

OVERVIEW

The H12310 series is a GaAsP photocathode 16-channel linear multianode PMT module. Its output can be adjusted by controlling the gain of each channel individually. The H12311 series is a PMT module consisting of a H12310 series and a cooler installed to the built-in PMT.

FEATURES

- Gain can be adjusted individually for each channel
- Reduced dark noise due to cooling effect (H12311-40/-42)

APPLICATIONS

- Biomedical fluorescence detection
- Laser scanning microscope
- High speed spectrophotometer



Left: H12310-40,
Right: H12311-40 with heat sink A14473 and fan A14474 (sold separately)

Figure 1: Typical spectral response

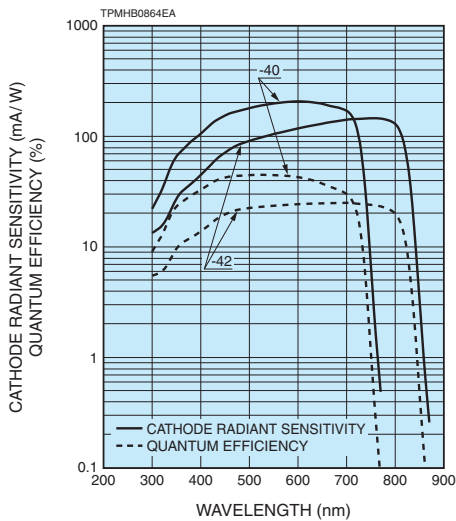


Figure 2: Typical gain

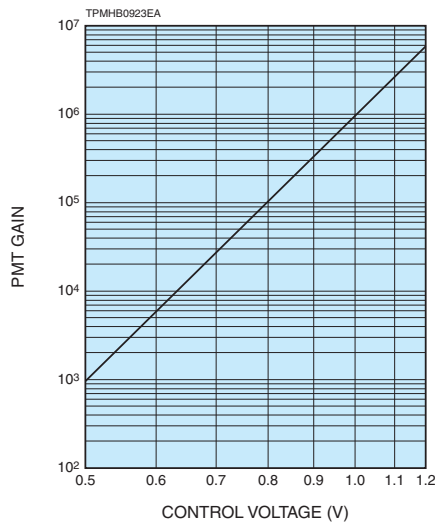
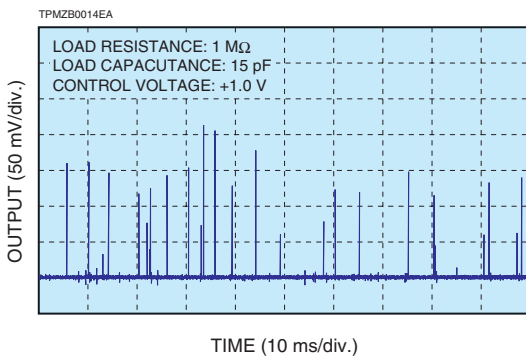
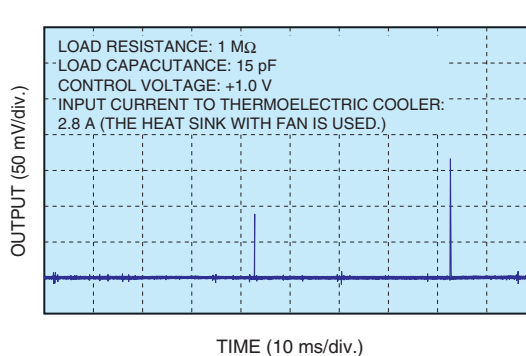


Figure 3: Voltage output in darkness

- Before cooling
Example: H12311-40



- After cooling
Example: H12311-40



LINEAR MULTIANODE PMT MODULE

H12310-40/-42, H12311-40/-42

SPECIFICATIONS

(at +25 °C)

