DATASHEET

Medical TV applications / XQ1395

1” High Resolution Resistron® – Camera Tube

XQ 1395

For use in medical TV application
Antimonytrisulfide – photoconductive layer (Sb_2S_3)
Separate mesh connection (grid-4-electrode)

Description

Camera Tubes are the key component of High Performance X-ray TV systems in medical applications. Their high sensitivity and high dynamic range combined with high resolution allows real-time x-ray imaging for any type of medical imaging as during critical surgeries. The Resistron® camera tube XQ 1395 is a 1” diameter image tube with magnetic focusing and magnetic deflection method for camera installations adapted through optics to X-ray image intensifiers.

Features and Benefits

- High sensitivity
- Video high-resolution
- High dynamic range
- Real-time X-ray imaging
- Low noise imaging

Applications

- Radiography
- Cardiology
- C-arm
- Angiography
- Radiosurgery

PerkinElmer® precisely.

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Physical Dimensions of XQ 1395

(All dimensions in mm)

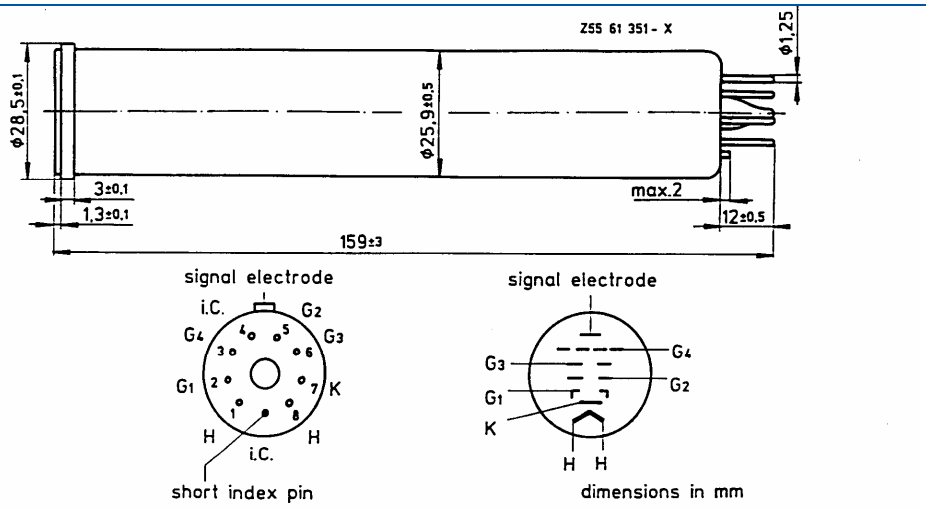

Figure 1
Image Tube dimensions

Description	Parameter
Max. length	162 mm
Max. diameter	28.6 mm
Faceplate thickness	2.45 ± 0.15 mm
Weight	approx. 60 g
Base	8 pin special type
Socket	1030 (for printed circuits) 1031 (with solder tags)
Focusing and deflection assembly	BV 200, BV 400
Mounting position	any

Typical Operating Data and Characteristics XQ 1395

Description	Parameter
Heater voltage	6.3 V (1)
Heater current	95 mA (1) indirect by AC or DC, series or parallel supply
Grid no. 1 voltage	see operating instructions point 2.5
Grid no. 1 cut-off voltage	-50 … -100 V
Grid no. 2 voltage	300 V
Grid no. 3 voltage	560 … 645 V (2)
Grid no. 4 voltage	860 V (2)
Blanking voltage applied to grid no. 1	75 Vp-p
Blanking voltage applied to cathode	25 Vp-p
Focusing method	magnetic
Deflection method	magnetic
Inter-electrode capacitance – signal electrode to all other electrodes	3 - 5 pF (3)
Scanned area with a 3:4 aspect ratio	15.0 x 20.0 mm²
Useful diameter of the photoconductive layer	approx. 17 mm
Signal electrode voltage	20 …. 50 V (4)
Spectral response	see diagram
Gamma value	0.7 ± 0.15
Resolution of center picture (grid 3=620 V, grid 4=860 V)	> 60 lp/mm (5)

Maximum Ratings (absolute values)

Full size scanning of the 15.0 mm x 20.0 mm area of the photoconductive layer must be assured.

Description	Parameter
Grid no. 1 voltage positive	max. 0 V
Grid no. 1 voltage negative	max. –150 V
Grid no. 2 voltage	max. 450 V
Grid no. 2 load	max. 0.8 VA
Grid no. 3 voltage	max. 900 V
Grid no. 4 voltage	max. 1000 V
Peak heater-cathode voltage heater negative with respect to cathode heater positive with respect to cathode	 max. 125 Vp max. 10 Vp
Faceplate temperature	max. 70 °C (12)

(1) If the maximum variation of the heater voltage exceeds the absolute limit of ± 5 %, the operating performance of the tube will be impaired and its life shortened. If series connection is applied, the heater voltage may not exceed 9.5 V. It is recommended to use a current limiter. The preheating time of the tube should be 1 minute minimum with beam current off.

