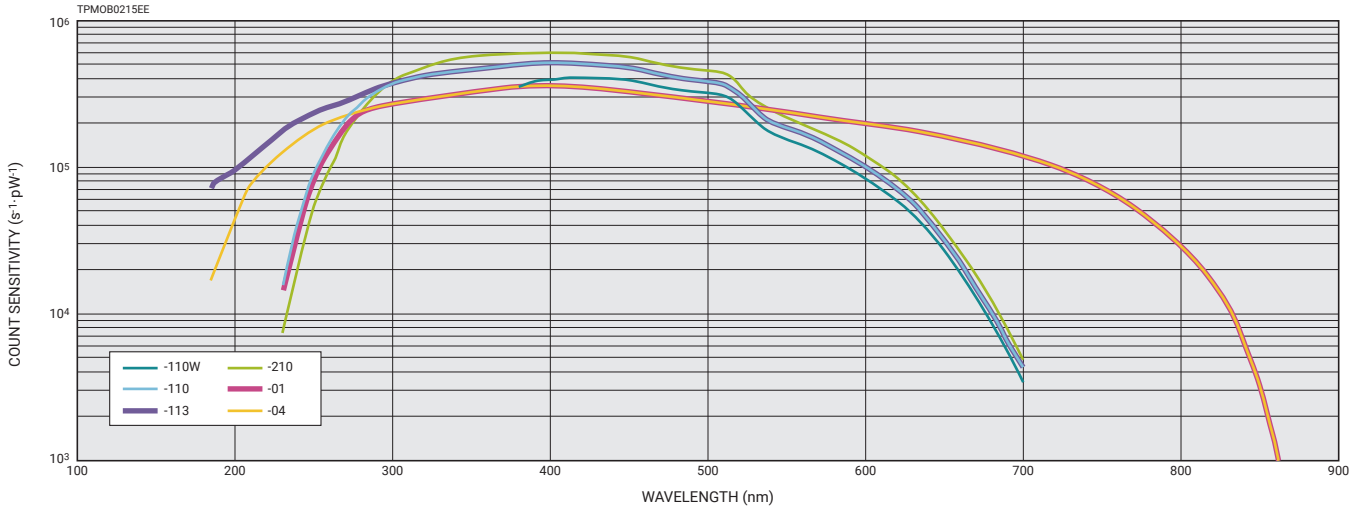
H10682 and H17712 series are photon counting heads device consisting of a metal package photomultiplier tube, along with a high-speed photon counting circuit and a high-voltage power supply circuit. The high voltage power supply for photomultiplier tube and the discrimination level are preset to optimum values, allowing photon counting measurement by just connecting a +5 V supply.
These have also over light detection function to output a signal at the state that output counts fall by excessive incident light. By this signal, measurement data can be judged that it is normal or not.
The H17712 series is high count linearity model. Compared to H10682 series, count linearity has expanded by a factor of 4. (H10682 series: 5×10^6 s^{-1}, H17712 series: 20×10^6 s^{-1} *Random pulse, at 10 % count loss)
The H10682-110W is integrated with a newly designed condenser lens offering high light-collecting efficiency while using a thin profile.

Product variations

Parameter	H10682	H10682 / H17712					Unit
Suffix	-110W	-110	-113	-210	-01	-04	—
Lens integration	Integrated lens	No lens					—
Effective area	Φ21	Φ8					mm
Peak sensitivity wavelength	400						nm
Spectral response	380 to 700	230 to 700	185 to 700	230 to 700	230 to 870	185 to 870	nm
Photocathode	Super bialkali			Ultra bialkali	Multialkali		—
Window material	Borosilicate glass		UV glass	Borosilicate glass		UV glass	—

This product can't be used at vacuum environment or reduced pressure environment.

Typical count sensitivity



-110W: Parallel and homogenized light is irradiated over the entire incident surface with a diameter of 21 mm.