Parameter		H12310-40	H12311-40	H12310-42	H12311-42	Unit	
Input voltage	High voltage power supply (+12 V input)	+10.5 to +13.5				V	
	Amplifier power supply (±5 V input)	±4.5 to ±5.5				V	
Max. input voltage	High voltage power supply (+12 V input)	+15				V	
	Amplifier power supply (±5 V input)	±6				V	
Max. input current ^①	High voltage power supply (+12 V input)	+40				mA	
	Amplifier power supply (±5 V input)	+110/-110				mA	
Max. average output signal voltage / ch ^②		+0.4 (Load resistance 10 kΩ)				V	
Max. control voltage		+1.2 (Input impedance 400 kΩ)				V	
Recommended control voltage adjustment range		+0.5 to +1.1 (Input impedance 400 kΩ)				V	
Effective area		0.8 mm × 5.0 mm × 16 ch				—	
Spectral response range		300 to 740		300 to 840		nm	
Peak quantum efficiency wavelength		520		660		nm	
Cathode	Quantum efficiency	at peak quantum efficiency wavelength	Min.	40	15	% rowspan="8">	
			Typ.	45	25		
		at 800 nm	Min.	—	12		
			Typ.	—	20		
	Radiant sensitivity	at peak quantum efficiency wavelength	Min.	168	80		
			Typ.	189	133		
		at 800 nm	Min.	—	77		
			Typ.	—	129		
Anode ^③	Radiant sensitivity	at peak quantum efficiency wavelength	Min.	8.4	4.0	V/nW	
			Typ.	18.9	13.3		
		at 800 nm	Min.	—	3.9		
			Typ.	—	12.9		
	Voltage output / ch in darkness ^④	Typ.	0.05	0.005 ^⑧	0.1	0.01 ^⑧	mV
		Max.	0.15	0.015 ^⑧	0.3	0.03 ^⑧	
	PMT Gain	Min.	5.0 × 10 ⁵				—
		Typ.	1.0 × 10 ⁶				
	Cross-talk	Typ.	2				%
	Gain adjustment	Range	1: 0.01				—
Step		256				—	
Frequency bandwidth (-3 dB)		DC to 1 MHz				—	
Current-to-voltage conversion factor		0.1				V/μA	
Output offset voltage		Typ.	±2			mV	
Ripple noise ^{③⑤} (peak to peak)		Max.	1			mV	
Settling time ^⑥		Max.	2			s	
Operating ambient temperature ^⑦		+5 to +50	+5 to +35	+5 to +50	+5 to +35	°C	
Storage temperature ^⑦		-20 to +50				°C	
Weight		Typ.	434	680	434	680	g

- NOTE:** ① At +12 V and ±5 V input voltage, +1.0 V control voltage, Gain adjustment step = 255 in darkness
 ② At +12 V and ±5 V input voltage, Averaged over any duration of 30 seconds maximum, Max. pulse output signal voltage = +3.5 V
 ③ Control voltage = +1.0 V
 ④ After 30 minutes storage in darkness. The actual output value in darkness is the sum of dark current and offset voltage.
 ⑤ Ribbon cable, Cable length 500 mm, Load resistance = 1 MΩ, Load capacitance = 15 pF
 ⑥ 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.
 ⑦ No condensation
 ⑧ Input current to thermoelectric cooler = 2.8 A, used with heat sink A14473 and fan A14474.

