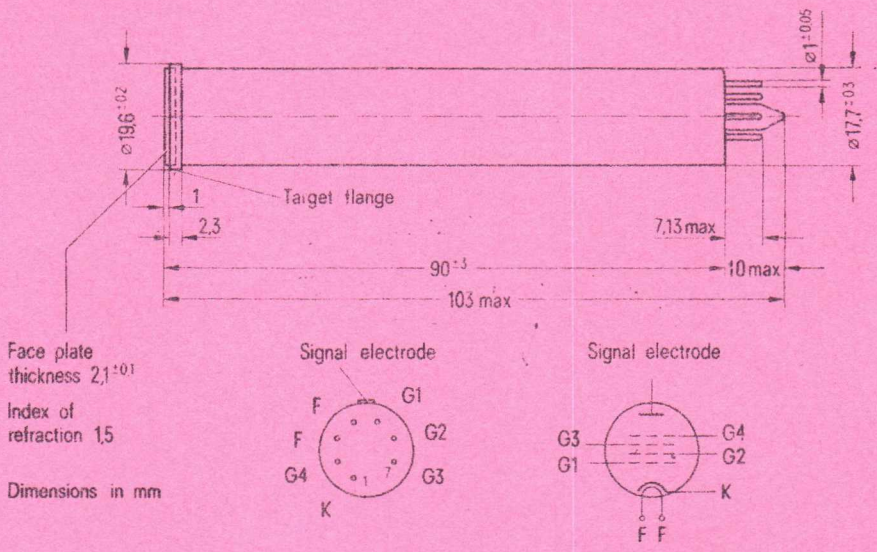
2/3"-Vidicon camera tube with cadmiumselenid-target

Vidicon camera tube with magnetic focus and deflection. Useful faceplate 6,6 mm × 8,8 mm with a 3 : 4 aspect ratio. The seperate mesh electrode G4 improve modulations depth and uniform resolution of the tube. The γ-value of the photoconductive layer is approximately 1 and constant over a wide range of the signal output current. By high sensitivity the tube has a very good resistance by extreme illumination and features short lag, high modulation depth and very low current.

Depending on the required picture quality the following types are available:

XQ 1451	Live broadcast	type series
XQ 1452	General industrial TV applications, quality grade I	with very
XQ 1453	General industrial TV applications, quality grade II	low lag
XQ 1456	Live broadcast	type series
XQ 1457	General industrial TV applications, quality grade I	with
XQ 1458	General industrial TV applications, quality grade II	low lag



Max. length:	103 mm
Max. diameter:	19,8 mm
Weight:	approx. 25 g
Base:	7 pin-miniatur (Jedec E7-91)
Socket:	Rö Fsg 1034 (for printed circuits)
	Rö Fsg 1035 (with solder tags)
Mounting and transport position:	any

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Heating

Heater voltage	6.3	V	①
Heater current	95	mA	
	indirect by ac or dc, series or parallel supply		

Characteristics

Inter-electrode capacitance			
Signal electrode to all other	2	pF	②
Spectral response	see diagram		
Maximum of the spectral response	see diagram		
Focusing method	magnetic		
Deflection method	magnetic		
Useful diameter of the photoconductive layer	11	mm	
Useful size of rectangular image (3 : 4 aspect ratio)	6,6 × 8,8	mm	

Maximum ratings (absolute Values)

Full size scanning of the 6,6 mm×8,8 mm area of the photoconductive layer must be assured.

Grid No. 1 voltage			
positive	max.	0	V
negative	max.	–300	V
Grid No. 2 voltage	max.	350	V
Grid No. 3 voltage	max.	800	V
Grid No. 4 voltage	max.	800	V
Signal electrode voltage	max.	50	V
Peak beam current	max.	800	nA
Peak heater to cathode voltage			
Heater negative with respect to cathode	max.	125	V
Heater positive with respect to cathode	max.	10	V
Faceplate illumination	max.	1000	Lux
Faceplate temperatur	max.	–20 to +60	°C ③

Typical Operation (Faceplate temperature approx. 25 to 35°C).

