

A standard fast, low voltage, 8-stage, 29 mm (1 1/8") tube

Applications :	For high energy physics and scintillation counting where high gain good timing characteristics are required e.g. coincidence measurements and Cherenkov light detection.		
Description :	Window :	Material :	borosilicate glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.48
	Multiplier :	Material :	antimonied CuBe
		First dynode :	high gain
		Structure :	linear focused
		Nb of stages :	8
	Mass :		34 g

Photocathode characteristics

Spectral range :				270-650	nm
	Maximum sensitivity at :			420	nm
Sensitivity ① :					
<input checked="" type="checkbox"/>	Luminous :		typ.:	85	μA/lm
	Blue :	min.:	9	typ.:	11
	Radiant, at 400 nm :			typ.:	85
					μA/lmF
					mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log) :				6	
For an anode sensitivity of :				10	A/lmF
Typical gain :				9.1x10 ⁵	
<input checked="" type="checkbox"/> Supply voltage :	max.:	1500	typ.:	1350	V
	min.:	1100			
<input checked="" type="checkbox"/> Anode dark current ② :	max.:	10	typ.:	2	nA
Pulse height resolution ¹³⁷ Cs ③ :			typ.:	7.7	%
Mean anode sensitivity deviation ④ :					
	long term (16 h) :		typ.:	1	%
	after change of count rate :		typ.:	1	%
	vs temperature between 0 and +40°C at 400 nm :		typ.:	-0.2	%/K
Gain halved for a magnetic field of :					
	perpendicular to axis "n" :			0.2	mT
	parallel to axis "n" :			0.1	mT
	parallel to tube axis :			0.3	mT

Characteristics with voltage divider :

For a supply voltage of :				1350	V
Gain :				9.1x10 ⁵	
Linearity (2%) of an. current up to :				40	mA
Anode pulse ⑤ :					
	Rise time :			1.8	ns
	Duration at half height :			2.9	ns
	Transit Time :			19	ns
Capacitance	anode to all dynodes :			5	pF

Recommended voltage divider

Type A for maximum gain

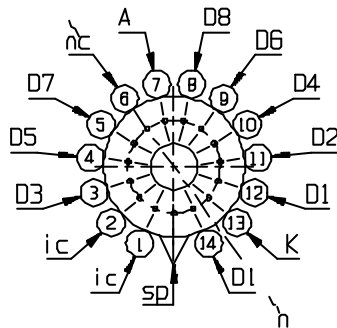
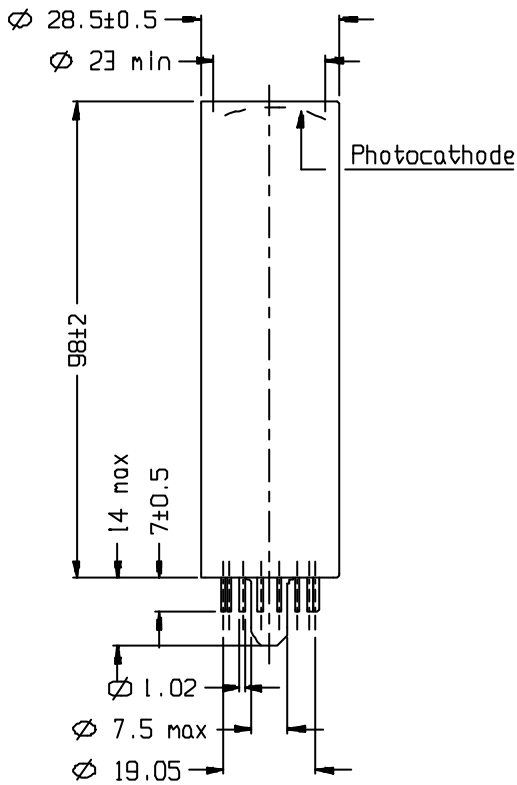
K	D1	D2	D3	D4	D5	D6	D7	D8	A	
2	1	1.5	1	1	1	1	1	1	1	(total : 10.5)