Figure 4: Typical frequency response

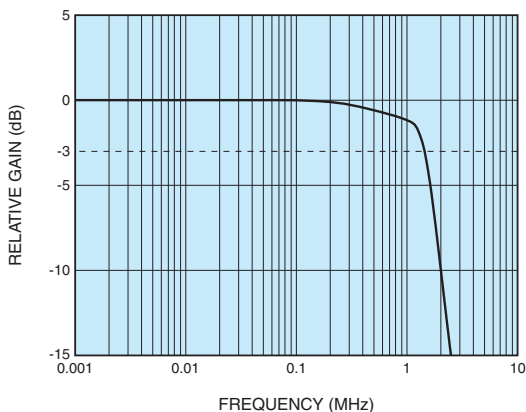


Figure 5: Typical ripple noise

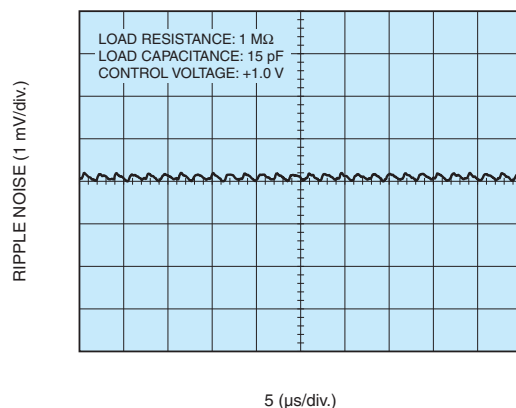
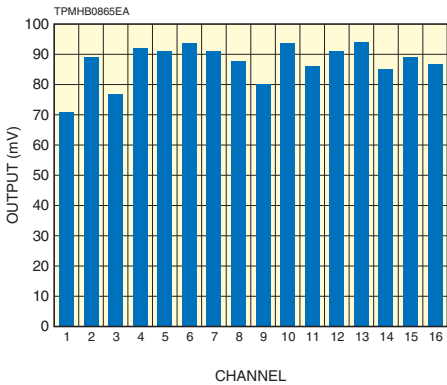


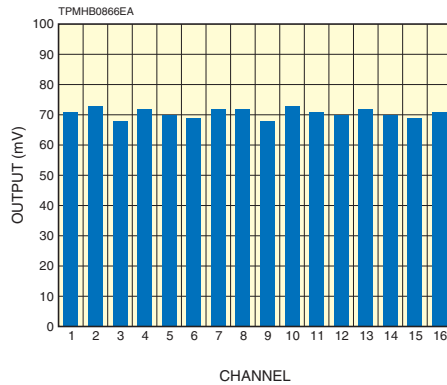
Figure 6: Gain adjustment function

● Before gain adjustment

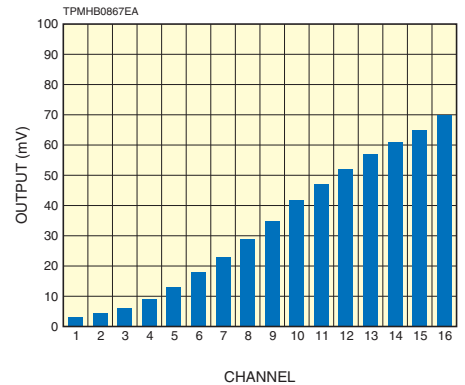


● After gain adjustment

• Example 1



• Example 2

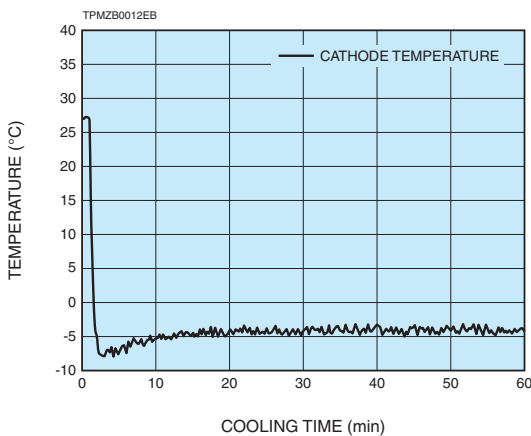


COOLING SPECIFICATIONS (H12311-40/-42)

Parameter	Description / Value	Unit
Cooling method	Thermoelectric cooling	—
Max. cooling temperature (ΔT) ^⑨	25	°C
Cooling time ^⑨	Approx. 10	min
Max. input voltage for thermoelectric cooler	3.2	V
Max. input current for thermoelectric cooler	4.0	A

NOTE: ^⑨Input current to thermoelectric cooler = 2.8 A, used with heat sink A14473 and fan A14474

Figure 7: Cooling characteristics



* Input current to thermoelectric cooler = 2.8 A (The heat sink with fan is used)