Scanned area		6,6×8,8	mm	
Grid No. 1 cutoff voltage		–45 to –100	V	
Grid No. 2 voltage		300	V	
Grid No. 3 voltage				
normal resolution		240	V	⑤
high resolution		450	V	⑤
Grid No. 4 voltage				
normal resolution		400	V	⑤
high resolution		750	V	⑤
Blanking voltage applied to Grid No. 1	min.	75	V	
Blanking voltage applied to cathode	min.	20	V	
Signal electrode voltage		adjust	V	⑤
Dark current		0,5	nA	
"Gamma" of transfer characteristics		≈ 0,95		

	XQ 1451 XQ 1452 XQ 1453	XQ 1456 XQ 1457 XQ 1458		
Resolution				
at center of picture	600/700	700/750	TV lines	
at corner of picture	500	550	TV lines	
Signal output current	300	300	nA	
Signal uniformity	10	10	%	
Modulations depth at 5 MHz				
normal resolution	25	25	%	⑦
high resolution	35	35	%	⑦
Lag after 60 ms	6	10	%	⑧
Sensitivity	2600	2600	µA/lm	⑨
Faceplate illumination	1	1	Lux	
Signal output current (white)	150	150	nA	⑩
Signal output current (red)	110	110	nA	⑩
Signal output current (green)	26	26	nA	⑩
Signal output current (blue)	17	17	nA	⑩

Order Numbers

Type	Order-No.
XQ 1451	Q 72 – B 8020
XQ 1452	Q 72 – C 8020
XQ 1453	Q 72 – D 8020
XQ 1456	Q 72 – B 8021
XQ 1457	Q 72 – C 8021
XQ 1458	Q 72 – D 8021

Accessories	Order-No.
Sockets	
Rö Fsg 1033	Q 81 – X 133
Rö Fsg 1034	Q 81 – X 198
Deflection and focus assembly	
KV12	Q 3006 – X 2

Notes

If the maximum variation of the heater voltage exceeds the absolute limits of ± 5% the operating performance of the tube will be impaired and its life shortened.

This capacitance, which is effectively the output impedance of the tube (resistive component approx. 100 MΩ) increases when the tube is mounted in the deflecting-yoke and focusing coil assembly.

Additional air cooling or heat protection filter between optics and faceplate may be necessary.

Without blanking voltage on grid No. 1.

Optimum focusing of the electron beam is obtained by adjusting either the focusing coil current or the grid No. 3 voltage. The grid No. 3 voltage must be more than 220 V and between 60 and 90% of the grid No. 4 voltage.

Increased grid No. 4 voltage requires an increased deflection amplitude. A higher focusing coil current is necessary, if the grid No. 3 voltage is increased.

Optimum ratio of grid No. 4 and grid No. 3 voltages depends on the focusing coil used. A poor voltage ratio may produce brightening or darkening in the face plate corners.

Recommended signal electrode voltage is noted on the individual test sheet within the range of 20 to 45 volts. Switch off the signal electrode voltage automatic.

The modulation depth is measured at the picture center at 5 MHz in comparison with 0.5 MHz. The modulation depth depends on the signal output current, which is 300 nA.

Signal output current of 300 nA at 60 ms after illumination is removed.

At a color temperatur of 2854 K tungsten-filament lamp.

Unfiltered illumination incident on the faceplate is 1 lux. The optical filter interposed between the tube and a light source.
red = Schott OG2/3 mm, green = Schott VG9/1 mm, blue = Schott BG23/3 mm.

Target Defect Specification

General

This specification regards to target defects of vidicon camera tubes visible in the scanned area.

Glas defects of the face plate are not dealt with.

Test Conditions

The tube shall be best centred and focused according to the operating data and adjusting instructions.

The illumination (color temperature 2854 K shall be adjusted to a signal current of 300 nA (100% white signal).

The target voltage must be taken from the test sheet.

Temperatur of the face plate 30°C (± 2°).

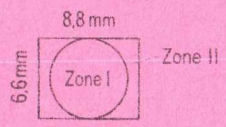
Monitor adjusted for a non-blooming white.

The video amplifier bandwidth shall be 5.5 MHz.

Target Zones

A uniformly illuminated field with an aspect ratio of 3 : 4 and a scanned area of 6.6 mm × 8.8 mm shall be displayed on the target of the vidicon camera tube.

According to the following drawing the scanned area is divided into the two zones I and II.



Target Defects Estimation

The target defect size is measured in percent of the picture hight. The equivalent numbers of raster lines in a 625 lines TV-system and in a 525 lines TV-system resp. are indicated for comparison purposes only.

Inspection for target defects to be performed with illuminated and nonilluminated target.