(2) Optimum focusing of the electron beam is obtained by adjusting either the focusing coil current or varying grid no. 3 voltage. Grid no. 3 voltage should be between 65 and 75 % of the voltage applied to grid no. 4 voltage. Optimum resolution is obtained by highest grid no. 4 voltage. Higher grid no. 4 voltage requires an increase of deflection current. If grid no. 3 voltage is increased, a higher focusing current will be necessary. The optimum ratio of grid no. 4 to grid no. 3 voltage depends on the type of focusing and deflection assembly. An improper voltage ratio may produce brightening or darkening in the faceplate corners. Generally, grid no. 4 voltage must be higher than grid no. 3 voltage.

(3) This capacitance which is the effective output impedance of the tube (resistive component approx. 100 MΩ) increases if the tube is mounted in the focusing and deflection assembly.

(4) The upper limit of the signal electrode voltage must be adjusted to the value indicated in the test sheet. This value applies to a faceplate temperature of 30 ± 2 °C. To obtain an optimum life time the dark current should not exceed the value of 30 nA.

(5) Measured with video amplifier of suitable bandwidth.

(6) At a color temperature of 2856 K.

(7) The signal current is the target output current, measured with an integral measuring instrument, minus dark current. During the measurement the scanned area is uniformly illuminated.

(8) Non-uniformity of the signal current depends on the quality of focusing and deflection assembly, deflection linearity and beam alignment. The black to white transition in the middle of the test pattern is set as 100 % value. The maximum signal deviations within a radius of 6.4 mm are measured.

(9) The modulation depth is measured at the faceplate center at 20 lp/mm in comparison with 1.3 lp/mm. The modulation depth depends on the signal current. The signal current amounts to 200 nA, the beam current is adjusted for stabilising a signal of 500 nA.

(10) The decay lag is measured in percent of the signal current, which is preset at 250 nA. The beam current is adjusted for stabilising a signal of 500 nA.

Blemish Specification

- Test Conditions

The tube shall be centred and focused according to the operating and adjusting instructions for optimum performance.

Illumination should be adjusted to a signal current of 250 nA at a beam current for stabilising a signal of 500 nA.

- Target Zone

A uniformly illuminated field with an aspect ratio of 3:4 and a scanned area of 15.0 mm x 20.0 mm shall be displayed on the target of the camera tube. According to the following drawing the scanned area is divided into three zones 1, 2 and 3.

The blemish size is measured in percent of the picture height. The equivalent numbers of TV-lines are indicated for comparison purposes only. Black and white spots are equally weighted. Measurement of blemishes will be performed with and without target illumination. The minimum separation between two target spots must be greater than the diameter of the larger one, otherwise the combination is considered as a whole. Target spots with a diameter ≤ 0.2 % of the picture height as well as blemishes with a modulation depth ≤ 10 % are not counted, unless an accumulation causes a smudged appearance.
Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted up to a noise amplitude of 10 %.

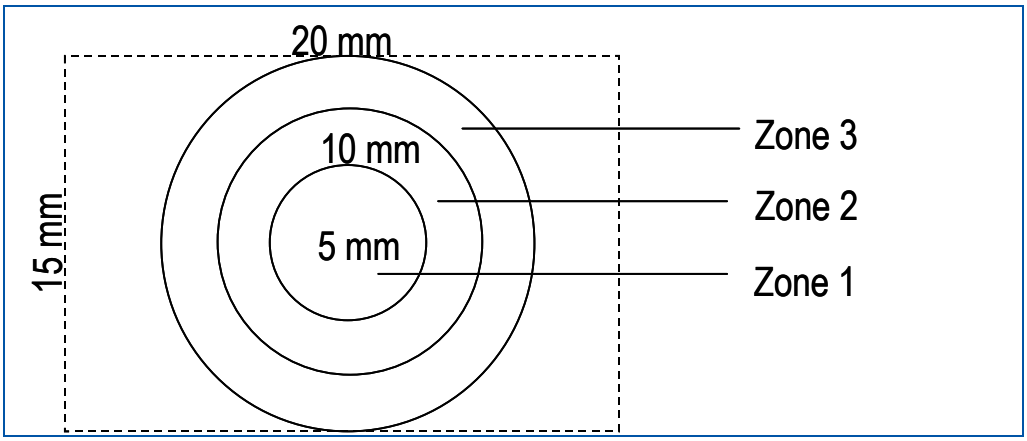

Figure 2
Target Zone of Image Tubes

Possible Number, Size and Location of Blemishes

Specification		Maximum permissible number of blemishes		
Blemish size in % of picture height 15.0mm = 100 %	Blemish size TV lines 625 line system	Zone 1	Zone 2	Zone 3
> 0.7	> 4	0	0	0
> 0.5 … ≤ 0.7	> 3 … 4	0	0	1
> 0.2 … ≤ 0.5	> 1 … 3	0	2	4
Max. permissible total number of blemishes		4		

