Narragansett Imaging

DATA SHEET

XQ1412
CAMERA TUBE

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April 2001

Camera Tube XQ1412

30-mm (1.2-inch) diameter Plumbicon® television camera tubes with high-resolution lead-oxide photoconductive target, exclusively for use with X-ray image intensifiers with P20 output phosphor in medical equipment.

QUICK REFERENCE DATA

Diameter	30 mm (1.2 in)
Length	approx. 210 mm
Focusing	magnetic
Deflection	magnetic
Useful target area, circle diameter	18 mm
Spectral response	see Fig. 3
Sensitivity with P20 light source	typ. 175 μA/lmF
Resolution	typ. 55%
Heater	6.3 V, 190 mA

OPTICAL DATA

Dimensions of quality area on photoconductive target circle, 18 mm.

Orientation of image on target

For correct orientation of the image on the target the vertical scan should be essentially parallel to the plane passing through the tube axis and the mark on the tube base.

Faceplate

Thickness	1.2 ± 0.1 mm
Refractive index	n= 1.49

®Registered Trade Mark for television camera tube

ACCESSORIES

Socket	type 56021 or 56603
Deflection and focusing coil unit	type AT1130S

ELECTRICAL DATA

Deflection	magnetic	
Focusing	magnetic	
Heating		
Indirect by a.c. or d.c.		
Heater voltage	V_f	6.3 V ± 5%
Heater current, at Vf = 6.3 V	$I_f nom$	190 mA

The heater voltage must not exceed 9.5 V r.m.s. For optimum performance stabilization of the heater voltage is recommended.

Capacitance

Signal electrode to all	C_{as}	3 to 6 pF

This capacitance, which is effectively the output impedance, increases when the tube is inserted in the coil.

LIMITING VALUES (Absolute maximum rating system)

All voltages are referred to the cathode, unless otherwise stated.

				Notes
Signal electrode voltage	V_{as}	max.	50 V	
Grid 4 voltage (mesh)	V_{g4}	max.	1100 V	
Grid 3 voltage	V_{g3}	max.	800 V	
Voltage between grid 4 and grid 3	$V_{g4/g3}$	max.	350 V	
Grid 2 voltage	V_{g2}	max.	350 V	
Grid 2 dissipation	W_{g2}	max.	1W	
Grid 1 voltage, positive	V_{g1}	max.	0V	
Grid 1 voltage, negative	$-V_{g1}$	max.	125V	

				Notes
Cathode heating time before drawing cathode current	th	min.	1 min.	
Cathode to heater voltage, positive peak	V_{kfp}	max.	50V	
Cathode to heater voltage, negative peak	$-V_{kfp}$	max.	50 V	
Ambient temperature, storage and operation	T_{amb}	max. min.	50°C -30°C	
Faceplate temperature, storage and operation	T	max. min.	50°C -30°C	1
Faceplate illuminance	E	max.	500 lx	2

OPERATING CONDITIONS AND PERFORMANCE

Conditions

				Notes
For a scanned circular area with a diameter of 18mm				3
Cathode voltage	V_k	0	V	
Signal electrode voltage	V_{as}	45	V	
Beam current	I_b			4
Grid 4 voltage	V_{g4}	675	V	
Grid 3 voltage	V_{g3}	600	V	
Grid 2 voltage	V_{g2}	300	V	
Grid 1 voltage	V_{g1}			4
Blanking voltage on grid 1, peak to peak	$V_{g1\ p\text{-}p}$	50±10V		
Faceplate illuminance (P20 light source)	E	approx. 2 lx		
Faceplate temperature	T	20 to 45 °C		