The minimum separation between two target defects must be greater than the diameter of the larger one, otherwise the combination is considered on the whole.

Target defects are not counted when their contrast expressed in % of picture white is less than 13% white spots, <28% black spots.

Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted when their contrast expressed in % of picture white is less than 13%.

To obtain optimum picture quality or to avoid moire effects the tube may be rotated.

Allowable number, size and position of target defects

Type			XQ 1451 XQ 1456	
Target defect size in percent of the picture hight 6.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II
>0,8	>5	>4	0	0
>0.6 to ≦0.8	>4 to 5	3 to 4	0	2
>0.2 to ≦0.6	>1 to 4	1 to 3	3	4
≦0.2	≦1	< 1	are not considered unless concentration causes a smudge appearance	

Type			XQ 1452 XQ 1457		XQ 1453 XQ 1458	
Target defect size in percent of the picture hight 6.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II	Zone I	Zone II
> 1.2	> 7	> 6	0	0	0	0
> 0.8 to ≦ 1,2	> 5 to 7	4 to 6	0	2	1	2
> 0.2 to ≦ 0.8	> 1 to 5	1 to 4	3	4	3	4
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance			

Target defects outside the scanned area will not be counted.

Operating Considerations

The tube must be located in the coil assembly such that a line between the longitudinal axis of the tube and the short pin is parallel to the direction of horizontal deflection.

To obtain high signal uniformity the magnetic fields of the deflection and focusing coils must be adjusted such that the electrons strike the faceplate perpendicularly across the whole area.

The polarity of the focusing coil should be such that a northseeking pole is attracted to the image end of the focusing coil. Connection to the faceplate is usually made by a suitable spring contact mounted in the coil assembly. The connecting cable of the pre-amplifier should be low capacitance.

The following must be observed when firing up the tube for the first time:

[1]) Set the grid 1 voltage negative, until the picture cutoff is reached. Then set the electrode voltages as indicated as operating voltages with a signal electrode voltage which is noted on the individual test sheet. The deflection power must be sufficient to cause the electron beam to scan a maximum area of the photoconductive layer.

[2]) After mounting a dimmed lens reduce the grid 1 voltage until the scanning beam recharges even the brightest spots of the picture. Then improve the picture sharpness with the aid of the focusing field strengh and varying the distance between camera and optics.

[3]) Adjust the alignment field so that the center oft the picture does not move as the grid 3 voltage is varied. After this adjustment it may be necessary to reset the horizontal and vertical centering.

[4]) Adjust the beam current by varying grid 1 voltage so that the brightest picture point is recharged. An unnecessary increase in beam current reduces the picture quality.

Dark Current

The dark current is as low as 1 nA, or below. No picture quality deterioration is caused by the increase of environmental temperature because the approximate dark current ist within 10 nA even at 60°C.

Target Voltage

Target voltage must be adjusted to the optimum value refering to the value noted on the individual test sheet. Increase the target voltage to some voltage when a negative after-image is apt to appear shifting an incident pattern and taking white back ground. If the target voltage is set to too high voltage white spots increase in the picture.

As shown in figures the signal-output current tends to saturate with the target voltage and therefore has a near constant sensitivity. The curve shows the dark current increase. When the dark current beccmes extremely large, the picture quality goes wrong.

Photosensitivity and Light Transfer Characteristics

Figures shows the light transfer characteristics with the faceplate illumination using a standard tungsten lamp of 2854 K in colour temperature. Red, Green and Blue sensitivities are measured by interposing the optical filter between the tube and the tungsten lamp.

Lag

The build up-and decay-lag at different signal currents are shown in figures respectively. Improvement of lag, especially build up lag, is possible by employing the bias-light when taking a low light level scene and, consequently, low signal current. (See curve (b), (e) and (d) in figures). The intensity of the bias-light should be adjusted so as to take a output current of 20 nA or above.

There is no difference of the influence by spectral wavelength.

If the adjustment of optical lens system of color TV camera is made to have the same level of signal currents in each of the red, green and blue color channels, no differences of lag characteristic occur in the color channels, so that the tail or head of a moving white object does not have any special color, and attract little attention of the human eye. If the optical lens system is designed on the basis of the colour temperature of 6000 K the same level of signal output current will be obtained.

Signal Uniformity

Shading, which is usually observed in the conventional vidicon, is not seen. On account of the saturated signal current-voltage characteristics, signal output currents do not make so much difference throughout the scanning area, even if there is a landing error of electron beam causing a difference of electric fields across the photoconductive target between center and corner.

