

FEATURES

- High quantum efficiency: GaAsP / GaAs photocathode
- Built-in thermoelectric cooler
- Low noise
- For photon counting



SPECIFICATIONS

(at +25 °C)

Parameter		H7421-40	H7421-50	Unit
Input voltage		+4.5 to +5.5		V
Max. input voltage for main unit		+6		V
Max. input current for main unit		50		mA
Max. input voltage for thermoelectric cooler		2.6		V
Max. input current for thermoelectric cooler		2.2		A
Effective area		φ5		mm
Photocathode material		GaAsP	GaAs	—
Spectral response		300 to 740	380 to 920	nm
Peak count sensitivity wavelength		580	800	nm
Count sensitivity	at peak count sensitivity wavelength	Min.	—	s ⁻¹ ·pW ⁻¹
		Typ.	5.0 × 10 ⁵	
	at 800 nm	Min.	4.1 × 10 ⁵	
		Typ.	5.1 × 10 ⁵	
Count linearity ^①		1.5 × 10 ⁶	1.5 × 10 ⁶	s ⁻¹
Dark count ^{②③}	Typ.	100	125	s ⁻¹
	Max.	300	375	
Pulse-pair resolution		70		ns
Output pulse width		30		ns
Output pulse height ^④	Min.	3.0		V
	Typ.	3.6		
Recommended load resistance		50		Ω
Signal output logic		Positive logic		—
Operating ambient temperature ^⑤		+5 to +35		°C
Storage temperature ^⑤		-20 to +50		°C
Weight		Approx. 400		g

① Random pulse, at 10 % count loss

② PMT setting temperature 0 °C, used with C8137, M13413 and A7423

③ After 30 minutes storage in darkness

④ With input voltage +5 V, Load resistance 50 Ω and Coaxial cable RG-174/U (450 mm)

⑤ No condensation

COOLING SPECIFICATIONS

Parameter	H7421-40 / H7421-50	Unit
Cooling method	Thermoelectric cooling	—
Max. cooling temperature (ΔT) ^⑥	35	°C
Cooling time ^⑥	Approx. 5	min