H10682 series (Standard type)

Specifications

(at +25 °C)

Parameter				H10682-110	H10682-113	H10682-210	H10682-01	H10682-04	Unit
Input voltage				+4.75 to +5.25					V
Max. input voltage				+6					V
Max. input current *1				40					mA
Count sensitivity		200 nm	Typ.	—	9.7×10^4	—		4.3×10^4	$s^{-1} \cdot pW^{-1}$
		300 nm	Typ.	3.7×10^5		3.9×10^5	2.7×10^5		
		400 nm	Typ.	4.9×10^5		6.1×10^5	3.6×10^5		
		500 nm	Typ.	3.7×10^5		4.6×10^5	2.8×10^5		
		600 nm	Typ.	1.1×10^5		1.3×10^5	2.0×10^5		
		700 nm	Typ.	7.7×10^3		9.1×10^3	1.2×10^5		
		800 nm	Typ.	—			3.0×10^4		
Count linearity *2				5×10^6					s^{-1}
Dark count *3			Typ.	50			600		s^{-1}
			Max.	100			1000		
Pulse-pair resolution			Typ.	20					ns
Output pulse width			Typ.	10					ns
Output pulse height	Load resistance 50 Ω		Min.	+2					V
			Typ.	+2.2					
	Un-terminated		Min.	+4					
			Typ.	+4.4					
Recommended load resistance				50					Ω
Signal output logic				Positive logic					—
Over light detection output *4	High level		Min.	+3.5					V
	Low level		Max.	+0.5					
Operating ambient temperature *5				+5 to +40					°C
Storage temperature *5				-20 to +50					°C
Storage humidity *5				Below 85					%RH
Weight				47					g

*1: At 5×10^6 s^{-1} count rate
*2: Random pulse, at 10 % count loss
*3: After 30 min storage in darkness
*4: Load resistance 10 kΩ
*5: No condensation

H17712 series (High count linearity type)

Specifications

(at +25 °C)

Parameter				H17712-110	H17712-113	H17712-210	H17712-01	H17712-04	Unit
Input voltage				+4.75 to +5.25					V
Max. input voltage				+6					V
Max. input current *1				40					mA
Count sensitivity		200 nm	Typ.	—	9.7×10^4	—		4.3×10^4	$s^{-1} \cdot pW^{-1}$
		300 nm	Typ.	3.7×10^5		3.9×10^5	2.7×10^5		
		400 nm	Typ.	4.9×10^5		6.1×10^5	3.6×10^5		
		500 nm	Typ.	3.7×10^5		4.6×10^5	2.8×10^5		
		600 nm	Typ.	1.1×10^5		1.3×10^5	2.0×10^5		
		700 nm	Typ.	7.7×10^3		9.1×10^3	1.2×10^5		
		800 nm	Typ.	—			3.0×10^4		
Count linearity *2				20×10^6					s^{-1}
Dark count *3			Typ.	50			600		s^{-1}
			Max.	100			1000		
Pulse-pair resolution			Typ.	5					ns
Output pulse width			Typ.	3					ns
Output pulse height	Load resistance 50 Ω		Min.	+2					V
			Typ.	+2.2					
	Un-terminated		Min.	Not recommend					
			Typ.						
Recommended load resistance				50					Ω
Signal output logic				Positive logic					—
Over light detection output *4	High level		Min.	+3.5					V
	Low level		Max.	+0.5					
Operating ambient temperature *5				+5 to +40					°C
Storage temperature *5				-20 to +50					°C
Storage humidity *5				Below 85					%RH
Weight				47					g

*1: At 20×10^6 s^{-1} count rate
*2: Random pulse, at 10 % count loss
*3: After 30 min storage in darkness
*4: Load resistance 10 kΩ
*5: No condensation

H10682-110W (Lens integration type)

Specifications

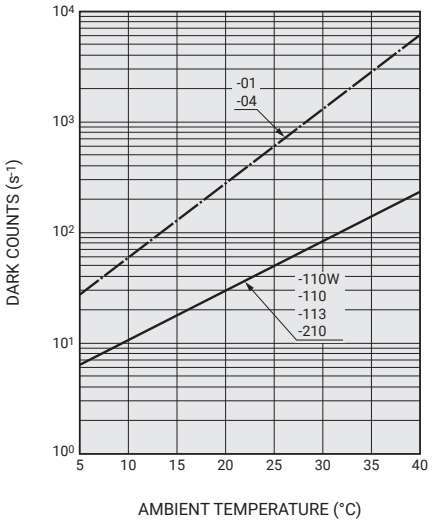
(at +25 °C)

