

PHILIPS COMPONENTS

DATA SHEET

Camera Tubes

XQ1285

Vidicon TV camera tube with 25.4 mm (1 in) diameter, low heater power consumption, magnetic focusing and deflection, provided with a precision electron gun as in the 1 in diameter Plumbicon® tubes of the XQ1070 series.

The XQ1285 has a fiber optic faceplate and is mainly intended for use in medical or industrial X-ray equipment in which it is directly coupled to an X-ray image intensifier with a P11 or P20 phosphor on a fiber optic output window. For this purpose it is provided with a special photoconductive layer with a high sensitivity in the 450 to 500 nm spectral region and medium lag for proper X-ray noise integration.

QUICK REFERENCE DATA

Faceplate	fiber optic
Separate mesh	
Focusing	magnetic
Deflection	magnetic
Diameter	25.4 mm (1 in)
Length	159 mm (6¼ in)
Heater	6.3 V, 95 mA
Spectral response, max. at	450 to 500 nm
cut-off at	800 nm
Resolution	≥ 50 lp/mm

®Registered Trade Mark for television camera tube

OPTICAL DATA

Dimensions of quality area on photoconductive target	circle of 15.8 mm dia (note 1)
Orientation of image on target	
The direction of the horizontal scan should be essentially parallel to the plane defined by pin 1 and the longitudinal tube axis of the tube.	
Photoconductive layer	Type B
Spectral response, max. at cut-off	approx. 475 nm approx. 800 nm
Spectral response curve	see Fig. 1
Faceplate	
Center to center spacing of fibers	7.5 μ m
Flat within	1.5 μ m
Numerical aperture	1.0

Mechanical Data

Mounting Position: any

Mass: approx. 60 g

Base: IEC 67-I-33a (JEDEC E8-11)

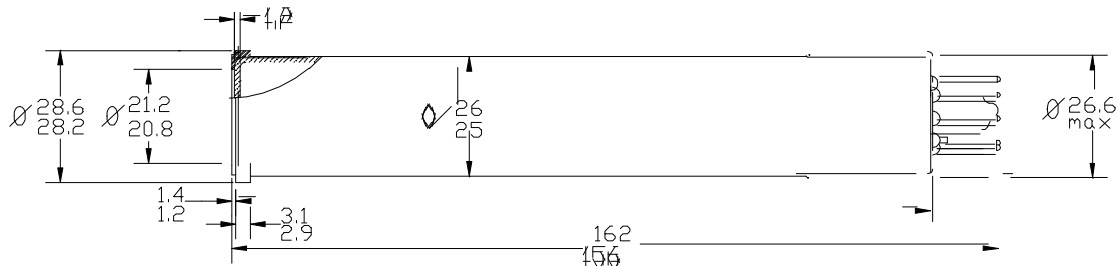


Fig. 2a.

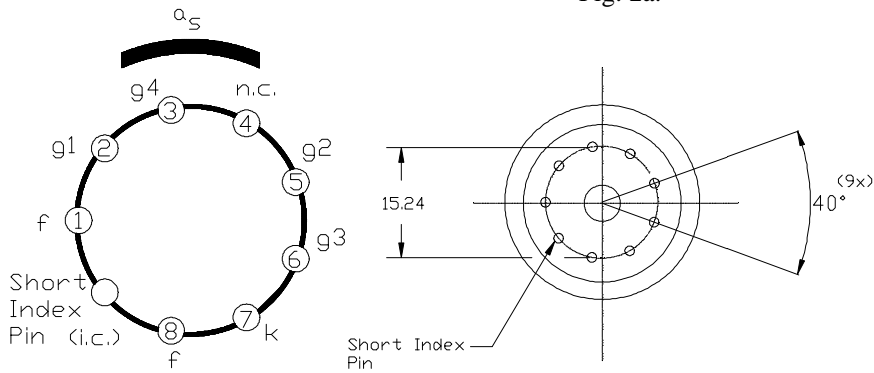


Fig. 2a.

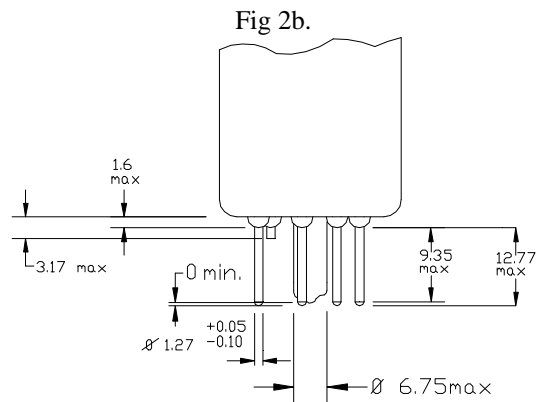


Fig 2c.

ACCESSORIES

Socket type 56602 or equivalent

Deflection and focusing coil unit

AT1102/01, AT1116S or equivalent

(1) Epoxy resin. Proper coupling of the XQ1285 to the fiber optic output window of an image intensifier may be obtained by arrangements which either exert an evenly distributed base end or socket of the tube.

In either case the recommended force is in the order of 100 to 120 N.

ELECTRICAL DATA**Heating:** Indirect by a.c. or d.c.; parallel or series supply

Heater voltage

 V_f 6.3 V \pm 10%Heater current, at $V_f = 6.3$ V I_f 95 mA

When the tube is used in a series heater chain, the heater voltage must never exceed an r.m.s. value of 9.5 V when the supply is switched on.