Flare

The color of the photoconductor is black without giving any harmful reflection of light from the surface of the photoconductor in the visible light region, therefore the stable black level can be obtained.

Beam Current Setting

The beam current is recommended to adjust to twice as much as the value to just discharge the highlight signal current on the typical operation data. Flowing more over the required beam current may decrease the amplitude response characteristics.

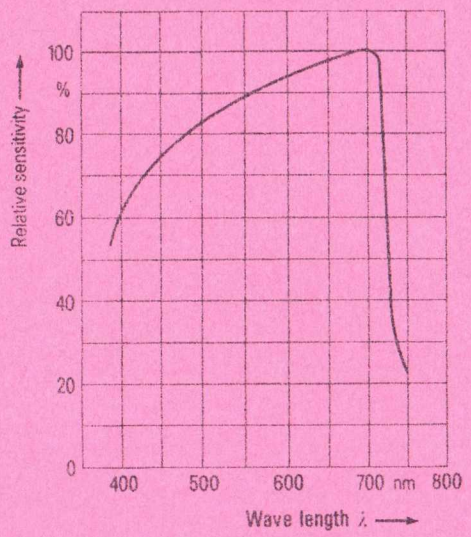
Burn-In Damage

At the optimum target voltage, damages caused by excess light, which is usually observed in the conventional vidicon, are seldom seen. When, however, after-image due to the incidence of strong bright spots are observed, operate the tube for a while with uniform illumination at the higher target voltage so as to fade off.

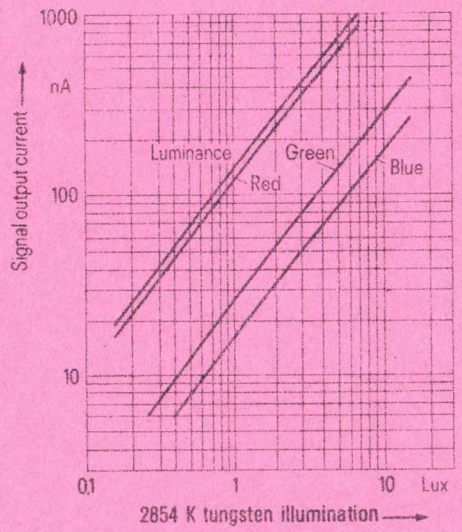
High Voltage Operation

Under the high voltage operation the amplitude response is improved. Figures shows amplitude response characteristics of the high voltage operation.

Typical spectral response characteristics

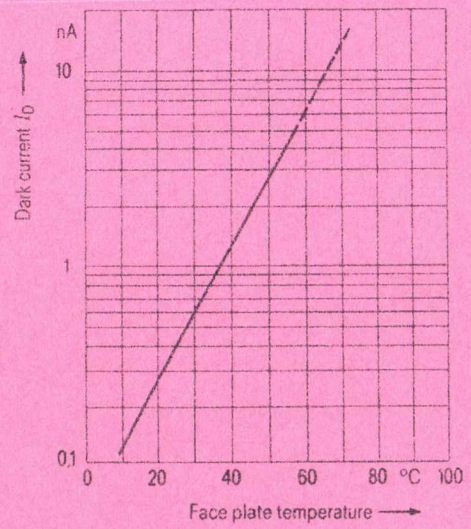


Typical light transfer characteristics

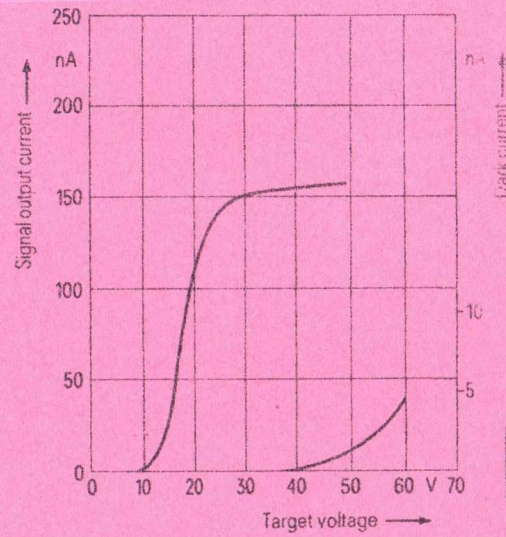


Luminance:	2854 K	no filter
Red:	Schott	OG – 2 3 mm
Green:	Schott	VG – 9 1 mm
Blue:	Schott	BG – 23 3 mm

