

FEATURES

- Compact size: 13 mm (1/2 inch) diameter (Effective area: $\phi 10$ mm)
- Low and stable dark count
- R12421 with HA treatment (R12421-00-01)
- R12421 with HA treatment and magnetic shield (R12421-00-03, R12421P)
- R12421 with voltage divider circuit, HA treatment and magnetic shield (H12690 series)
- High sensitivity type in 500 nm to 700 nm: R12421-300, H12690-300

APPLICATIONS

- Biomedical applications (Bioluminescence, Chemiluminescence)
- Scintillation counting (Radiation monitor)
- Light scatter detection



Left: R12421, Right: H12690

GENERAL

Parameter		R12421 series	H12690 series	Unit
Spectral response	Range	-300 type: 300 to 700, Others: 300 to 650		nm
	Peak wavelength	420		nm
Window material		Borosilicate glass		—
Photocathode	Material	-300 type: Extended green bialkali, Others: bialkali		—
	Minimum effective area	$\phi 10$		mm
Dynode	Structure	Linear-focused		—
	Number of stages	10		—
Operating ambient temperature		-30 to +50	0 to +50	°C
Storage temperature		R12421, R12421-300: -80 to +50 Others: -30 to +50	-15 to +50	°C
Suitable socket		E678-13F (supplied)		—

MAXIMUM RATINGS (Absolute maximum values)

Parameter		R12421 series	H12690 series	Unit
Supply voltage	Between anode and cathode	1250	-1250	V
Average anode current		0.1	0.016	mA

CHARACTERISTICS (at 25 °C)

Parameter		R12421 series / H12690 series			R12421-300, H12690-300 series			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Cathode sensitivity	Luminous (2856 K)	80	110	—	120	160	—	$\mu\text{A/lm}$
	Radiant at 420 nm	—	80	—	—	105	—	mA/W
	Quantum efficiency at peak	—	25	—	—	32	—	%
	Blue sensitivity index	—	10	—	12	14	—	—
Anode sensitivity	Luminous (2856 K)	100	220	—	100	320	—	A/lm
Gain		—	2.0×10^6	—	—	2.0×10^6	—	—
Anode dark current (after 30 min storage in darkness) [Ⓐ]		—	0.5	2	—	1	5	nA
Dark count (after 30 min storage in darkness) [Ⓑ]		—	80 (P type: 40)	400 (P type: 200)	—	400	1200	s ⁻¹
Time response	Anode pulse rise time	—	1.2	—	—	1.2	—	ns
	Electron Ttransit time	—	14	—	—	14	—	ns
	Transit time spread (FWHM)	—	1.4	—	—	1.4	—	ns
Pulse linearity	± 2 % deviation	—	3	—	—	3	—	mA
	± 5 % deviation	—	12	—	—	12	—	mA

NOTE: [Ⓐ]Anode characteristics are measured at 1000 V (H12690 series: -1000 V) with the voltage distribution ratio shown below.

[Ⓑ]Dark count is a guaranteed value.

VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE

Electrodes	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	P
Ratio	2	1	1	1	1	1	1	1	1	1	1	1

Supply voltage: 1000 V (H12690 series: -1000 V), K: Cathode, Dy: Dynode, P: Anode

