

FEATURES

- High quantum efficiency: GaAsP / GaAs photocathode
- Built-in thermoelectric cooler
- Low noise
- Built-in protection circuit (See Figure 3)



SPECIFICATIONS

(at +25 °C)

Parameter				H7422-40 H7422A-40	H7422P-40 H7422PA-40	H7422-50 H7422A-50	H7422P-50 H7422PA-50	Unit	
Input voltage				+11.5 to +15.5				V	
Max. input voltage for main unit				+18				V	
Max. input current for main unit ^①				62				mA	
Max. input voltage for thermoelectric cooler				2.6				V	
Max. input current for thermoelectric cooler				2.2				A	
Max. output signal current				2				A	
Max. control voltage				+0.9 (Input impedance 100 kΩ)				V	
Recommended control voltage adjustment range ^②				+0.5 to +0.8				V	
Effective area				φ5				mm	
Photocathode material				GaAsP		GaAs		—	
Spectral response				300 to 740		380 to 920		nm	
Peak sensitivity wavelength				520		630		nm	
Cathode	Quantum efficiency	at peak quantum efficiency wavelength	Min.	40		14		% rowspan="6">mA/W	
			Typ.	45		19			
		at 800 nm	Min.	—		11			
	Radiant sensitivity	at peak quantum efficiency wavelength	Min.	168		70			
			Typ.	189		95			
		at 800 nm	Min.	—		71			
						97			
Anode	Radiant sensitivity	at peak quantum efficiency wavelength	Min.	1.0 × 10 ⁵ ^③	1.7 × 10 ⁵ ^⑤	4.2 × 10 ⁴ ^③	7.0 × 10 ⁴ ^⑤	A/W	
			Typ.	1.9 × 10 ⁵ ^③	3.8 × 10 ⁵ ^⑤	9.5 × 10 ⁴ ^③	1.9 × 10 ⁵ ^⑤		
		at 800 nm	Min.	—		4.3 × 10 ⁴			
		Typ.	—		9.7 × 10 ⁴				
	Dark current ^{③④}			Typ.	0.4		0.5		nA
				Max.	1.0		1.3		
	Dark count ^{④⑤}			Typ.	—		100		s ⁻¹
				Max.	—		300		
	Gain ^③			Min.	6.0 × 10 ⁵		6.0 × 10 ⁵		—
				Typ.	1.0 × 10 ⁶		1.0 × 10 ⁶		
Rise time ^③				Typ.				1.0	ns
Ripple noise ^{③⑥} (peak to peak)				Max.				0.6	mV
Settling time ^⑦				Typ.				0.2	s
Operating ambient temperature ^⑧								+5 to +35	°C
Storage temperature ^⑧								-20 to +50	°C
Weight								Approx. 455	g

① Input voltage = +15.0 V, Control voltage = +0.8 V in darkness, just after protection circuit works.

② Under protection circuit is active, V_{cont} outputs +15 V and high voltage turn off. (Output impedance 33 kΩ)

Status of protection operation can be checked by monitoring V_{cont} voltage.

③ Control voltage = +0.8 V ④ After 30 minutes storage in darkness, PMT setting temperature 0 °C, used with C8137-02 and A7423

⑤ Plateau voltage = control voltage ⑥ Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF

⑦ 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.

⑧ No condensation

PHOTOSENSOR MODULES H7422 SERIES

COOLING SPECIFICATIONS

Parameter	H7422 series	Unit
Cooling method	Thermoelectric cooling	—
Max. cooling temperature (ΔT) ^⑨	35	°C
Cooling time ^⑨	Approx. 5	min