⑥ Input current to thermoelectric cooler = 2 A

PHOTON COUNTING HEAD H7421 SERIES

Figure 1: Count sensitivity

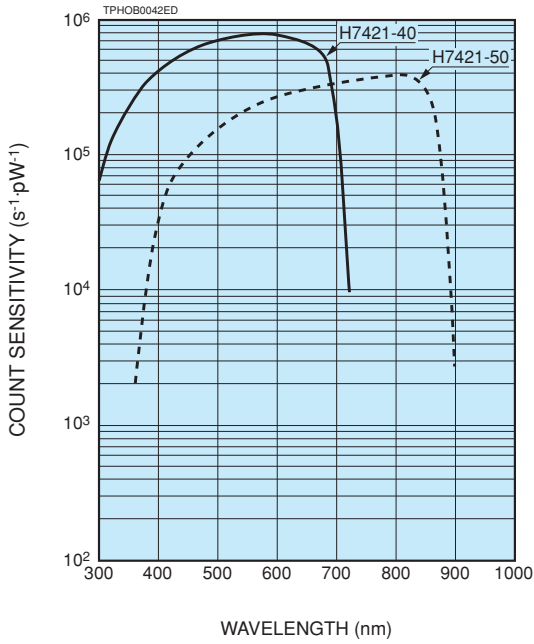


Figure 2: Dark count

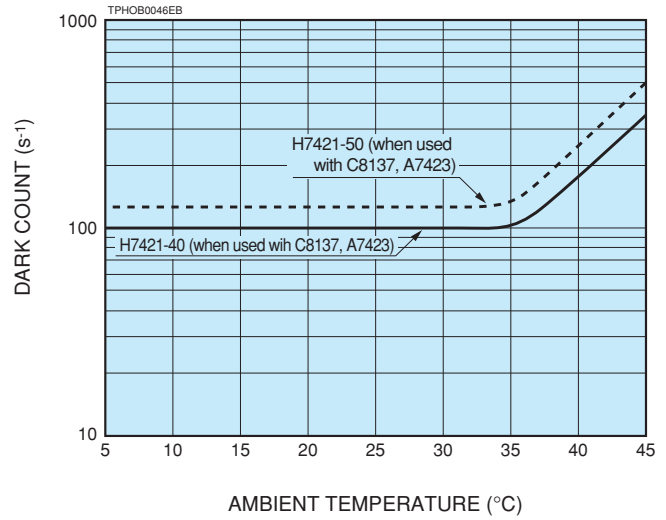


Figure 3: Block diagram

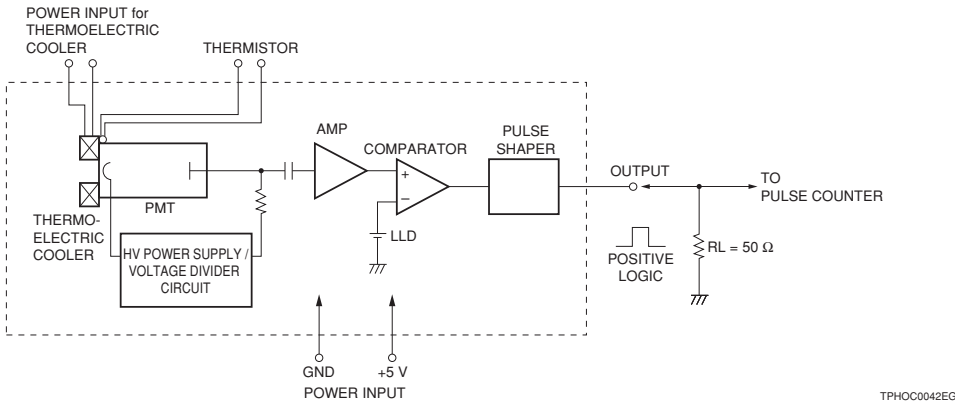
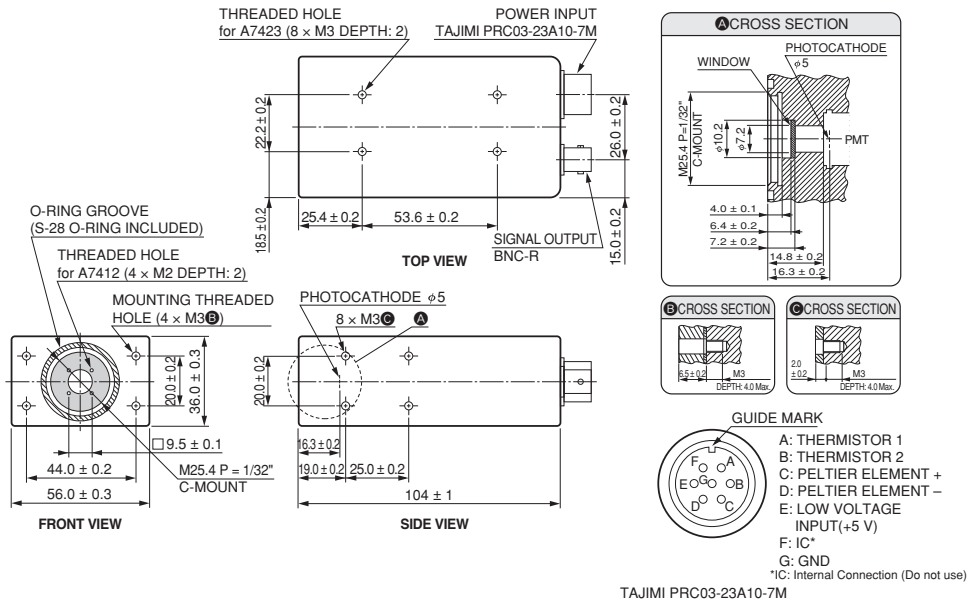
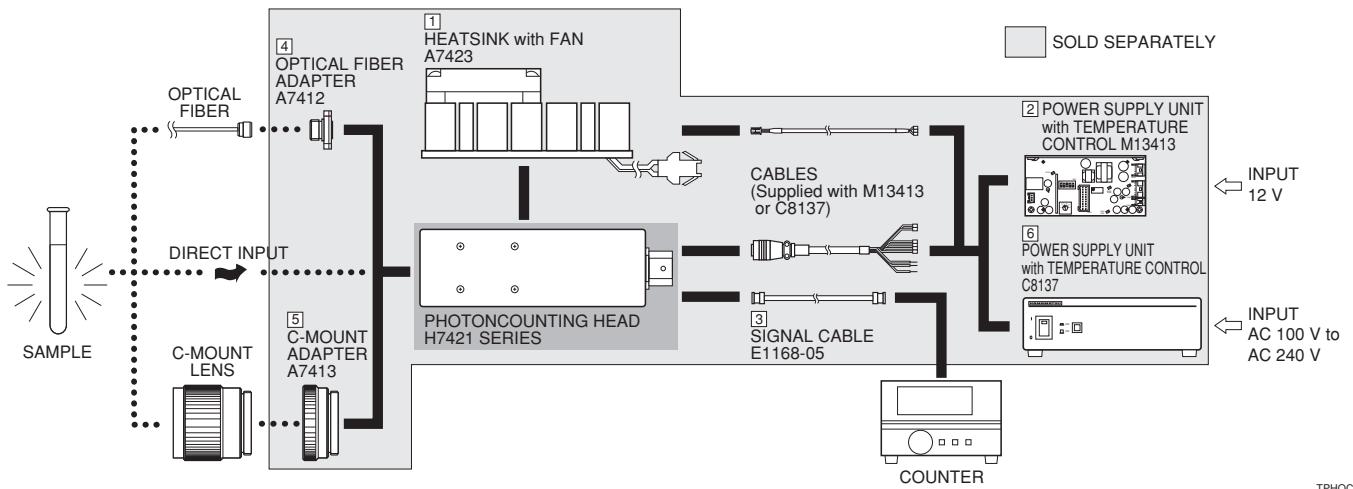