Typical dark current – Temperature characteristics



Typical signal output current as a function of target voltage



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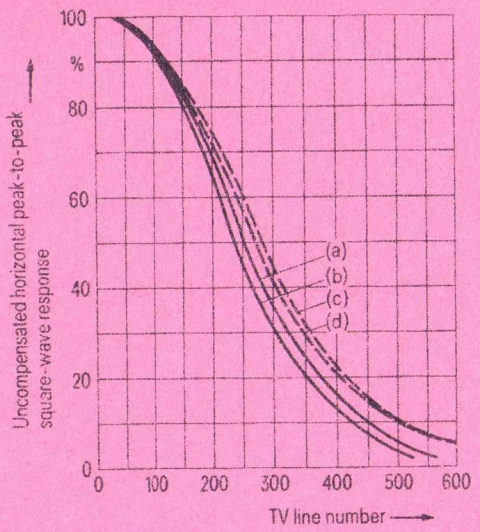
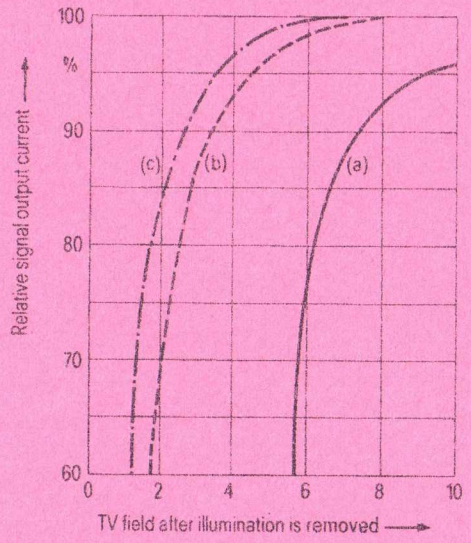
Typical uncompensated horizontal square wave response

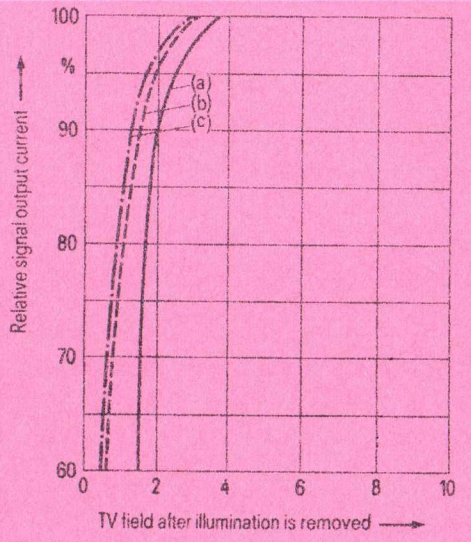


Signal output current: 300 nAp-p
Standard Operation
(a) Beam current: 300 nA
(b) Beam current: 600 nA
High voltage operation
(c) Beam current: 300 nA
(d) Beam current: 600 nA

Typical build-up lag characteristics
(after 10sec of complete darkness)

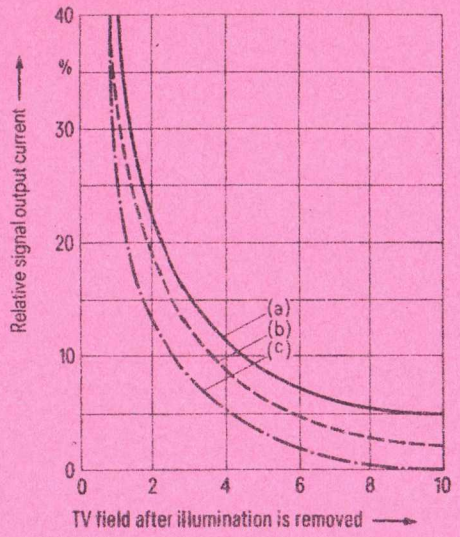


Signal output current: 50 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

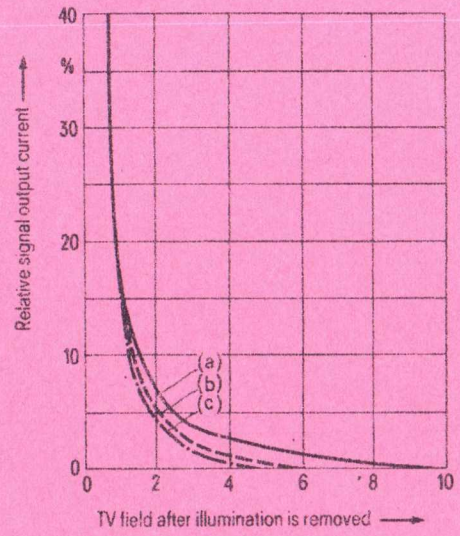


Signal output current: 300 nA
Beamt current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