⑨ Input current to thermoelectric cooler = 2 A

Figure 1: Cathode radiant sensitivity

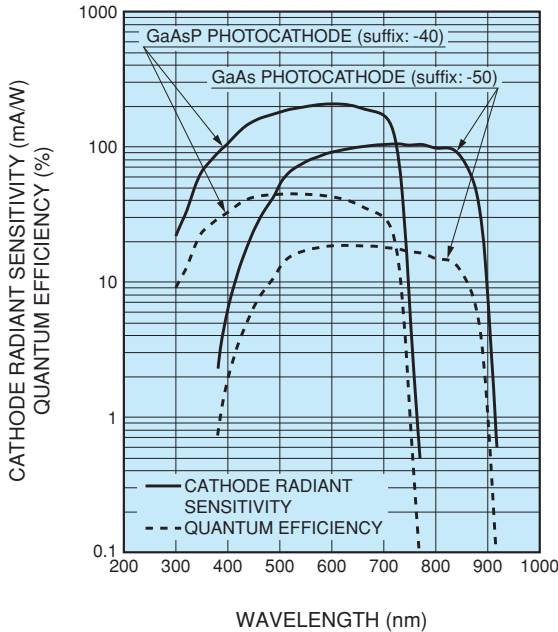


Figure 2: Gain

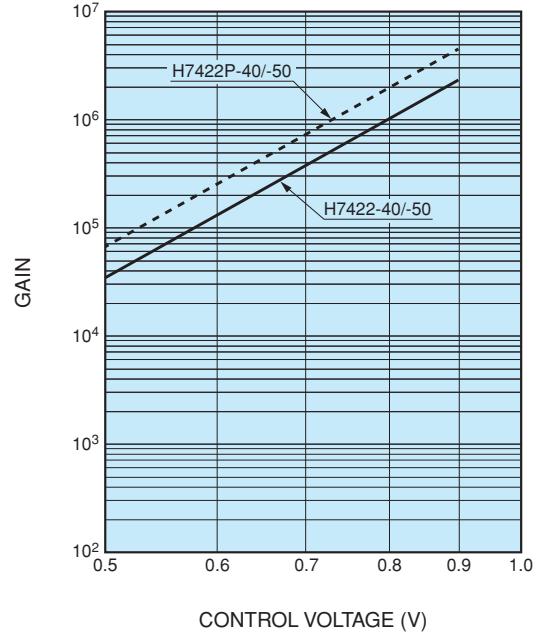
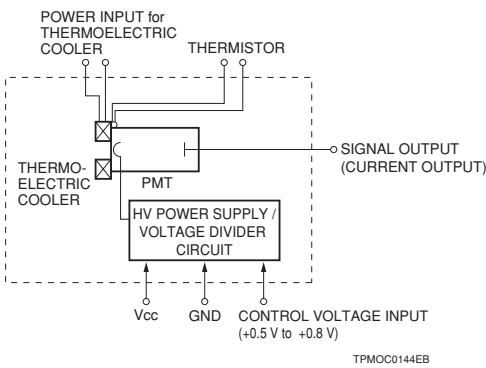
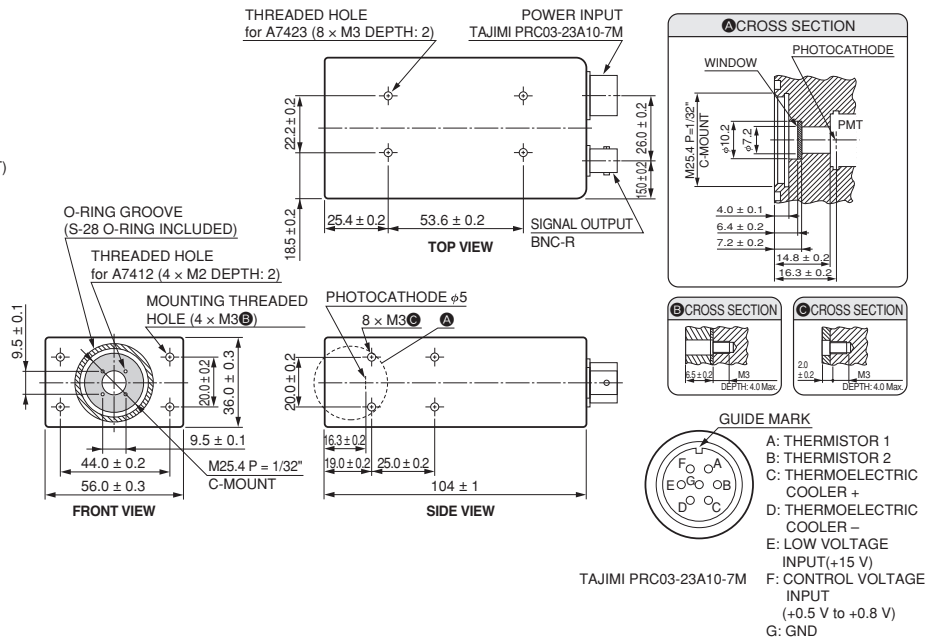


