

FEATURES

- Large effective area: 48.5 mm × 48.5 mm
- Packing density: 87 %
- 8 × 8 multianode,
Pixel size: 6 mm × 6 mm / anode
- High quantum efficiency: 33 % Typ.
- Small dead space
- Fast time response
- Two types for HV input
H12700A series / H14220A: Cable input type
H12700B series / H14220B: Connector input type
- With tapered divider (-10 type)
- High sensitivity in green region: H14220 series



Left: HV cable input type, Right: HV connector input type

APPLICATIONS

- Academic research
(RICH, Gamma ray telescope, etc.)
- Nuclear medicine equipment
(PET, Gamma camera, etc.)
- 2D radiation imaging

Figure 1: Typical spectral response

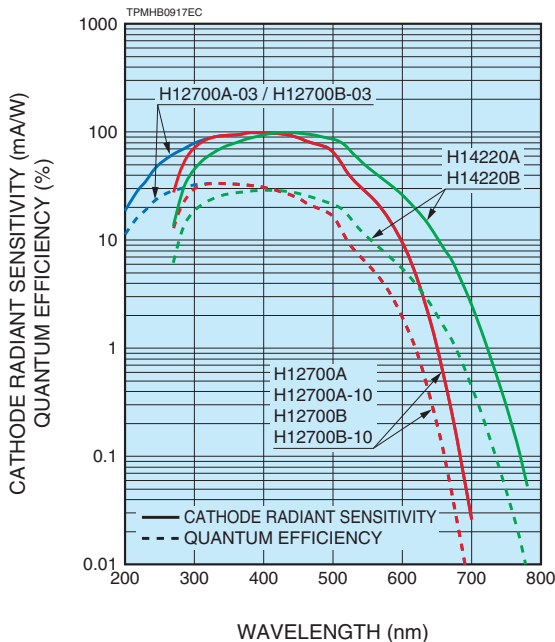
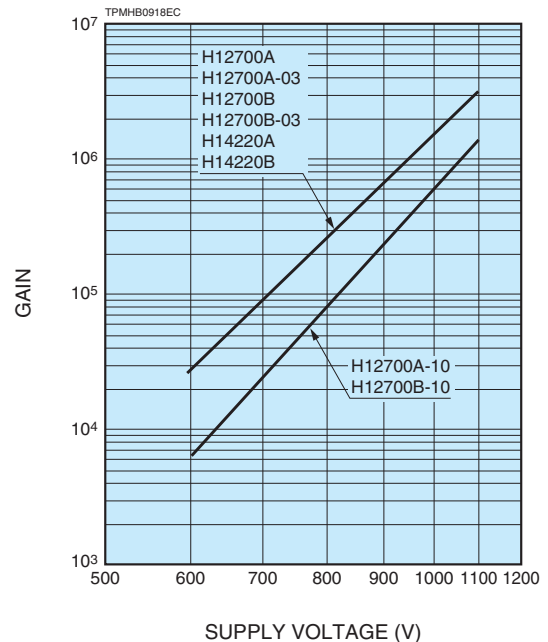


Figure 2: Typical gain



FLAT PANEL TYPE MULTIANODE PMT ASSEMBLY H12700 SERIES / H14220 SERIES

SPECIFICATIONS

Type No.	Spectral response		Photo-cathode material ^(A)	Window material ^(B)	Dynode structure / Stages ^(C)	Maximum ratings			Cathode characteristics		Anode to cathode supply voltage (V)	
	Range (nm)	Peak wavelength (nm)				Supply voltage between anode and cathode (V)	Average anode output current in total (μA)	Divider current at -1100 V (μA)	Luminous ^(D)			Blue sensitivity index (CS 5-58) Typ.
									Min. (μA/lm)	Typ. (μA/lm)		
H12700A	300 to 650	380	BA	K	MC/10	-1100	100	225	60	95	12	-1000
H12700B	300 to 650	380	BA	K	MC/10	-1100	100	225	60	95	12	-1000
H12700A-03	185 to 650	380	BA	U	MC/10	-1100	100	225	60	95	12	-1000
H12700B-03	185 to 650	380	BA	U	MC/10	-1100	100	225	60	95	12	-1000
H12700A-10	300 to 650	380	BA	K	MC/10	-1100	100	225	60	95	12	-1000
H12700B-10	300 to 650	380	BA	K	MC/10	-1100	100	225	60	95	12	-1000
H14220A	300 to 700	420	BA	K	MC/10	-1100	100	225	110	130	13	-1000
H14220B	300 to 700	420	BA	K	MC/10	-1100	100	225	110	130	13	-1000

NOTE: ^(A) BA: Bialkali

^(B) K: Borosilicate glass, U: UV glass

^(C) MC: Metal channel

^(D) The light source is a tungsten filament lamp operated at a distribution temperature of 2856 K. Supply voltage is 150 volts between the cathode and all other electrodes connected together as anode.