Typical decay – lag characteristics

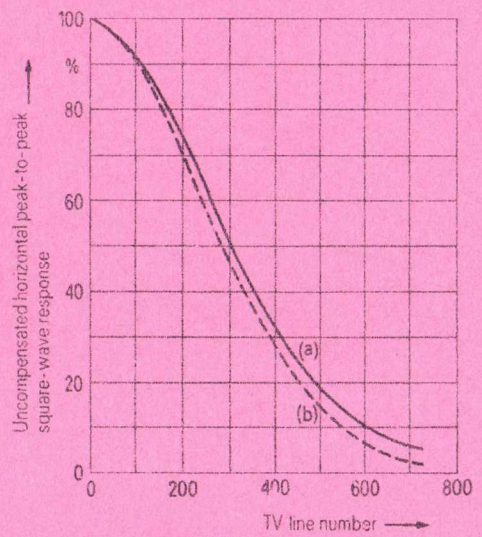


Signal output current: 50 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)



Signal output current: 300 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

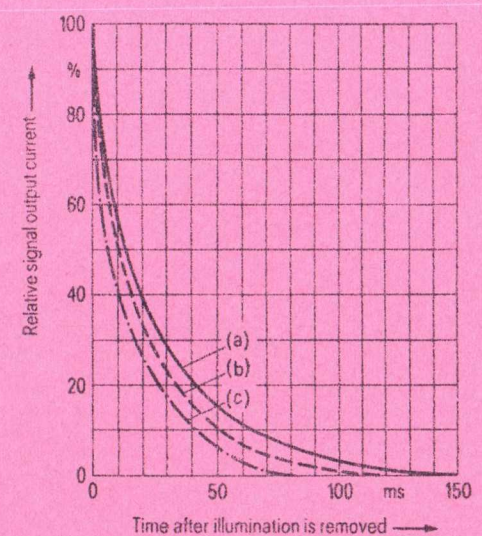
Typical horizontal square-wave response



Signal output current: 200 nA

(a) Grid No. 3 Voltage 300 V
Grid No. 4 Voltage 500 V
(b) Grid No. 3 Voltage 240 V
Grid No. 4 Voltage 400 V

Typical lag characteristics



Signal output current = 100 nA (a
= 200 nA (b
= 400 nA (c

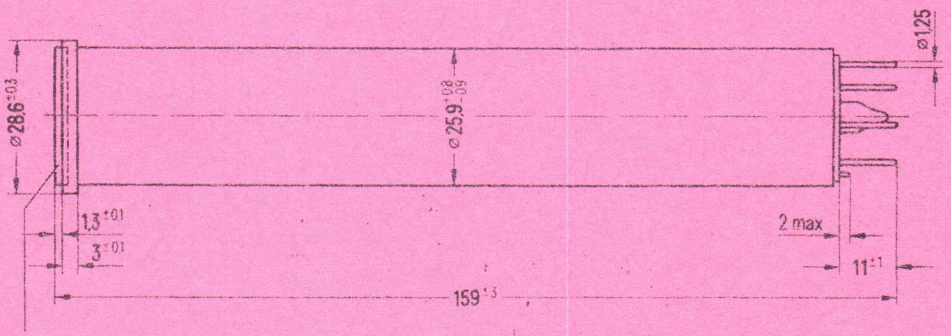
AL/1977/3
Annex PT
- 130 -

1"-Vidicon camera tube with cadmiumselenid-target

Vidicon camera tube with magnetic focus and deflection. Useful faceplate of 9,6 mm × 12,8 mm with a 3 : 4 aspect ratio. The seperate mesh electrode G4 improve modulations depth and uniform resolution of the tube. The γ-value of the photoconductive layer is approximately 1 and constand over a wide range of the signal output current. By high sensitivity the tube has a very good resistance by extreme illumination and features short lag, high modulation depth and very low dark current.

