

High PHR, low noise, 10-stage, 39mm (1.5") tube

Applications :	For high energy physics and scintillation counting where an optimum energy resolution and low noise are required.		
Description :	Window :	Material :	low K borosilicate glass [⁴⁰ K 3 cpm; ¹³⁷ Cs, ²³⁸ U, ²²⁶ Ra, ²²⁸ Ra, ²²⁸ Th < 0.3 cpm]
		Photocathode :	bi-alkali
		Refr. index at 400 nm :	1.48
	Multiplier :	Structure :	linear focused
		Nb of stages :	10
	Mass :		60 g

Photocathode characteristics

Spectral range :				270-650	nm
	Maximum sensitivity at :			420	nm
Sensitivity ① :	Luminous :		typ.:	80	µA/lm
<input checked="" type="checkbox"/>	Blue :	min.:	9	typ.:	10.5
	Radiant, at 700 nm :			typ.:	85
					mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log) :				7.5	
For an anode blue sensitivity of :				7.5	A/lmF
<input checked="" type="checkbox"/> Supply voltage :		max.:	900	typ.:	750
		min.:	600		V
Gain :				2x10 ⁵	
<input checked="" type="checkbox"/> Anode dark current ② :		max.:	1	typ.:	0.1
					nA
Background noise ③ :		max.:	2000	typ.:	300
					cps
Pulse height resolution ¹³⁷ Cs ④ :				typ.:	7.7
Pulse height resolution ⁵⁵ Fe ⑤ :				typ.:	40
Single electron spectrum peak to valley ratio :				typ.:	2.0
Mean anode sensitivity deviation ⑥ :					
	long term (16 h) :			1	%
	after change of count rate :			1	%
	vs temperature between 0 and +40 °C at 420 nm :			- 0.3	%/K
Anode sensitivity deviation for a magnetic field of 0.05 mT :				10	%

Characteristics with voltage divider : A

For a supply voltage of :				800	V
Gain :				1.2x10 ⁶	
Linearity (2%) of anode current up to :				30	mA
Anode pulse ⑦ :	Rise time :			3	ns
	Duration at half height :			7	ns
	Transit Time :			36	ns
Capacitance	anode to all dynodes :			5	pF

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	A	
2	1	1	1	1	1	1	1	1	1	1	1	(total :12)

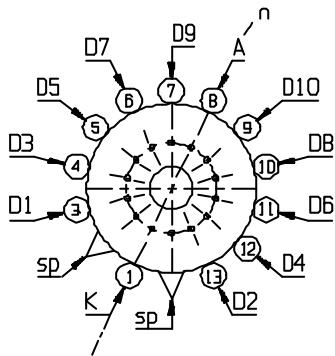
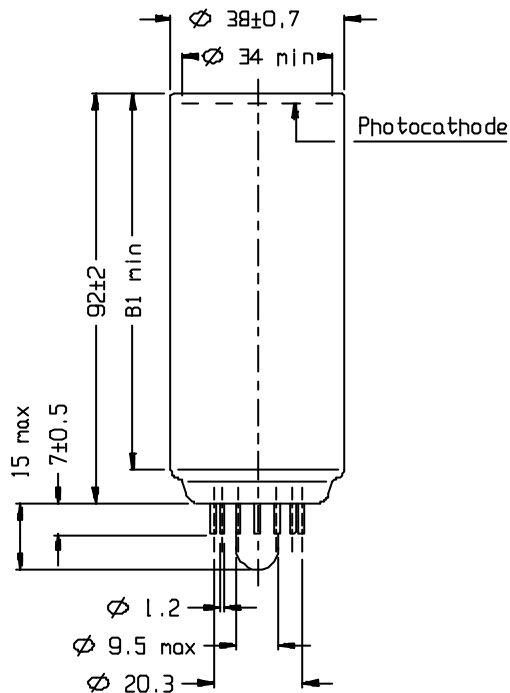
K: photocathode Dn: dynode A: anode

Limiting values

Anode luminous sensitivity :		max.:	75	A/lmF		
Supply voltage :		max.:	1400	V		
Continuous anode current :		max.:	0.2	mA		
Voltage between :						
	D1 and photocathode :	min.:	80	max.:	500	V
	consecutive dynodes :			max.:	300	V
	anode and D10 :	min.:	40	max.:	300	V
Ambient temperature :						
	short operation (< 30 mn) :	min.:	-30	max.:	+80	°C
	continuous operation & storage :	min.:	-30	max.:	+50	°C