Figure 4: Dimensional outline (Unit: mm)



OPTIONS FOR H7421 SERIES



● Heatsink with fan A7423

The temperature of the H7421 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 H7421. The A7423 can be easily installed onto the H7421 with four M3 screws. Apply a coat of heat conductive grease onto the joint surface shared by the H7421 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 M13413

The M13413 is an on-board type power supply unit. By just connecting to 12 V supply, the M13413 provides power necessary to operate the H7421 series. The M13413 also controls the thermoelectric cooler in the H7421 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 M13413.

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
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	4.5 to 5.5
LED output	Error	4.5 to 5.5
Setting cooling temperature	-10/-5/0/+5/+10/+15	$^{\circ}\text{C}$
Weight (including cables)	330	g

● Signal cable E1168-05

This signal cable comes attached to a BNC connector for easily connecting the H7421 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 H7421. 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 H7421.

● Power supply unit with temperature control C8137

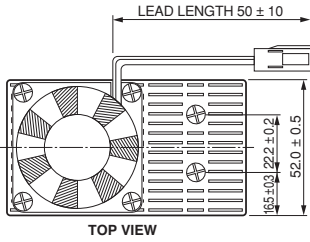
The C8137 is a power supply unit with a temperature control function. Just connecting to an AC source of 100 V to 240 V generates the output voltages for the thermoelectric cooler and the A7423 fan, needed for operating the H7421. The photomultiplier tube temperature can be maintained to 0°C by monitoring the thermistor and regulating the output current for

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	+5	V
Max. current for thermoelectric cooler	2.2	A
Output voltage for fan	12	V
Weight	1.28	kg

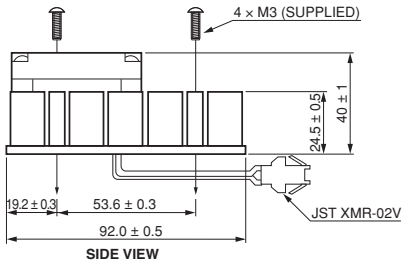
PHOTON COUNTING HEAD H7421 SERIES

OPTIONS (Unit: mm)