Parameter				H10682-110W	Unit
Input voltage				+4.75 to +5.25	V
Max. input voltage				+6	V
Max. input current *1				40	mA
Count sensitivity *2		200 nm	Typ.	—	$s^{-1}•pW^{-1}$
		300 nm	Typ.	—	
		400 nm	Typ.	3.8×10^5	
		500 nm	Typ.	3.0×10^5	
		600 nm	Typ.	8.8×10^4	
		700 nm	Typ.	6.0×10^3	
		800 nm	Typ.	—	
Count linearity *3				5×10^6	s^{-1}
Dark count *4			Typ.	50	s^{-1}
			Max.	100	
Pulse-pair resolution			Typ.	20	ns
Output pulse width			Typ.	10	ns
Output pulse height	Load resistance 50 Ω		Min.	+2	V
			Typ.	+2.2	
	Un-terminated		Min.	+4	
			Typ.	+4.4	
Recommended load resistance				50	Ω
Signal output logic				Positive logic	—
Over light detection output *5	High level		Min.	+3.5	V
	Low level		Max.	+0.5	
Operating ambient temperature *6				+5 to +40	°C
Storage temperature *6				-20 to +50	°C
Storage humidity *6				Below 85	%RH
Weight				50	g

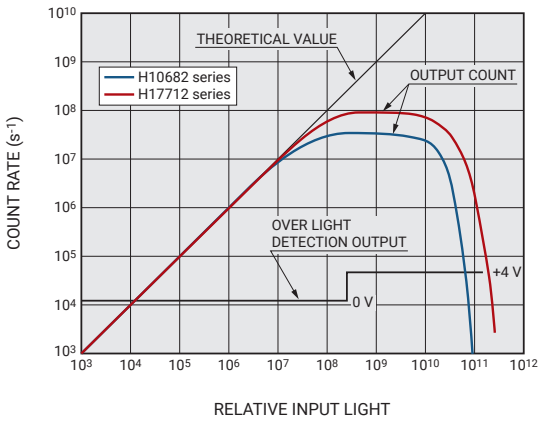
*1: At 5×10^6 s^{-1} count rate
*2: Parallel and homogenized light is irradiated over the entire incident surface with a diameter of 21 mm.
*3: Random pulse, at 10 % count loss
*4: After 30 min storage in darkness
*5: Load resistance 10 kΩ
*6: No condensation
Because it is equipped with a resin lens, even if the storage temperature/humidity is within the range, avoid sudden temperature changes or long-term storage at high temperatures and high humidity.