Figure 3: Block diagram



To prevent damage by excessive light, the H7422-40/-50 has a protection circuit that automatically turns off high voltage if the output current exceeds the preset current limit (approximately 10 μA). This protection circuit works whenever the preset current limit is exceeded, even for a very short moment. For example, in applications such as laser scanning microscopes, the output current may momentarily exceed the preset current limit of the protection circuit. This will trigger the protection circuit and interrupt measurement. For such applications, if the average output current is lower than the PMT module maximum rating (2 μA), we offer the H7422A-40/-50 series that uses a protection circuit with the preset current limit changed to approximately 50 μA and so allows continuous operation without turning off high voltage even if a momentarily high output occurs.

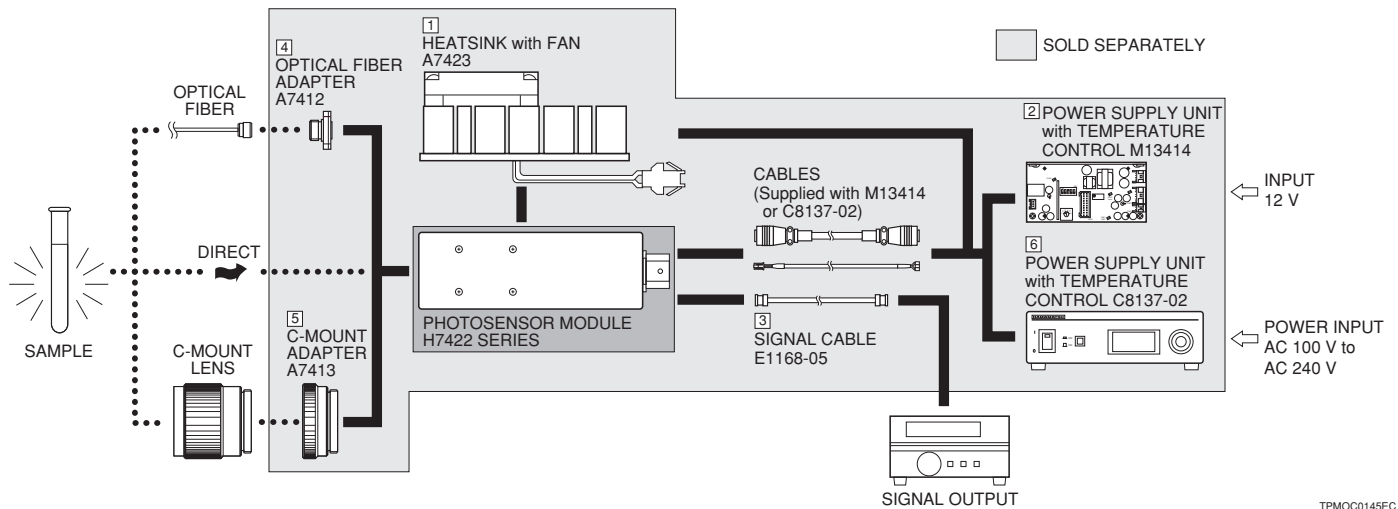
Figure 4: Dimensional outline (Unit: mm)