Blemishes outside the zone are not counted.

Characteristics of Spectral Sensitivity. Current, Modulation Depth and Lag

Typical behaviour of the image tubes XQ 1395 are shown in the following figures:

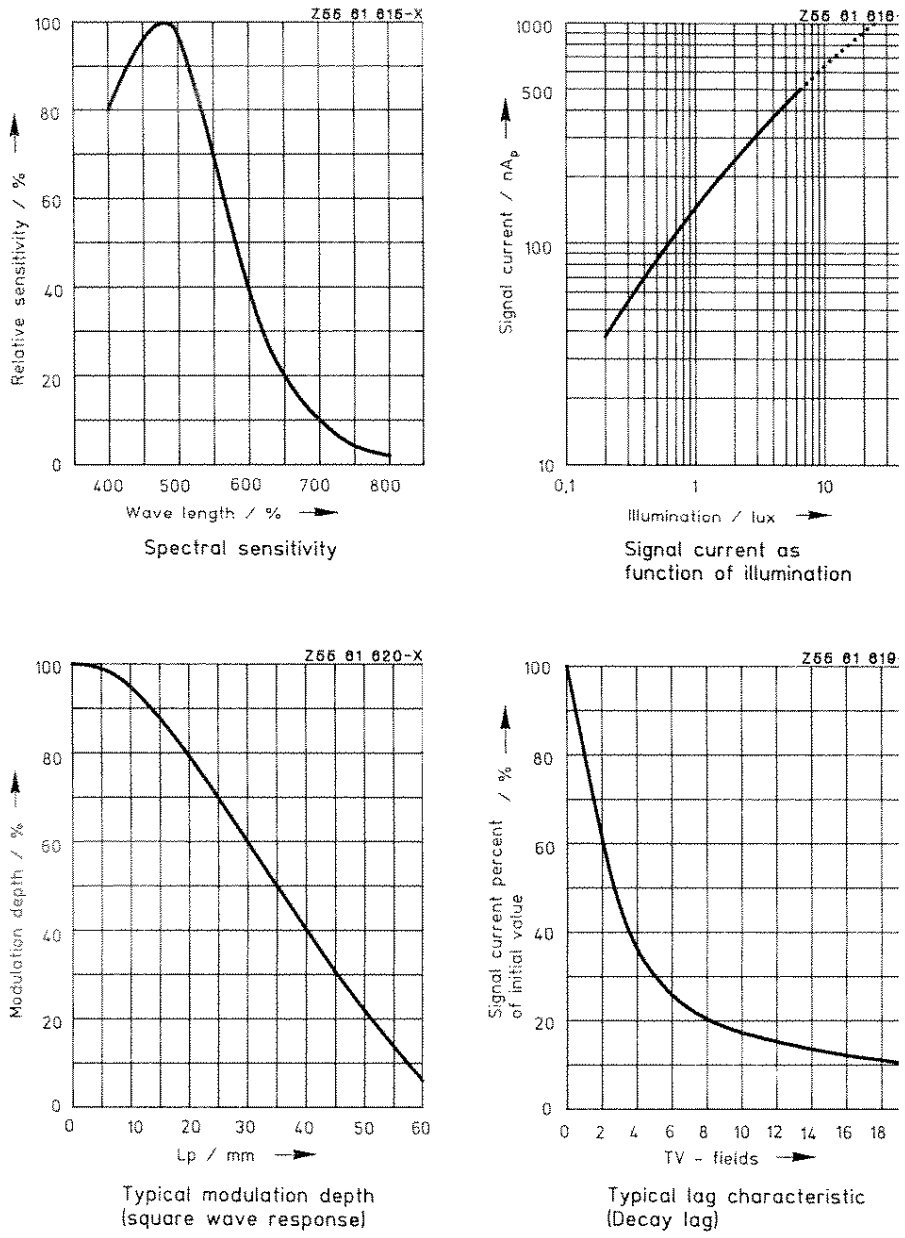

Figure 3
Key characteristics of Image Tubes

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