Limiting values

Anode luminous sensitivity :		max.:	25	A/ImF		
Supply voltage :		max.:	1600	V		
Continuous anode current :		max.:	0.2	mA		
Voltage between :						
	D1 and photocathode :	min.:	120	max.:	350	V
	consecutive dynodes :			max.:	250	V
	anode and D8 :	min.:	30	max.:	300	V
Ambient temperature :						
	short operation (< 30 mn) :	min.:	-30	max.:	+80	°C
	continuous operation & storage :	min.:	-30	max.:	+50	°C

Notes

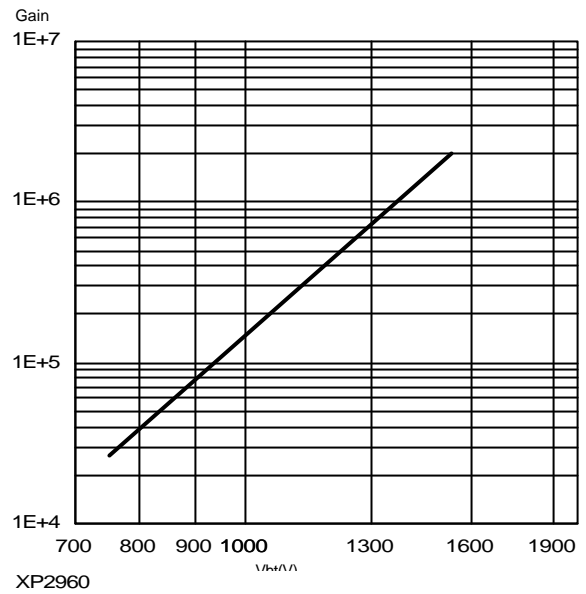
- Characteristic measured and mentioned on the test ticket of each tube.
- ① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue radiant blue sensitivity expressed in A/ImF ("F" as filtered) is measured with a tungsten filament lamp with a colour of 2856 ± 5 K transmitted through a blue filter Corning Cs N°5-58, polished to half stock thickness.
- ② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower values can be obtained after a longer stabilisation period in darkness (approx. 30 min.).
- ③ Pulse amplitude for ^{137}Cs is measured with NaI(Tl) cylindrical scintillator with a diameter of 25 mm and a height of 25 mm. The count rate used is $\sim 10^4$ cps.
- ④ 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 so that the count rate is $\sim 10^4$ cps, 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 so that the count rate can be changed from 10^4 to 10^3 cps corresponding to an anode current of $\sim 1 \mu\text{A}$ and $0.1 \mu\text{A}$ respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations.
- ⑤ 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 $(Vht)^{-1/2}$.



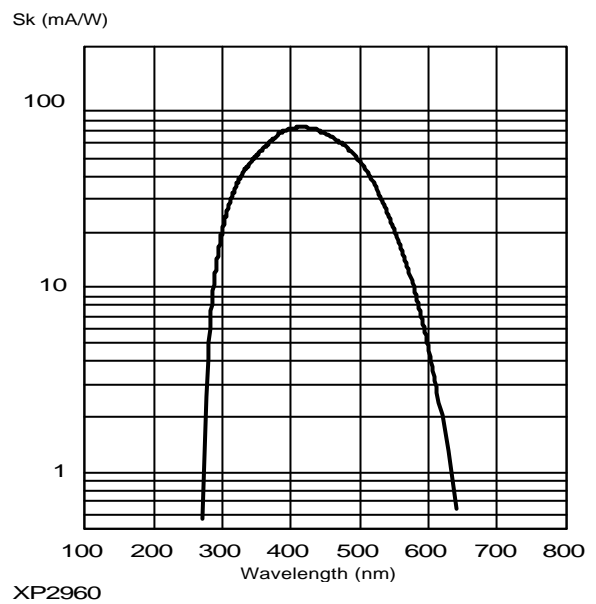
ref.: 99901948
 sp: short pin
 nc: not connected
 ic: internal connection
 n: plane of symmetry of the multiplier

K: cathode Dn: dynode
 A: anode

Typical gain curve



Typical spectral characteristics



Accessories

- Socket for wires: FE1114
- Socket for PCB: FE3114
- Mu-metal shield: MS179
- Voltage divider: VD189