TAJIMI PRC03-23A10-7M

GUIDE MARK
 A: THERMISTOR 1
 B: THERMISTOR 2
 C: THERMOELECTRIC COOLER +
 D: THERMOELECTRIC COOLER -
 E: LOW VOLTAGE INPUT(+15 V)
 F: CONTROL VOLTAGE INPUT (+0.5 V to +0.8 V)
 G: GND

H7422 SERIES OPTION



● Heatsink with Fan A7423

The temperature of the H7422 outer case rises due to the thermoelectric cooler housed in the case. The A7423 heatsink efficiently radiates away this heat to prevent a temperature rise in the H7422. The A7423 can be easily installed onto the H7422 with four M3 screws. Apply a heat conductive grease onto the joint surface shared by the H7422 and A7423.

Parameter	Value	Unit
Input voltage	12	V
Input current	During lock	140 mA
	During operation	90 mA
Operating voltage	10.2 to 13.8	V
Weight	128	g

● Power supply unit with temperature control M13414

The M13414 is an on-board type power supply unit. By just connecting to 12 V supply, the M13414 provides power necessary to operate the H7422 series. The M13414 also controls the thermoelectric cooler in the H7422 series so that the output and noise can be maintained at constant levels even when the ambient temperature changes. The thermoelectric cooler and PMT operation can be controlled from an external device by connecting it to the I/O connector on the M13414.

Parameter	Description / Value	Unit
Max. cooling temperature (ΔT)	35	$^{\circ}\text{C}$
Max. input voltage	13.2	V
Max. input current	0.9	A
Max. power consumption	11.9	V·A
Main circuit output voltage	6	V
Max. output current for thermoelectric cooler	2	A
Output voltage for fan	10.8 to 12.6	V
Max. control output voltage	1.26	V
Max. control input voltage	0.9	V
Control signal input voltage	Thermoelectric cooler	Non-insulated TTL level input
	PMT	Non-insulated TTL level input
	Fan	Non-insulated TTL level input
Error signal output voltage	Thermoelectric cooler	Non-insulated TTL level output
	PMT	Non-insulated TTL level output
LED output	Normal	4.5 to 5.5 V
	Error	4.5 to 5.5 V
Setting cooling temperature	-10/-5/0/+5/+10/+15	$^{\circ}\text{C}$
Weight (including cables)	330	g

● Signal cable E1168-05

This signal cable is terminated with a BNC connector for easily connecting the H7422 to external equipment.

● Optical fiber adapter (FC type) A7412

The A7412 is an FC type optical fiber connector that attaches to the light input window of the H7422. The A7412 can easily be secured in place with four M2 screws.

● C-mount adapter A7413

The A7413 mount adapter is used when a C-mount lens protruding 4 mm or more from the flange-back must be installed onto the H7422.

● Power supply unit with temperature control C8137-02

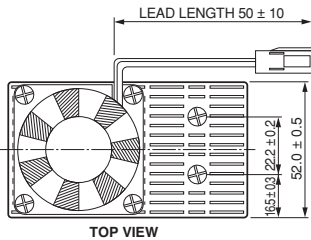
The C8137-02 is a power supply unit with a temperature control function. Just connecting to an AC source of 100 V to 240 V generates the output voltages for the thermoelectric cooler and the A7423 fan, needed for operating the H7422. The photomultiplier tube temperature can be maintained to 0°C by monitoring the thermistor and regulating the output current for the thermoelectric cooler. Control voltage can be varied by a knob on the front panel.

Parameter	Value	Unit
Max. cooling temperature (ΔT)	35	$^{\circ}\text{C}$
Setting cooling temperature (preset at factory)	0	$^{\circ}\text{C}$
AC input voltage	100 to 240	V
Input voltage frequency	50 / 60	Hz
Power consumption	30	V·A
Main circuit output voltage	+15	V
Max. current for thermoelectric cooler	2.2	A
Output voltage for fan	12	V
Control voltage adjustment range	0 to +0.9	V
Weight	1.1	kg