Characteristics

Typical dark count

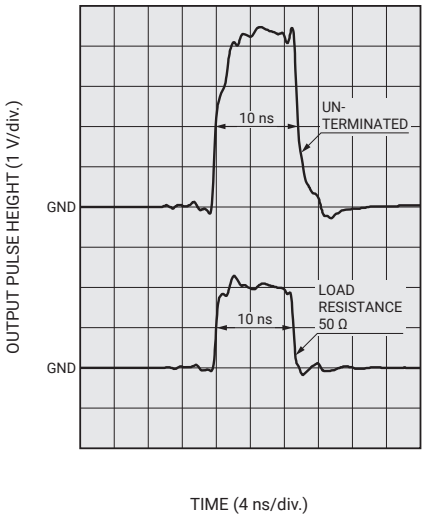


Typical count rate linearity and over light detection output

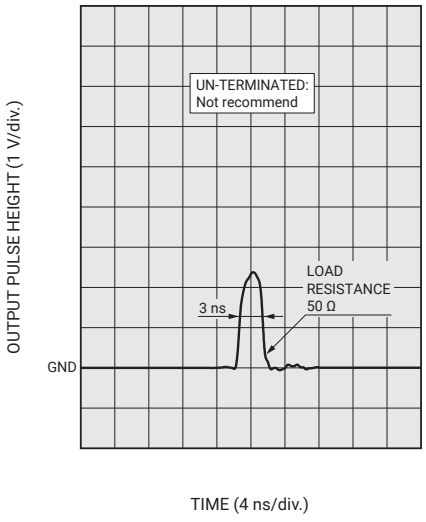


Typical output waveform

● H10682 series

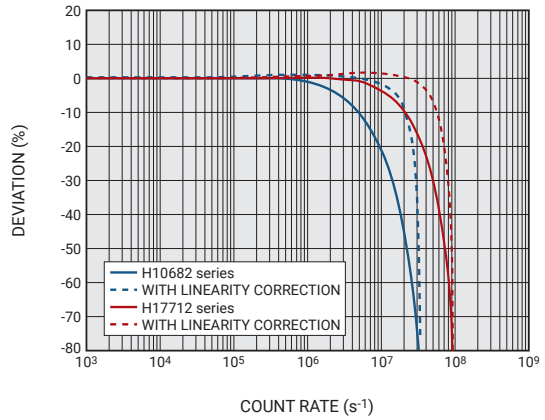


● H17712 series



* The recommended load resistance is 50 Ω.
Deviation from this value may lead to degradation of the output waveform.

Typical count rate linearity correction



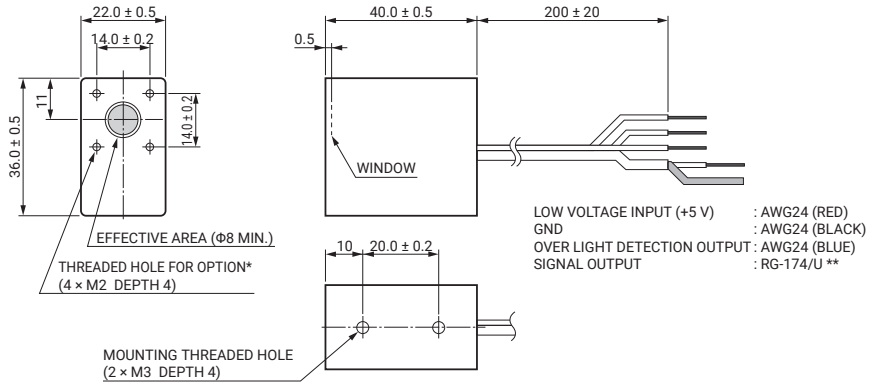
Correction formula

$$N = \frac{M}{1-Mt}$$

N: Real count rate (s^{-1})
M: Measured count rate (s^{-1})
t: Pulse pair resolution (s)

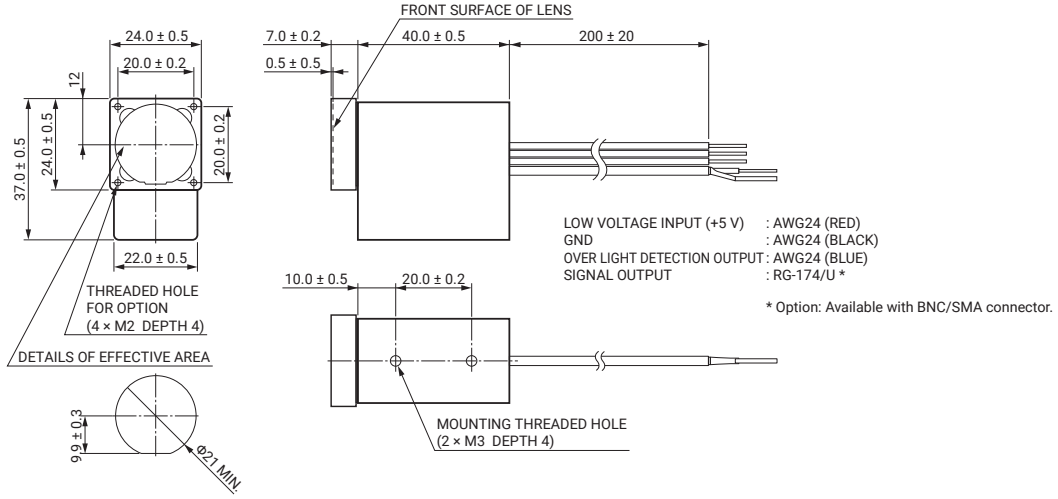
Dimensional outline (Unit: mm)

H10682 series (Standard type) / H17712 series (High count linearity type)



* Option: E5776, E5776-51, A9865, A10030-01
** Option: Available with BNC/SMA connector.