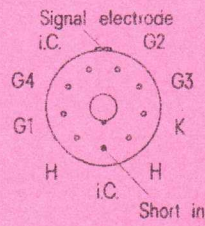
Depending on the required picture quality the following types are available:

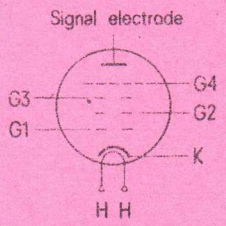
XQ 1460	Medical x-ray applications	type series with very low lag
XQ 1461	Live broadcast	
XQ 1462	General industrial TV applications, quality grade I	
XQ 1463	General industrial TV applications, quality grade II	
XQ 1465	Medical x-ray applications	type series with low lag
XQ 1466	Live broadcast	
XQ 1467	General industrial TV applications, quality grade I	
XQ 1468	General industrial TV applications, quality grade II	



Face plate thickness 2,4±0,2

Index of refraction 1,5





Dimensions in mm

Max. length:	162 mm
Max. diameter:	28,9 mm
Weight:	approx. 60 g
Base:	8 pin-ditetrar (Jedec E8-11)
Socket:	Rö Fsg 1030 (for printed circuits)
	Rö Fsg 1031 (with solder tags)
Mounting and transport position:	any

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Heating

Heater voltage	6.3	V ①
Heater current	95	mA
	indirect by ac or dc, series or parallel supply	

Characteristics

Inter-electrode capacitance		
Signal electrode to all other	4,6	pF ②
Spectral response	see diagram	
Maximum of the spectral response	see diagram	
Focusing method	magnetic	
Deflection method	magnetic	
Useful diameter of the photoconductive layer	15,7	mm
Useful size of rectangular image (3 : 4 aspect ratio)	9,6 × 12,8	mm

Maximum ratings (absolute values)

Full size scanning of the 9,6 mm × 12,8 mm area of the photoconductive layer must be assured.

Grid No. 1 voltage			
positive	max.	0	V
negative	max.	−300	V
Grid No. 2 voltage	max.	750	V
Grid No. 3 voltage	max.	1000	V
Grid No. 4 voltage	max.	1000	V
Signal electrode voltage	max.	50	V
Peak beam current	max.	800	nA
Peak heater to cathode voltage			
Heater negative with respect to cathode	max.	125	V
Heater positive with respect to cathode	max.	10	V
Faceplate illumination	max.	1000	Lux
Faceplate temperatur	max.	−20 to +60	°C ③

Typical Operation (Faceplate temperature approx 25 to 35°C)

Scanned area	9,6 × 12,8	mm	
Grid No. 1 cutoff voltage	−45 to −100	V	
Grid No. 2 voltage	300	V	
Grid No. 3 voltage			
normal resolution	300	V	⑤
high resolution	450	V	⑤
Grid No. 4 voltage			
normal resolution	500	V	⑤
high resolution	750	V	⑤
Blanking voltage applied to Grid No. 1	min. 75	V	
Blanking voltage applied to cathode	min. 20	V	
Signal electrode voltage	adjust	V	⑥
Dark current	0,8 to 1	nA	
"Gamma" of transfer characteristics	≈ 0,95		

	XQ 1460 XQ 1461 XQ 1462 XQ 1463	XQ 1465 XQ 1466 XQ 1467 XQ 1468		
Resolution				
at center of picture	700/900	750/1000	TV lines	
at corner of picture	600/700	600/800	TV lines	
Signal output current	300	300	nA	
Signal uniformity	10	10	%	
Modulations depth at 5 MHz				
normal resolution	35	45	%	⑦
high resolution	45	55	%	⑦
Lag after 60 ms	10	20	%	⑧
Sensitivity	2600	2600	µA/lm	⑨
Faceplate illumination	1	1	Lux	
Signal output current (white)	300	300	nA	⑩
Signal output current (red)	220	220	nA	⑩
Signal output current (green)	52	52	nA	⑩
Signal output current (blue)	34	34	nA	⑩

Order Numbers

Type	Order-No.
XQ 1460	Q 72 – A 8010
XQ 1461	Q 72 – B 8010
XQ 1462	Q 72 – C 8010
XQ 1463	Q 72 – D 8010
XQ 1465	Q 72 – A 8011
XQ 1466	Q 72 – B 8011
XQ 1467	Q 72 – C 8011
XQ 1468	Q 72 – D 8011

Accessories	Order-No.
Sockets	
Rö Fsg 1030	Q 81 – X 130
Rö Fsg 1031	Q 81 – X 131
Deflection and focus assembly	
KV9 P	Q 3006 – X 1

tes

If the maximum variation of the heater voltage exceeds the absolute limits of ± 5% the operating performance of the tube will be impaired and its life shortened.