^(E) The value is cathode output current when a blue filter (CS 5-58 polished to 1/2 stock thickness) is interposed between the light source and the tube under the same condition as Note ^(D).

^(F) Measured with the same light source as Note ^(D) and with the anode-to-cathode supply voltage and voltage distribution ratio shown in Table 1 below.

^(G) Measured with the same supply voltage and voltage distribution ratio as Note ^(F) after 30 minute storage in darkness.

^(H) Those are test data when a signal from a central channel (P28) of 64 anodes is used, while all photocathode are illuminated by pulsed light source.

^(J) The rise time is the time for the output pulse to rise from 10 % to 90 % of the peak amplitude when the whole photocathode is illuminated by a delta function light pulse.

^(K) The electron transit time is the interval between the arrival of delta function light pulse at the entrance window of the tube and the time when the anode output reaches the peak amplitude. In measurement, the whole photocathode is illuminated.

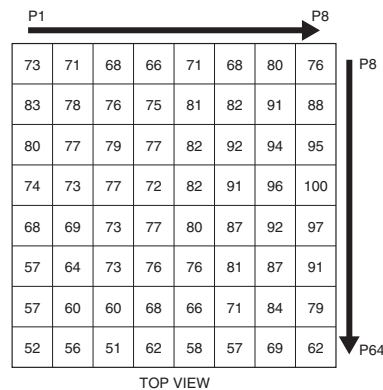
^(L) Also called transit time jitter. This is the fluctuation in electron transit time between individual pulses in the single photoelectron event, and defined as the FWHM of the frequency distribution of electron transit time.

Table 1: Voltage distribution ratio and supply voltage

Electrodes	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	GR	P
Standard divider type	2	1	1	1	1	1	1	1	1	1	1	1	0.5
Tapered divider type	2.4	1.2	1	1	1	1	1	1	1	1	1.1	3.5	0.5

Supply voltage: -1000 V, K: Cathode, Dy: Dynode, GR: Guard ring, P: Anode

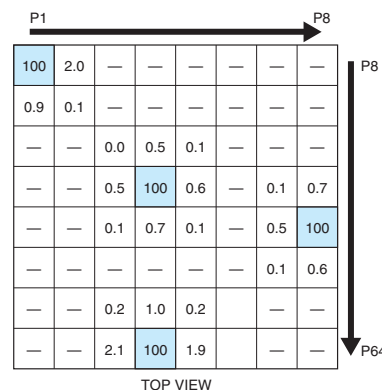
Figure 3: Anode uniformity (Example)



SUPPLY VOLTAGE: -1000 V
LIGHT SOURCE: TUNGSTEN LAMP with BLUE FILTER (DC LIGHT)
SPOT ILLUMINATION (APERTURE SIZE): 6 mm square on each channel

TPMHB0919EA

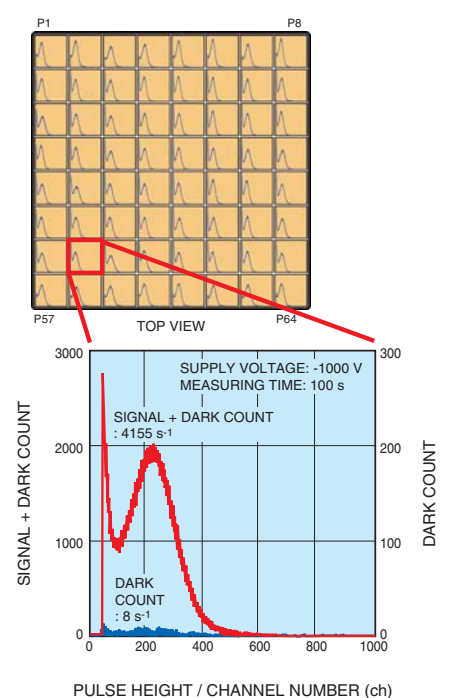
Figure 4: Anode cross-talk (Example)