Electron Gun Characteristics

		Notes
Cutoff		

Grid 1 voltage for cut-off at V_{g2} = 300V without blanking	V_{g1}	-30 to -100 V	
Blanking voltage, peak to peak at $V_{g2,4}$ = 300V			
on grid 1	$V_{g1\ p\text{-}p}$	50±10 V	
on cathode	$V_{kp\text{-}p}$	25V	
Grid 2 current at normally required beam currents	Ig2	≤ 1 mA	
Performance			
Dark current	I_d	≤ 3 nA	
Sensitivity at colour temperature of 2856K	min. 130	typ. 175µA/ImF	5
Sensitivity with P20 light source	min. 395	typ. 530µA/Im	
Peak signal current with E=1 lx (P20)	min. 230	typ. 305 nA	6
Gamma of transfer characteristic		0.95 ± 0.05	
Spectral response:		see Fig. 3	
Resolution			7
Modulation depth i.e. uncompensated amplitude response at 15.61 lp/mm (scanned area 12.8 mm x 17.1 mm) at the center of the picture (5 Mhz, 400 TV lines)		typ 55%	
Modulation transfer characteristic		see Fig. 4	
Decay lag, P20 light source, measured with a signal current of 200 nA, beam adjusted for correct stabilization after the target has been illuminated for at least 5 s.			
Residual signal after dark pulse of 50 ms	max. 13%	typ. 7%	
Residual signal after dark pulse of 60 ms	max. 10%	typ. 5%	
Residual signal after dark pulse of 200 ms	max. 4%	typ. 2%	

NOTES

1. The tube can withstand short excursions up to 70 °C without any damage or irreversible degradation in performance.

2. For short intervals. During storage the tube face shall be covered with the plastic hood provided; when the camera is idle the lens shall be capped, in stand-by also the beam will be cut-off.

3. The operating conditions and performance data quoted relate to operation of the tube in coil units AT1130. See relevant data of deflection/focusing assemblies. Scanning amplitude should be adjusted such that the useful target area of 18 mm is displayed on a standard monitor as a circular area with a diameter equal to the raster height.

4. The beam current I_b as obtained by adjusting the control grid voltage (grid 1) is set to max. 600 nA. Ib is not the total current available in the scanning beam, but is defined, as the maximum amount of signal current I_s, that can be obtained with this beam. See note 6.

5. Measuring conditions: illuminance level 4.54 lx at a color temperature of 2856K and a filter Schott VG9 inserted in the light path.

6. The peak signal currents are measured on a waveform oscilloscope and with a uniform illumination on the 18-mm φ target area. When measured with an integrating instrument connected in the signal-electrode lead the average signal currents will be smaller:

a) By a factor α ($\alpha = \frac{100-\beta}{100}$), β being the total blanking time in %; for the CCIR system α

amounts to 0.75; for the EIA system α amounts to 0.83.

b) By a factor δ, δ being the ratio of the active target area (circle with: 18 mm φ) to the area which would correspond with the adjusted scanning amplitude (18 mm x 24 mm). This ratio amounts to $\delta = 0.59$. The total ratio of integrated signal current, I_s, to the peak signal current, I_{sp}, amount to $\alpha \times \delta = 0.44$ for the CCIR system and 0.49 for EIA system.

7. As measured with a 50 mm Leitz Summicron lens having a sine response of approximately 85 % at 400 TV lines at f: 5.6. The published 55% typ. is uncorrected. Tube resolution is higher. Measured with 100 nA signal current and a beam current just sufficient to stabilize a signal current of 500 nA. The horizontal amplitude response can be raised by means of suitable correction circuits, which affect neither the vertical resolution nor the limiting resolution.

Diagrams

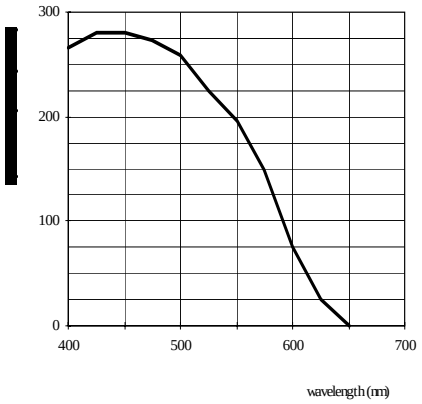

Fig. 3 Typical spectral response curve.