Figure 8: Temperature - Thermistor resistance

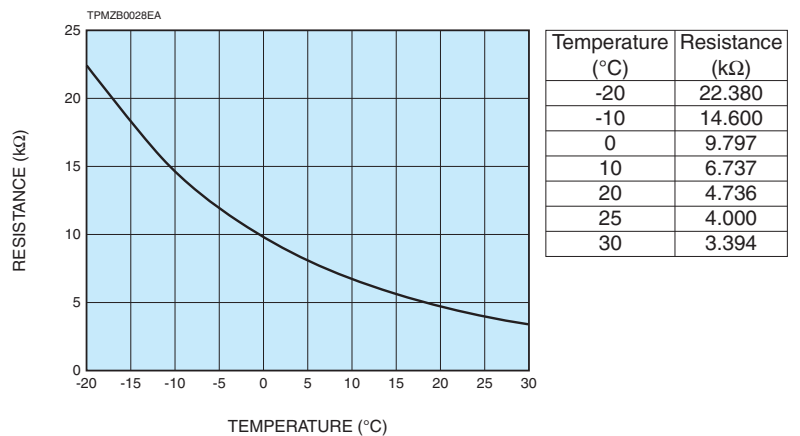
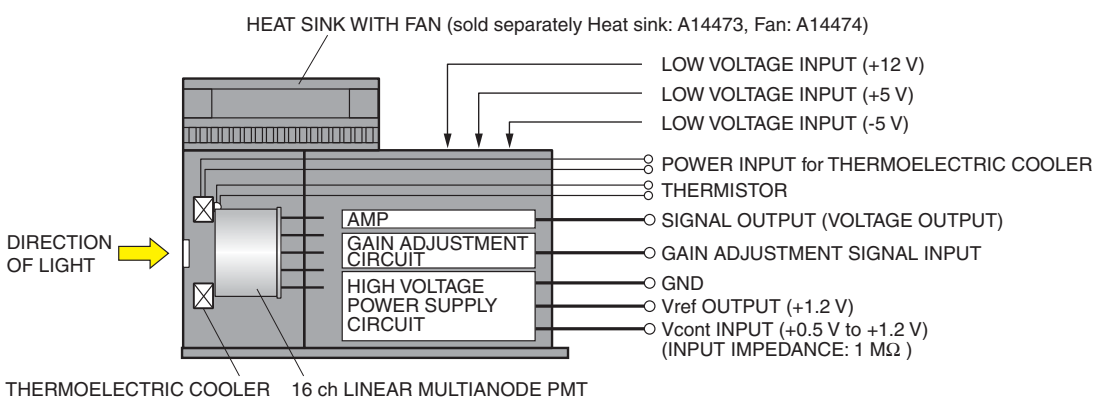


Figure 9: Block diagram (H12311-40/-42)