Electron gun characteristics

Cut-off

grid 1 voltage for cut-off at $V_{g2} = 300$ V V_{g1} -30 to -100 V

Blanking voltage, peak-to- peak

on grid 1

 $V_{g1\text{ pp}}$ 50 \pm 10 V

on cathode

 V_{kpp} 20 V

Grid 2 current at normally required beam currents

 I_{g2} max. 0.5 mA**Focusing**

magnetic

Deflection

magnetic

Capacitance

Signal electrode to all

 C_{as} 3 to 5 pF

This capacitance, which effectively is the output impedance of the tube, increases when the tube is inserted into the deflection and focusing coil unit.

LIMITING VALUES

(Absolute maximum rating system)

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

Signal electrode voltage

 V_{as} max. 100 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. 450 V

Grid 2 voltage

 V_{g2} max. 350 VGrid 1 voltage, negative
positive
 $-V_{g1}$ max. 125 V
 V_{g1} max. 0 V
Cathode to heater voltage, positive peak
negative peak
 V_{kfp} max. 125 V
 $-V_{kfp}$ max. 50 V
External resistance between cathode and heater
at $-V_{kfp} > 10$ V R_{kf} min. 2 k Ω

Dark current, peak	I_{darkp}	max.	0.1	μA
Output current, peak	I_{asp}	max.	0.6	μA
Axial force on signal-electrode ring in forward direction (evenly distributed)		max.	200	N
Faceplate illumination	E	max.	5000	lx
Faceplate temperature, storage and operation	T	max.	80°	°C

OPERATING CONDITIONS AND PERFORMANCE

For a target area of 15mm diameter; a faceplate temperature of $30 \pm 2^\circ\text{C}$.

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

Typical operating conditions

		normal operation	operation for high resolution		note
Grid 1(control grid) voltage	V_{g1}	adjusted for sufficient beam current to stabilize a peak output current, I_{asp} , of 600 nA			
Grid 2 (accelerator) voltage	V_{g2}	300	300	V	
Grid 3 (collector) voltage	V_{g3}	375	600	V	
Grid 4 (mesh) voltage	V_{g4}	600	960	V	2
Peak signal current	I_{sp}	150	150	nA	8
Peak dark current	I_{darkp}	20	20	nA	
Blanking voltage, peak to peak					
when applied to grid 1	$V_{g1\text{ pp}}$		50	V	
when applied to cathode	V_{kpp}		50	V	
Field strength at center of focusing coil (nominal)	H	3200	4800	A/m	3,4
Field strength of adjustable alignment coil	H	0 to 320	0 to 320	A/m	6
Deflection current					6

Performance

		min.	typ.	max.		notes
Signal electrode voltage for a peak dark current of 20nA	Vas	30	40	75	V	7,9
Grid 1 voltage for picture cut-off, with no blanking applied	Vg1	-30	-55	-100	V	
Sensitivity						
Illumination required for a peak signal current of 150 nA						
P20	E		1.5 3×10^{-7}	3 6×10^{-7}	lx W/cm ²	
P11	E		0.3 2.3×10^{-7}	0.6 4.5×10^{-7}	lx W/cm ²	
Decay:						
Residual signal current 200 ms after cessation of the illumination			15	20	%	10
Limiting resolution, at picture center normal operation				≥ 50	lp/mm	11
Modulation transfer characteristic				see Fig. 4		
Average γ of transfer characteristic for signal currents between 10 na and 300 na				0.7		12
Spurious signals				see "Spurious signal specification for XQ1285"		

NOTES

1.
 - a. The circular quality area of 15.8 mm diameter is concentric with the faceplate.
 - b. The scanning amplitudes are so adjusted that a target area of about 15 mm diameter is displayed on a standard monitor as a circular area with a diameter equal to the raster height. (15 mm x 20 mm scan).
 - c. The displayed circular area of approximately 15 mm diameter should fall within the quality area of 15.8 mm diameter but is generally not concentric with the latter due to eccentricities of the output window of the image intensifier and of the optical system.
 - d. Underscanning of the chosen target area, or failure of scanning should be avoided, so as not to cause damage to the photoconductive layer.
2. The optimal grid 4 voltage for best uniformity of black and white level depends on the type of coil unit used and will be 1.5 to 1.6 times V_{g3} for the coil units mentioned under "Accessories". Under no circumstances should grid 4 (mesh) be allowed to operate at a voltage level below that of grid 3, as this may damage the target.
3. Focus current adjusted for optimal electrical focus.
4. The polarity of the focusing coil should be such that its image end attracts an external northseeking pole.
5. The alignment coil unit should be so positioned that its center is at a distance of approximately 94mm (3 11/16 in) from the face of the tube and that its axis coincides with the axis of the tube, the deflecting yoke and the focusing coil.
6. See chapter "Deflection units".
7. The dark current is dependent on the signal electrode voltage and the temperature. This is shown in Figures 2 and 3.
8. Signal current is output current minus dark current.
9. As measured on a waveform oscilloscope.
10. Measured with a 100% peak signal current of 150nA.
11. Obtained with a video amplifier system with adequate bandwidth.

Measured with a transparent square-wave test pattern applied directly to the faceplate and which is illuminated with P20 light of a lambertian distribution. The average transmission of the test transparency is about 50% of the transmission of the transparency's whites.

No aperture correction or gamma correction is applied.

12. For typical transfer characteristics with P20 and P11 light input see Figures 5 and 6.

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