●Heatsink with fan A7423



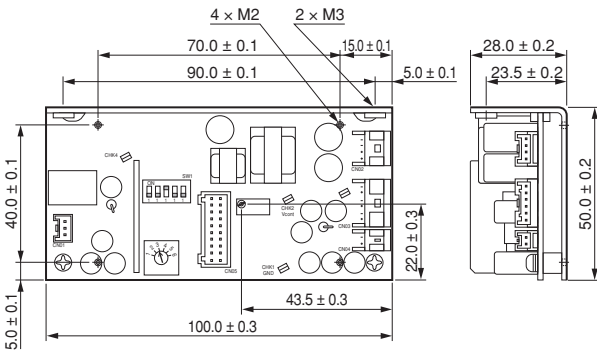
TOP VIEW



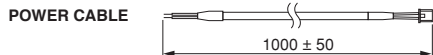
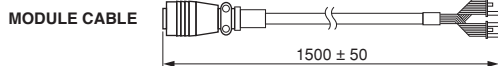
SIDE VIEW

TACCA0188ED

●Power supply unit with temperature control M13413



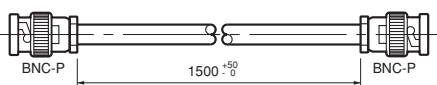
[ACCESSORIES] (Unit: mm) [SUPPLIED]



EXTERNAL I/O HOUSING

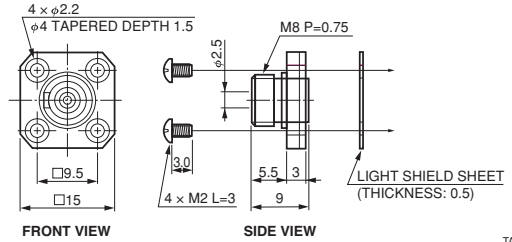
TACCA0362EA

●Signal cable E1168-05



TACCA0148EA

●Optical fiber adapter (FC type) A7412

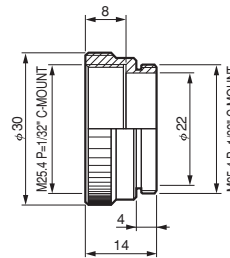


FRONT VIEW

SIDE VIEW

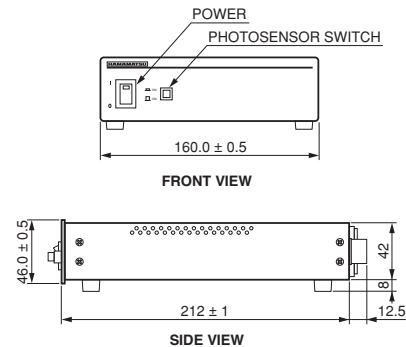
TACCA0190EB

●C-mount adapter A7413



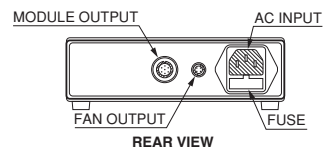
TACCA0191EA

●Power supply unit with temperature control C8137

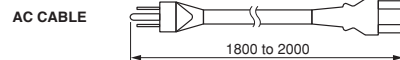
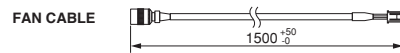
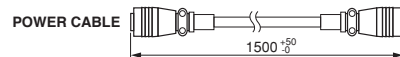


FRONT VIEW

SIDE VIEW



REAR VIEW



TACCA0237EB

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

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, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com

Germany: Hamamatsu Photonics Deutschland GmbH, Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: 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

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

North Europe: Hamamatsu Photonics Norden AB, Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01 E-mail: info@hamamatsu.se

Italy: Hamamatsu Photonics Italia S.r.l., Strada della Moia, 1 int. 6, 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: info@hamamatsu.it

China: Hamamatsu Photonics (China) Co., Ltd., 1201 Tower B, Jiaming Center, 27 Dongsanhuan Bellu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn

Taiwan: Hamamatsu Photonics Taiwan Co., Ltd., 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw

TPMO1099E01
JUL. 2021 IP