Notes

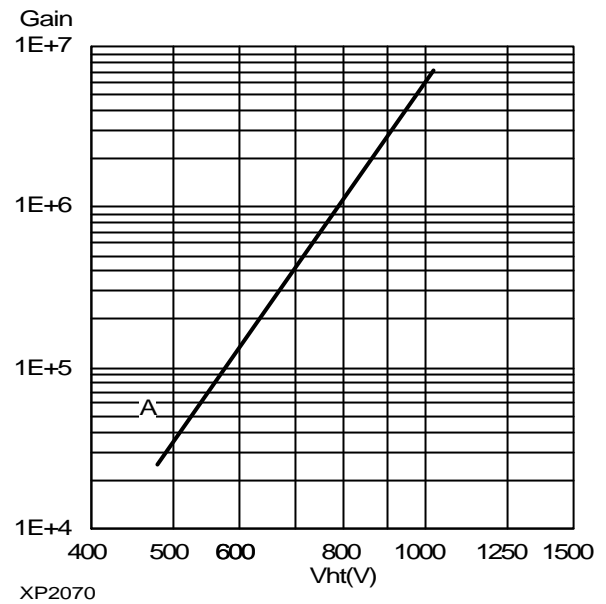
- Characteristic measured and mentioned on the test ticket of each tube.
- ① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue sensitivity, expressed in A/lmF ("F" as in Filtered) is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. Light is transmitted through an interference filter.
- ② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).
- ③ The background noise is measured with an output circuit and electronics with a bandwidth of the order of 3 MHz (in order to follow these fast transitions) above a threshold of 0.2 photoelectron.
- ④ Pulse amplitude resolution for ^{137}Cs is measured with NaI(Tl) cylindrical scintillator with a diameter of 32 mm and a height of 32 mm. The count rate used is $\sim 10^4$ c/s.
- ⑤ Pulse amplitude resolution for ^{55}Fe is measured with a NaI(Tl) cylindrical scintillator with a diameter of 25 mm and a height of 1 mm provided with a beryllium window. The count rate used is 2×10^3 cps.
- ⑥ The mean pulse amplitude deviation is measured by coupling a NaI(Tl) scintillator to the window of the tube. Long term (16h) deviation is measured by placing a ^{137}Cs source at a distance from the scintillator such that the count rate is $\sim 10^4$ c/s, corresponding to an anode current of ~ 300 nA. The mean pulse amplitude deviation after change of count rate is measured with a ^{137}Cs source at a distance from the scintillator such that the count rate can be changed from 10^4 to 10^3 c/s, corresponding to an anode current of ~ 1 μA and 0.1 μA respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations.
- ⑦ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1 ns., the cathode being completely illuminated. The rise time is determined between 10 % and 90 % of the anode pulse amplitude. The signal transit time is measured between the instant at which the illuminating pulse of the cathode becomes maximum, and the instant at which the anode pulse reaches its maximum. Rise time, pulse duration and transit time vary with respect to high tension supply voltage Vht as $(Vht)^{-1/2}$.



ref.: 99902225
sp: short pin
n: plane of symmetry of the multiplier

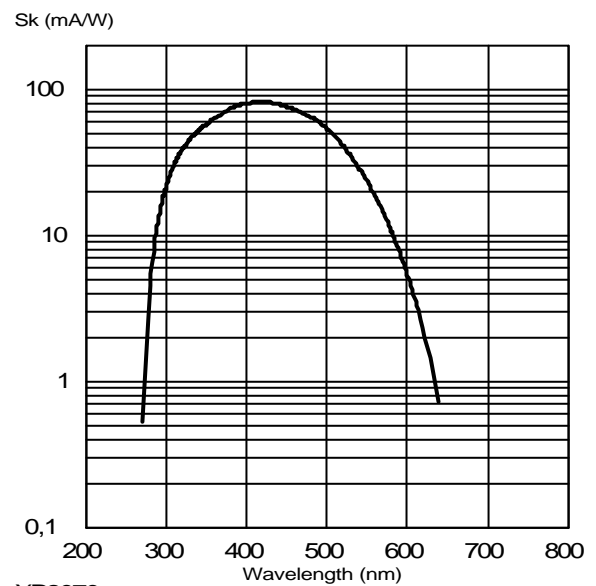
K: cathode Dn: dynode
A: anode

Typical gain curve



XP2070

Typical spectral characteristics



XP2070

Accessories

Socket : FE1112
Mu-metal shield : MS170