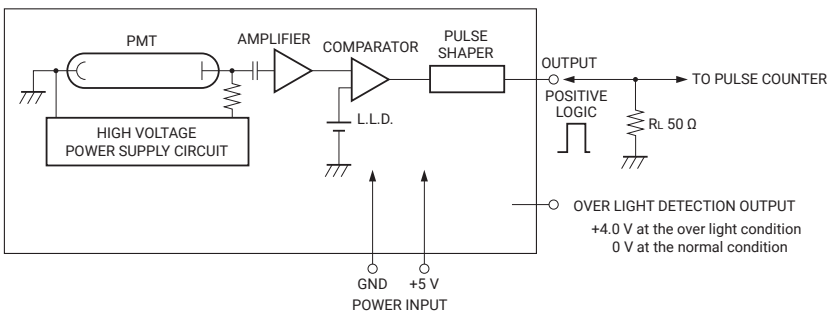
H10682-110W (Lens integration type)



* Option: Available with BNC/SMA connector.

Note: Do not push the lens and the plastic around the PMT strongly.
Excessive load may damage the lens and the PMT.

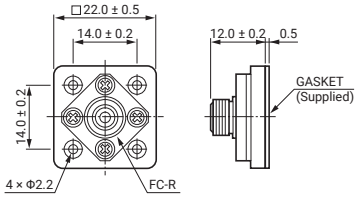
Block diagram



Related products

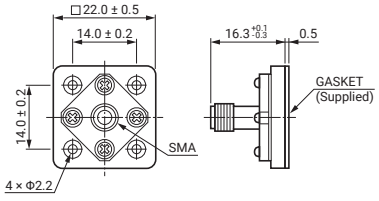
Optical fiber adapter E5776 / E5776-51 *1

● E5776 (FC type)



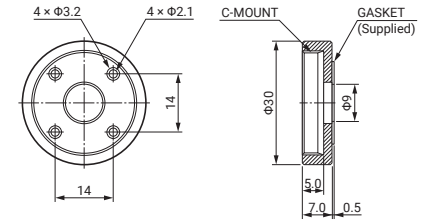
* Supplied with M2 screws(4 pcs) for fixing to module

● E5776-51 (SMA type)



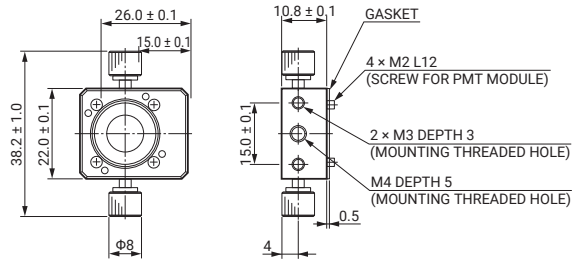
* Supplied with M2 screws (4 pcs) for fixing to module

C-mount adapter A9865 *1



* Supplied with M2 screws (4pcs) for fixing to module

Adapter block A10030-01 *1



*1: These adapters cannot be attached to H10682-110W.

Counting unit C8855-01 *2

The C8855-01 is a counting unit with a USB interface port. The counter of the C8855-01 has two counter circuits (double counter method) capable of counting input signals with no dead time. The sample software that comes with the C8855-01 helps you to start measurement easily and quickly.

Number of input signals: 1 ch

Counting unit C9945-13 series *2

The C9945-13 is a counting unit with a USB interface and can be used as 16 ch photon counter. The counter of the C9945-13 has two counter circuits (double counter method) capable of counting input signals with no dead time. The C9945-13 has TTL input for connecting multiple photon counting head.

Number of input signals: 16 ch

*2: These counting units cannot be used with the H17712 series.

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