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PHOTOMULTIPLIER TUBES AND PHOTOMULTIPLIER TUBE ASSEMBLIES

R12421 SERIES / H12690 SERIES

Figure 1: Typical spectral response

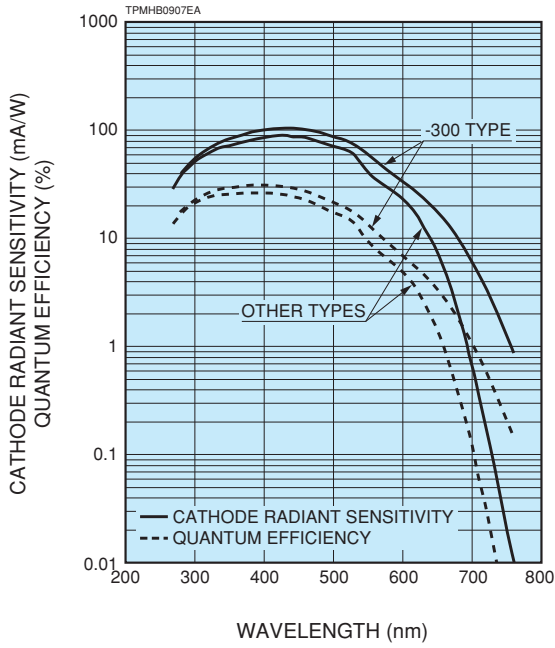


Figure 2: Typical gain

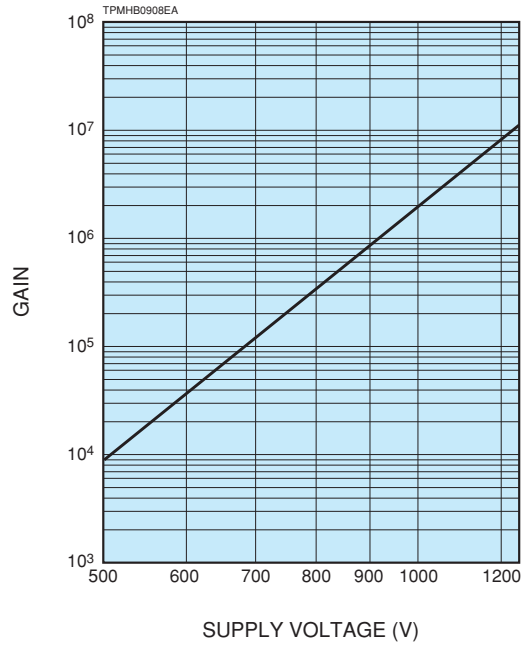


Figure 3: Time response (Example)

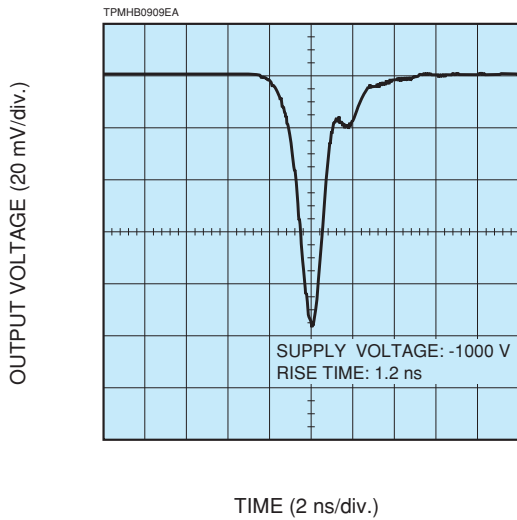


Figure 4: Single photon pulse height distribution (Example)

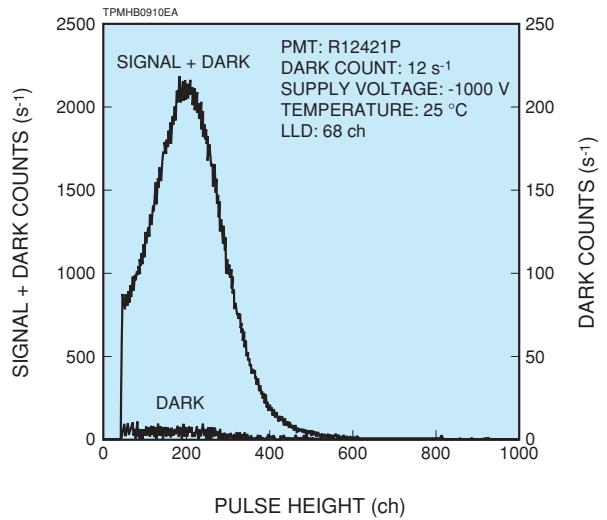


Figure 5: Plateau characteristics (Example)