SUPPLY VOLTAGE: -1000 V
LIGHT SOURCE: TUNGSTEN LAMP with BLUE FILTER (DC LIGHT)
FIBER SIZE: φ 1.0 mm (Kuraray: Clear Fiber NA=0.72)

TPMHB0920EA

Figure 5: Single photon counting (Example)



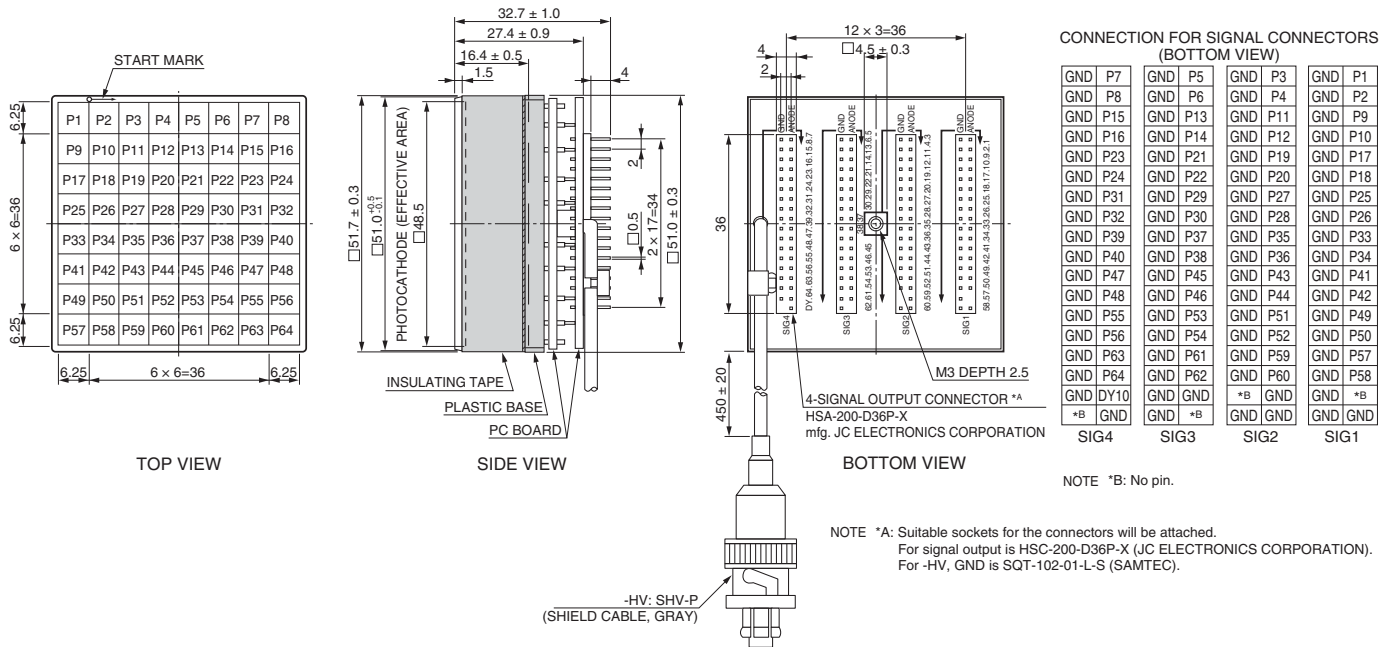
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Anode characteristics											Pulse linearity per channel [2% deviation]	Uniformity between each anode		Type No.
Luminous ^F		Gain ^F	Dark current per channel ^G		Dark current in total ^G		Time response ^H							
Min. (A/lm)	Typ. (A/lm)		Typ.	Typ.	Max.	Typ.	Max.	Rise time Typ. (ns)	Transit time Typ. (ns)	Transit time spread Typ. (ns)				
—	140	1.5×10^6	0.1	—	6	50	0.52	4.9	0.35	0.8	1: 2	1: 3	H12700A	
—	140	1.5×10^6	0.1	—	6	50	0.52	4.9	0.35	0.8	1: 2	1: 3	H12700B	
—	140	1.5×10^6	0.1	—	6	50	0.52	4.9	0.35	0.8	1: 2	1: 3	H12700A-03	
—	140	1.5×10^6	0.1	—	6	50	0.52	4.9	0.35	0.8	1: 2	1: 3	H12700B-03	
—	(60)	(0.6×10^6)	(0.1)	—	(6)	(50)	(0.52)	(4.9)	(0.35)	(3)	1: 2	1: 3	H12700A-10	
—	(60)	(0.6×10^6)	(0.1)	—	(6)	(50)	(0.52)	(4.9)	(0.35)	(3)	1: 2	1: 3	H12700B-10	
—	200	1.5×10^6	0.1	—	12	60	0.52	4.9	0.35	0.8	1: 2	1: 3	H14220A	
—	200	1.5×10^6	0.1	—	12	60	0.52	4.9	0.35	0.8	1: 2	1: 3	H14220B	

