

PHILIPS COMPONENTS

DATA SHEET

Camera Tubes

XQ1440XS

NEWVICON® television camera tube with a photoconductive target composed of cadmium and zinc tellurides featuring high resolution and extremely high sensitivity

The XQ1440XS is a 1 in diameter camera tube with low heater power, separate mesh, magnetic focusing and deflection,

The XQ1440XS is exclusively for use with X-ray image intensifiers with P20 output phosphor in medical equipment.

QUICK REFERENCE DATA

Diameter	25.9 mm (1 in)
Length	159 mm
Focusing	magnetic
Deflection	magnetic
Spectral response, max. at	approx. 750 nm
cut-off at	approx. 900 nm
Limiting resolution	750 TV lines
Heater	6.3 V, 95 mA

®Registered Trade Mark for television camera tube

Philips Components
Slatersville, RI
August 1997

OPTICAL DATA

Dimensions of quality rectangle on photoconductive layer (aspect ratio 3 : 4)

16 mm.

Orientation of image on target photoconductive layer:

The direction of the horizontal scan should be essentially parallel to the plane passing through the longitudinal tube axis and the short index pin.

Faceplate

thickness

2.5 mm

refractive index

n= 1.61

HEATING

Indirect by a.c. or d.c.; parallel or series supply

Heater voltage

 V_f 6.3 V \pm 5%

Heater current, at $V_f = 6.3$ V

 I_f nom 95 mA

When the tube is used in a series heater chain, the heater voltage must not exceed an r.m.s. value of 9.5V when the supply is switched on.

Capacitance

Signal electrode to all

 C_{as} 4.6 pF

This capacitance, which is effectively 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)

for a scanned area of 9.6 mm x 12.8 mm.

“Full-size scanning” i.e. scanning of a 9.6 mm x 12.8 mm area of the photoconductive layer should always be applied. Underscanning, i.e. scanning of an area smaller than 9.6 mm x 12.8 mm, may cause permanent damage to the specified full-size area.

Signal electrode voltage	V_{as}	max.	50 V*
Grid 4 voltage (mesh)	V_{g4}	max.	1000 V
Grid 3 voltage	V_{g3}	max.	1000 V
Grid 2 voltage	V_{g2}	max.	300 V
Grid 1 voltage, negative	$-V_{g1}$	max.	300 V
positive	V_{g1}	max.	0 V
Cathode to heater voltage, positive peak	V_{kfp}	max.	125 V
negative peak	$-V_{kfp}$	max.	10 V
Output current, peak	I_{asp}	max.	800 na **
Faceplate illumination	E	max.	10000 lx***
Faceplate temperature, storage and operation	T	max.	70°
Cathode heating time before drawing cathode current	t_h	min.	1 min

* Newvicon tubes do not permit automatic sensitivity control by means of regulation of the signal electrode voltage. Adequate control is therefore to be achieved by other means (iris control and neutral density filters). If the tube is applied in the cameras originally designed for vidicon tubes, the automatic sensitivity control circuitry should be made inoperative and the signal electrode voltage set to the value indicated by the tube manufacturer. See General Operational Notes.

** Video amplifiers should be capable of handling signal electrode currents of this magnitude without overloading the amplifier or distorting the picture.

*** White light, uniformly diffused over entire tube face.

Care must be taken not to focus the solar image on the target through a lens opening wider than f:11 to avoid instantaneous breakdown.

OPERATING CONDITIONS AND PERFORMANCE

For a scanned circular area of 9.6 mm x 12.8 mm, a faceplate temperature of 25 to 35 C and standard TV scanning rate.

Conditions

Camera Tubes**XQ1440X**

Notes

Signal electrode voltage	V_{as}	10 to 35V	1
Grid 4 (decelerator) voltage	V_{g4}	500 V	2
Grid 3 (beam focus electrode) voltage	V_{g3}	300 V	3
Grid 2 (accelerator) voltage	V_{g2}	300 V	
Grid 1 voltage for picture cut-off (no blanking applied)	V_{g1}	-100 to -45V	4
Blanking voltage on grid 1, peak to peak when applied to grid 1		75V	
when applied to cathode		20V	
Flux density at center of focusing coil		3.8 to 4.4 mT	
Flux density of adjusted alignment coil or magnet		0 to 0.4 mT	

Performance

Dark current (at 25°C)	min 3.5	typ. 7	max nA
Sensitivity current, white light faceplate illumination 0.5 lx c.t.2856K	200	240	nA
Decay: residual signal current 60 ms after cessation of the illumination (c.t. 2856 K), initial signal current 200 nA		17	25%
Limiting resolution, at picture center	650	750TV line	4
at picture corners	400	500TV line	4
Average of transfer characteristic		1	
Spurious signals (spots and blemishes)			5

NOTES

1. The signal electrode voltage should be adjusted to the value indicated by the tube manufacturer as printed on the envelope ($E_{sj} = \dots V$).
To minimize picture sticking effects the signal electrode voltage should be adjusted within a tolerance of $\pm 2 V$; the voltage drop across R_1 should be kept small. In the case of cathode blanking the voltage drop across the cathode resistor during read-out should be taken into account.
2. Grid 4 voltage must always be higher than grid 3 voltage. The recommended ratio of grid 4 voltage to grid 3 voltage both for best geometry and most uniform signal output depends upon the type of coil unit used and will be 5 : 3 for the recommended type (see "Accessories").
3. Resolution decreases with decreasing grid 3 voltage. In general grid 3 should be operated above 250V.
4. On EIA Resolution test chart: faceplate illumination adjusted for a peak output current of 200 nA.
5. **Conditions**
The camera focused on a uniformly illuminated one-zone test pattern, the diameter being 16mm. Faceplate illumination adjusted to produce 200 nA signal current, beam current adjusted for correct stabilization. A Scott VG9 and Calflex B1/K1 filters inserted in the light path to simulated the spectral response of P-20 phosphor found in fluoroscopic image intensifiers. Monitor set-up and contrast control adjusted for faint raster when lens of camera is capped and for non-blooming bright raster when lens of camera is uncapped.

Under above conditions the number and size of spots visible in the monitor picture will not exceed the limits stated below. $\geq 100\%$ are fully counted, spots having a contrast $> 50\%$ but $< 100\%$ will be considered as having half their actual size.

Spots size in % of picture height	# of spots over total image area
Smaller than or equal to 0.2%	5
Between 0.2% to 0.3%	3
Between 0.3% to 4%	none

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