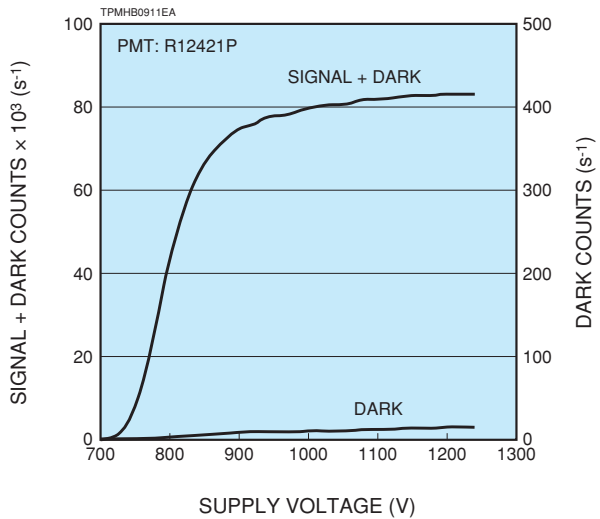


Figure 6: Dark count stability (Example)

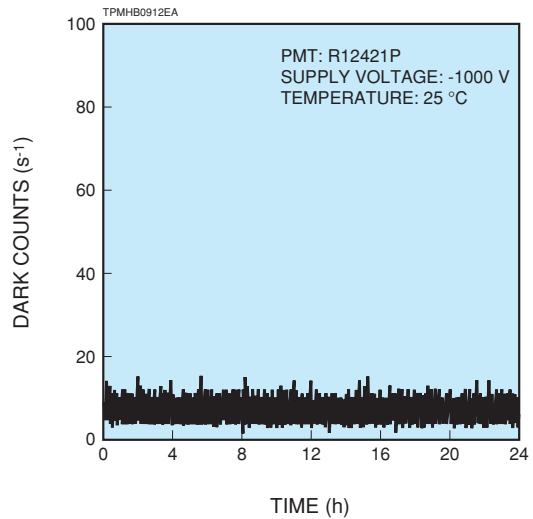


Figure 7: Dark count vs. Temperature (Example)

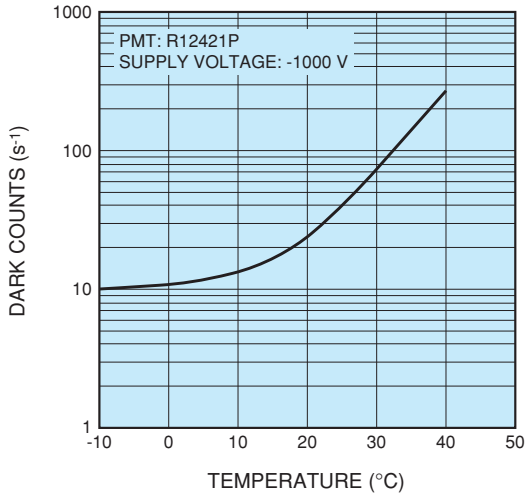


Figure 8: Block diagram for photon counting

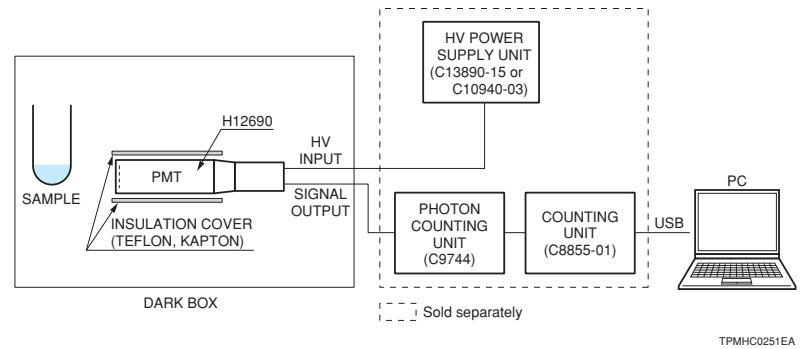
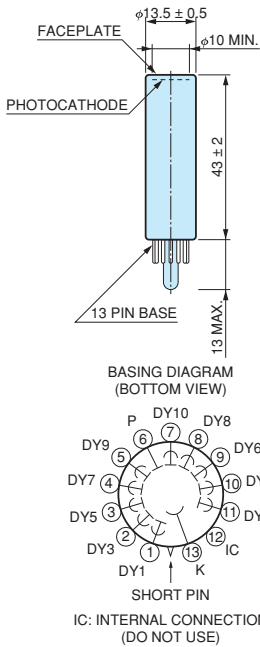
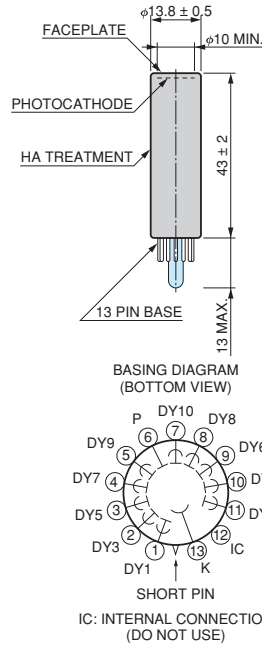