(): Measured with the special voltage distribution ratio (Tapered divider) shown in Table 1 below.

Figure 6: Dimensional outlines and basing diagram (Unit: mm)

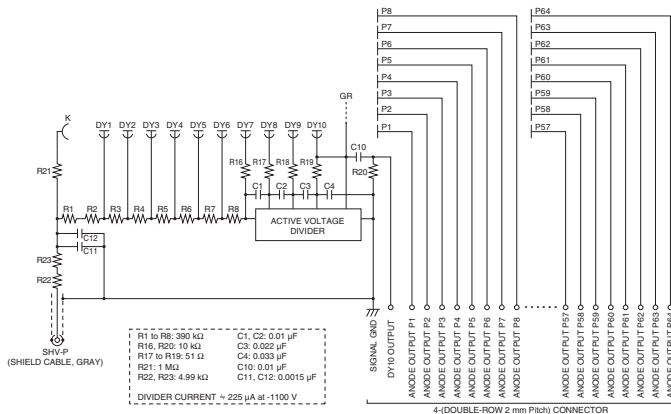
●HV cable input type (H12700A / H12700A-03 / H12700A-10 / H14220A)



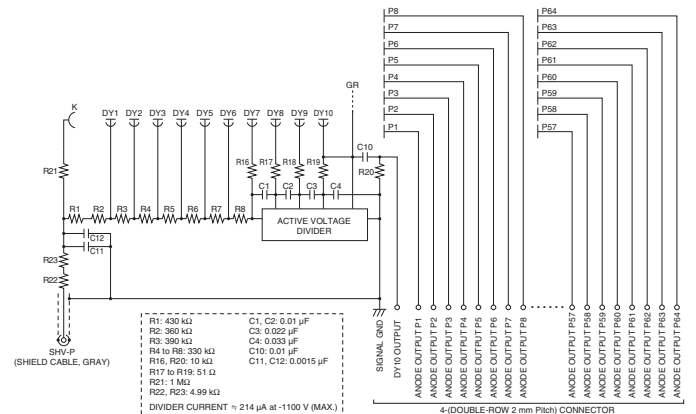
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Figure 7: Internal circuit

H12700A / H12700A-03 / H14220A



H12700A-10



FLAT PANEL TYPE MULTIANODE PMT ASSEMBLY H12700 SERIES / H14220 SERIES

Figure 8: Dimensional outlines and basing diagram (Unit: mm)

●HV connector input type (H12700B / H12700B-03 / H12700B-10 / H14220B)