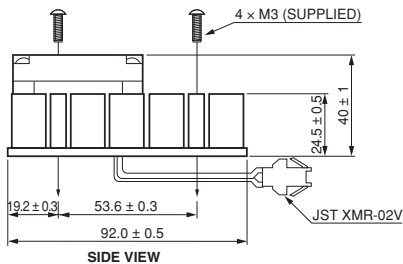
PHOTOSENSOR MODULES H7422 SERIES

OPTIONS (Unit: mm)

●Heatsink with fan A7423



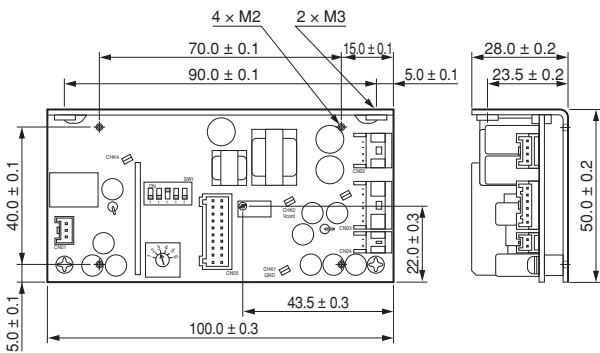
TOP VIEW



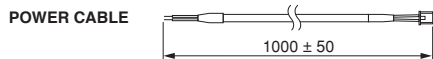
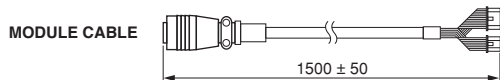
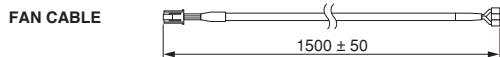
SIDE VIEW

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●Power supply unit with temperature control M13413



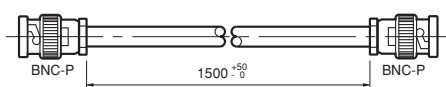
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EXTERNAL I/O HOUSING

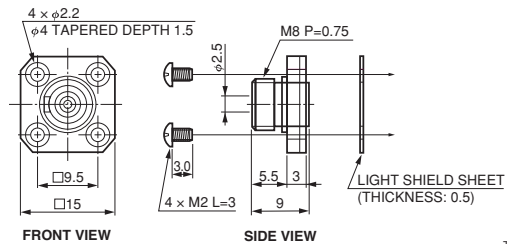
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●Signal cable E1168-05



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●Optical fiber adapter (FC type) A7412

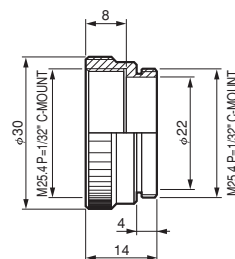


FRONT VIEW

SIDE VIEW

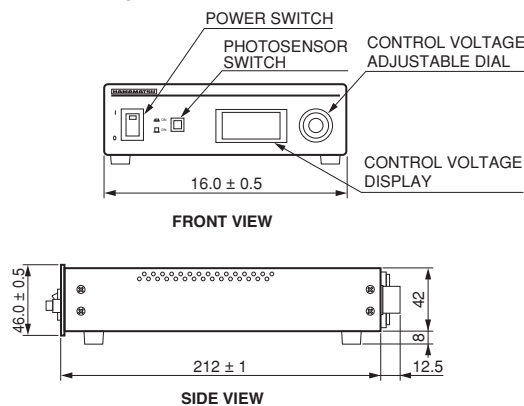
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●C-mount adapter A7413



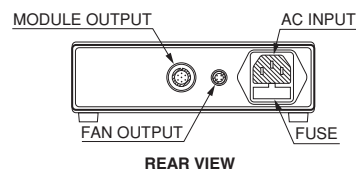
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●Power supply unit with temperature control C8137-02

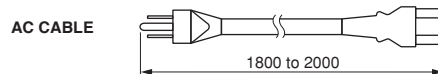
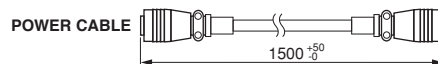


FRONT VIEW

SIDE VIEW



REAR VIEW



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