Figure 9: Dimensional outline and basing diagram (Unit: mm)

●R12421, R12421-300



●R12421-00-01



●R12421-00-03, R12421P

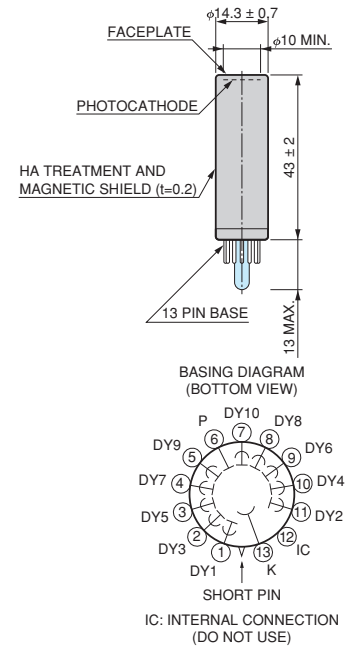


Figure 10: Socket (Supplied) (Unit: mm)

●E678-13F

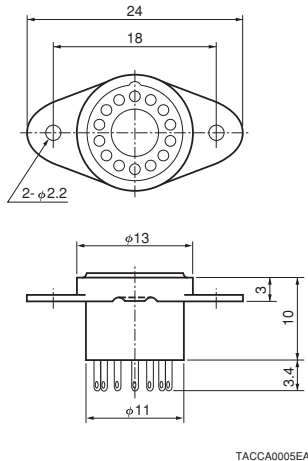
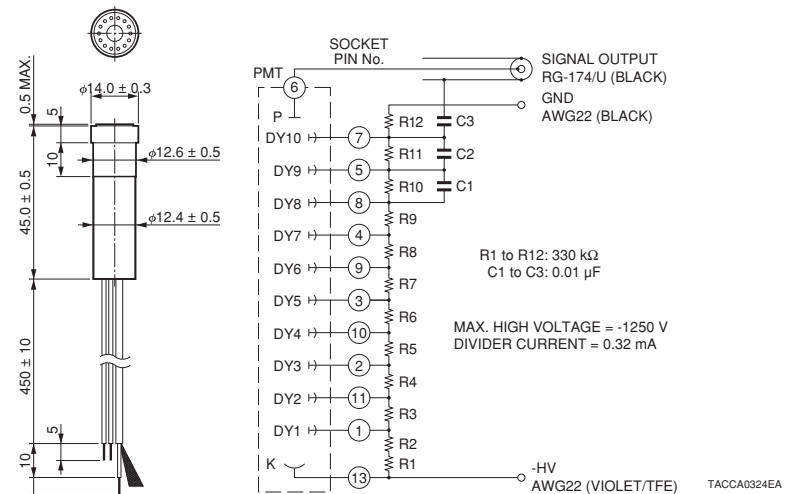


Figure 11: Socket assembly (Sold separately) (Unit: mm)