LINEAR MULTIANODE PMT MODULE H12310-40/-42, H12311-40/-42

Figure 10: Sensitivity adjustment method

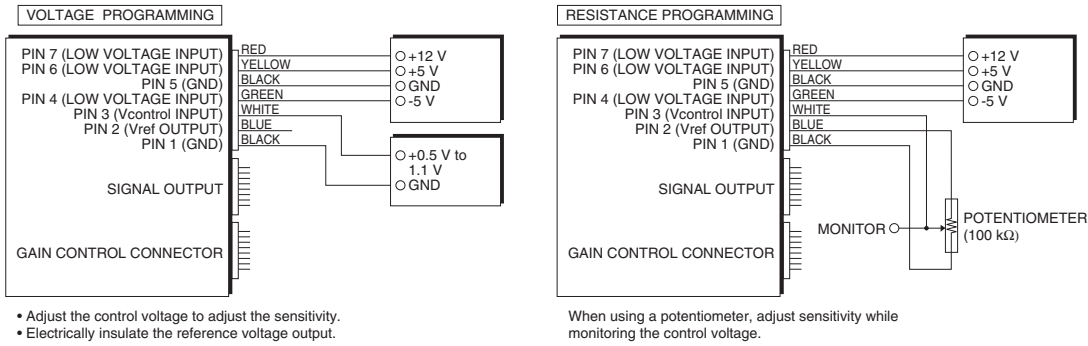
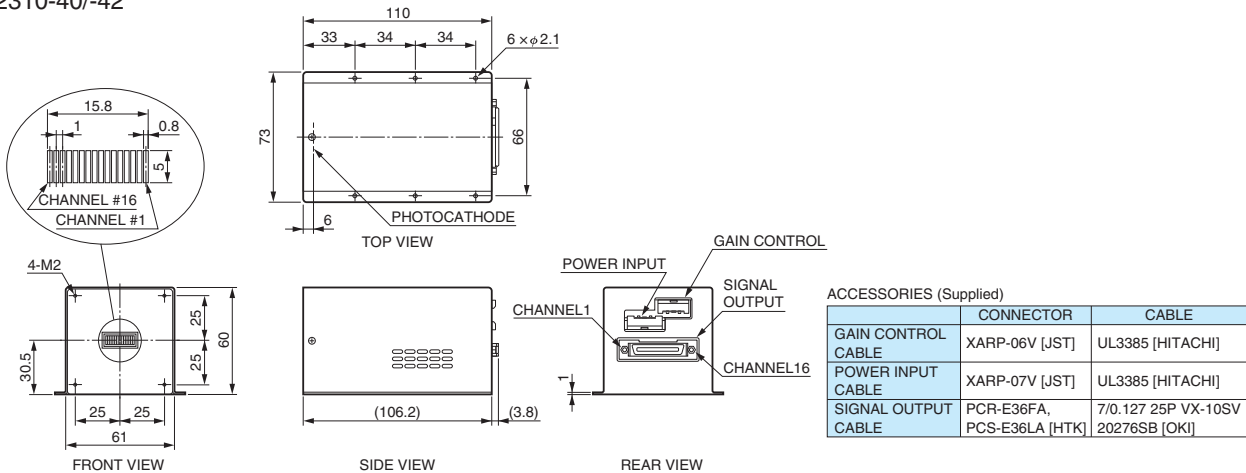
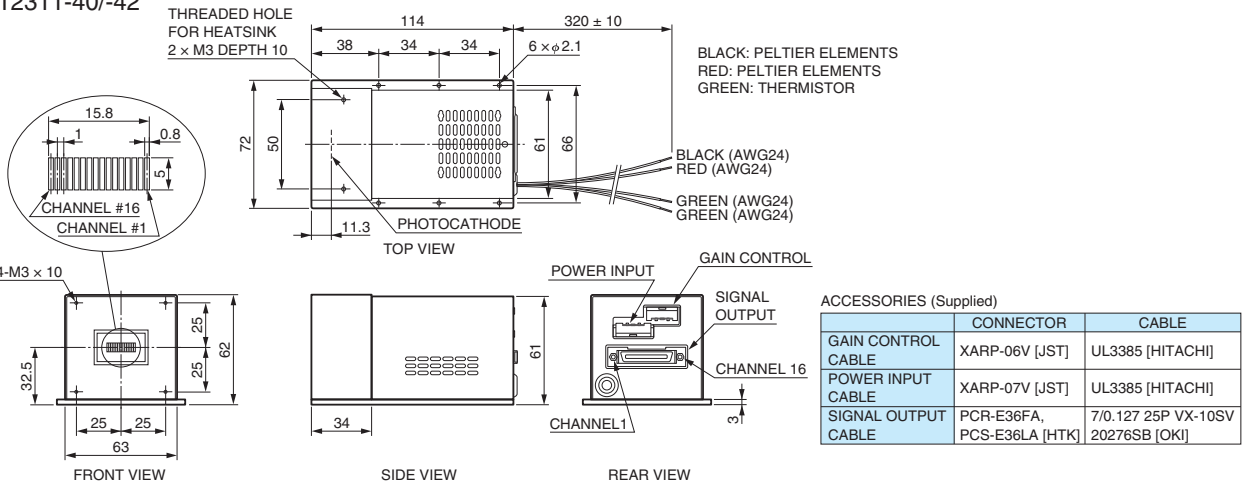


Figure 11: Dimensional outline (Unit: mm)

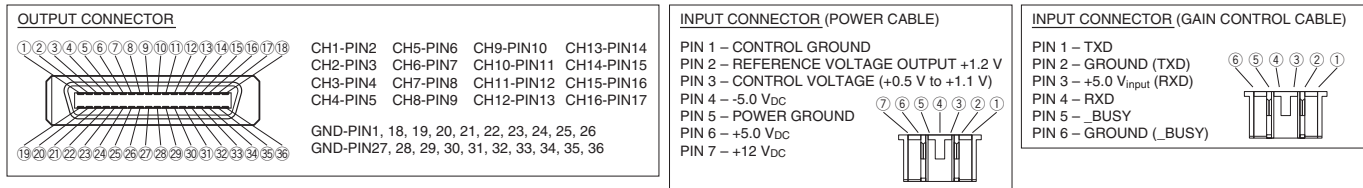
●H12310-40/-42



●H12311-40/-42



●CONNECTOR



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