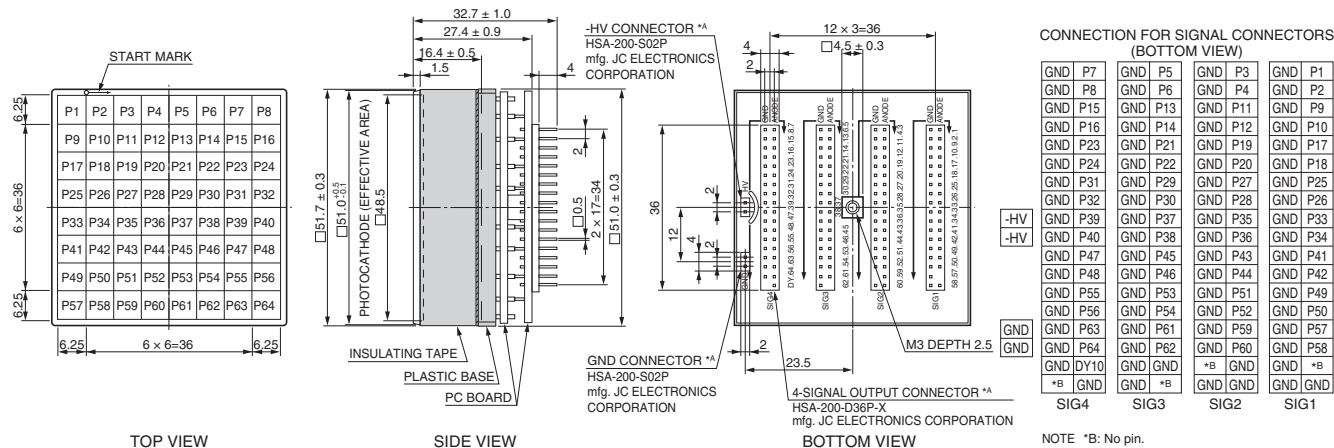
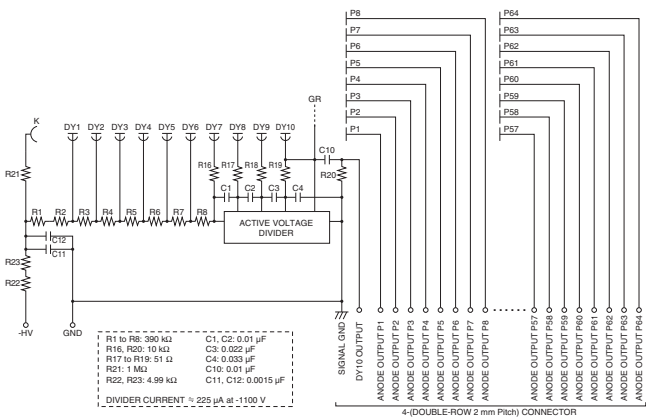


Figure 9: Internal circuit

H12700B / H12700B-03 / H14220B



H12700B-10

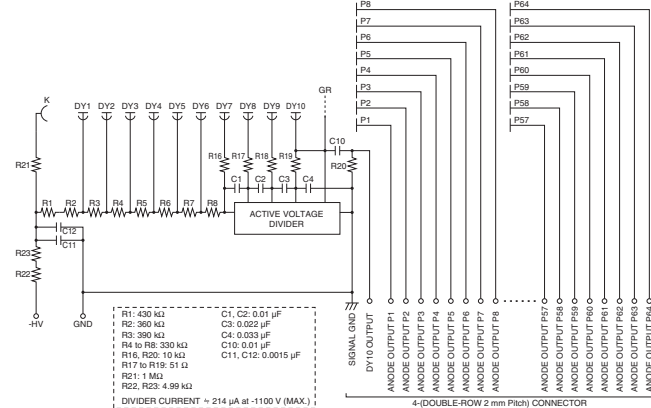
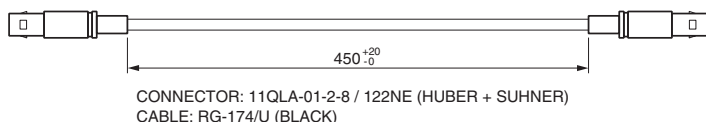


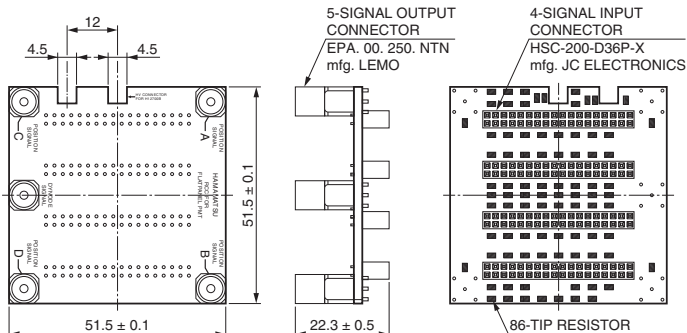
Figure 10: Accessories (Unit: mm) Sold separately

●Signal cable A13976



●Signal read-out board E14340

(for position imaging with center of gravity method)



* The fall time slows down caused by resistor chain of E14340

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