●E849-99



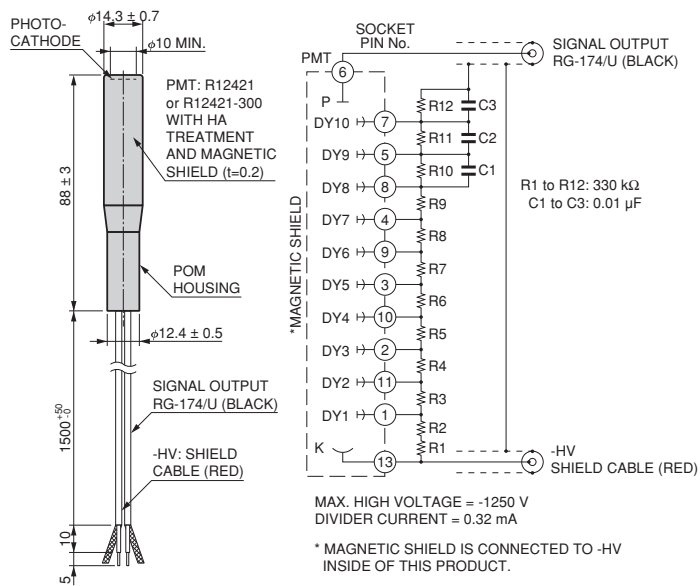
* HAMAMATSU also provides C13890 series and C10940 series high voltage power supply modules.

PHOTOMULTIPLIER TUBES AND PHOTOMULTIPLIER TUBE ASSEMBLIES

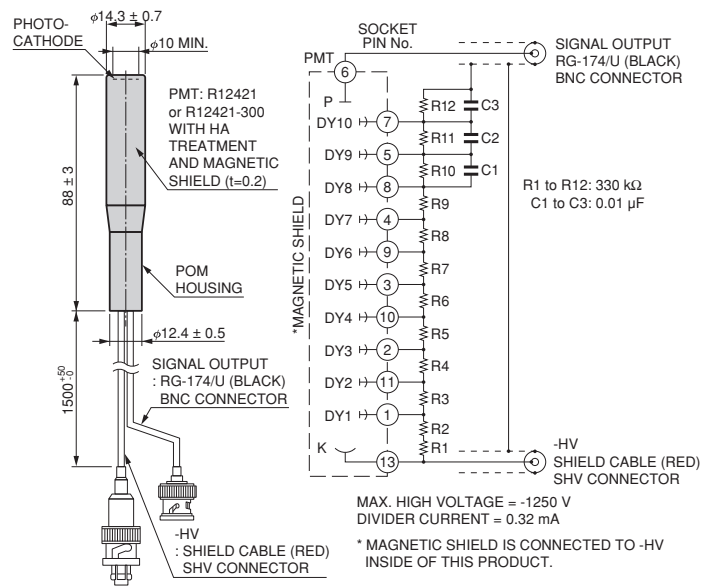
R12421 SERIES / H12690 SERIES

Figure 12: Dimensional outline and diagram (Unit: mm)

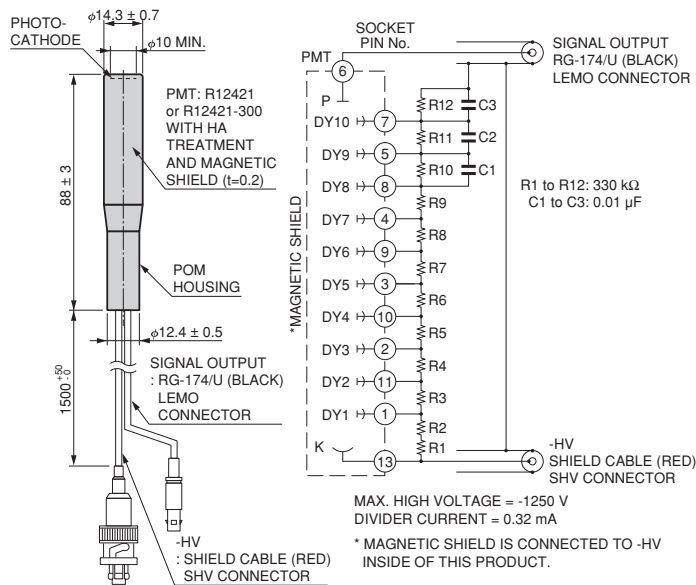
●H12690, H12690-300



●H12690-00-01, H12690-300-01



●H12690-00-02, H12690-300-02



Photon counting head H12775 consisting of R12421, high voltage power supply circuit, divider circuit, and photon counting circuit, is also available.

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