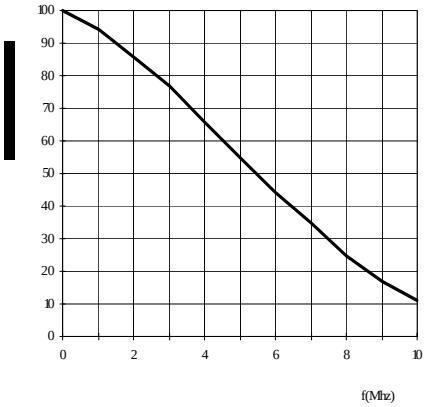

Fig. 4 Typical square-wave response curve.

Mechanical Data

Mounting Position: any

Mass: approx. 60 g
Base: IEC 67-I-33a (JEDEC E8-11)

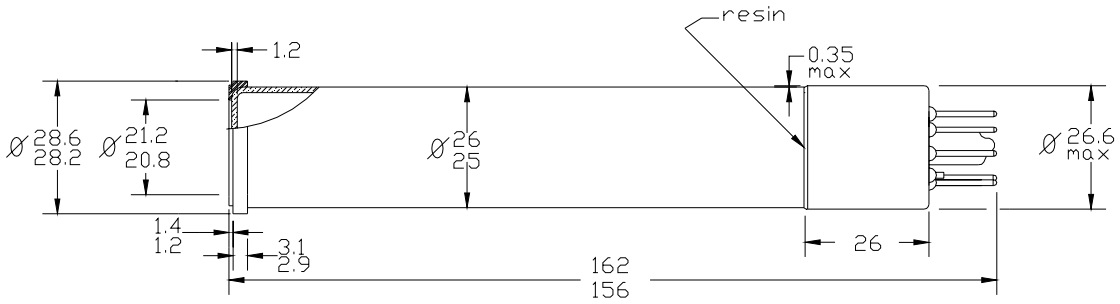

Figure 1.

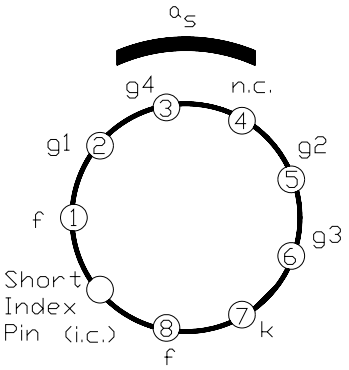

Figure 2a.

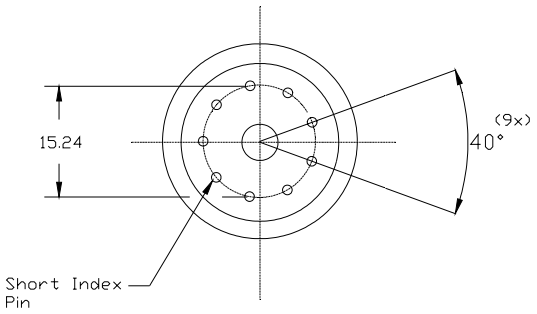

Figure 2b.

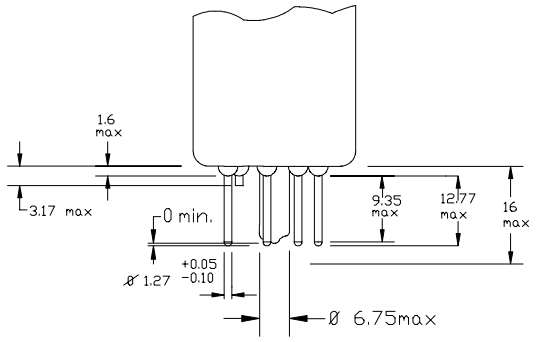

Figure 2c

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