This capacitance, which is effectively the output impedance of the tube (resistive component approx. 100 MΩ) increases when the tube is mounted in the deflecting-yoke and focusing coil assembly.

Additional air cooling or heat protection filter between optics and faceplate may be necessary.

Without blanking voltage on grid No. 1.

Optimum focusing of the electron beam is obtained by adjusting either the focusing coil current or the grid No. 3 voltage. The grid No. 3 voltage must be more than 250 V and between 60 and 90% of the grid No. 4 voltage.

Increased grid No. 4 voltage requires an increased deflection amplitude. A higher focusing coil current is necessary, if the grid No. 3 voltage is increased.

Optimum ratio of grid No. 4 and grid No. 3 voltages depends on the focusing coil used. A poor voltage ratio may produce brightening or darkening in the face plate corners.

Recommended signal electrode voltage is noted on the individual test sheet within the range of 20 to 45 volts. Switch off the signal electrode voltage automatic.

The modulation depth is measured at the picture center at 5 MHz in comparison with 0,5 MHz. The modulation depth depends on the signal output current, which is 300 nA.

Signal output current of 300 nA at 60 ms after illumination is removed.

At a color temperatur of 2854 K tungsten-filament lamp.

Unfiltered illumination incident on the faceplate is 1 lux. The optical filter interposed between the tube and a light source.
red = Schott OG2/3 mm, green = Schott VG9/1 mm, blue = Schott BG23/3 mm.

Target Defect Specification

General

This specification regards to target defects of vidicon camera tubes visible in the scanned area.

Glas defects of the face plate are not dealt with.

Test Conditions

The tube shall be best centred and focused according to the operating data and adjusting instructions.

The illumination (color temperature 2854 K shall be adjusted to a signal current of 300 nA (100% white signal).

The target voltage must be taken from the test sheet.

Temperatur of the face plate 30°C (± 2°).

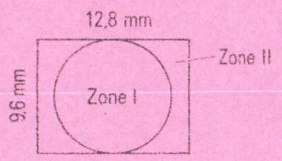
Monitor adjusted for a non-blooming white.

The video amplifier bandwidth shall be 5.5 MHz.

Target Zones

A uniformly illuminated field with an aspect ratio of 3 : 4 and a scanned area of 9.6 mm × 12.8 mm shall be displayed on the target of the vidicon camera tube.

According to the following drawing the scanned area is divided into the two zones I and II.



Target Defects Estimation

The target defect size is measured in percent of the picture hight. The equivalent numbers of raster lines in a 625 lines TV-system and in a 525 lines TV-system resp. are indicated for comparison purposes only.

Inspection for target defects to be performed with illuminated and nonilluminated target.

The minimum separation between two target defects must be greater than the diameter of the larger one, otherwise the combination is considered on the whole.

Target defects are not counted when their contrast expressed in % of picture white is less than 13% white spots, <28% black spots.

Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted when their contrast expressed in % of picture white is less than 13%.

To obtain optimum picture quality or to avoid moire effects the tube may be rotated.

Allowable number, size and position of target defects

Type			XQ 1460 XQ 1465		XQ 1461 XQ 1466	
Target defect size in percent of the picture hight 9.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II	Zone I	Zone II
> 0.8	> 5	> 4	0	0	0	0
> 0.6 to ≦ 0.8	> 4 to 5	3 to 4	0	0	0	0
> 0.2 to ≦ 0.6	> 1 to 4	1 to 3	2	3	2	3
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance			

Type			XQ 1462 XQ 1467		XQ 1463 XQ 1468	
Target defect size in percent of the picture hight 9.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II	Zone I	Zone II
> 1.2	> 7	> 6	0	0	0	0
> 0.8 to ≦ 1.2	> 5 to 7	4 to 6	0	2	1	2
> 0.2 to ≦ 0.8	> 1 to 5	1 to 4	3	4	3	4
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance			

Target defects outside the scanned area will not be counted.

Operating Considerations

The tube must be located in the coil assembly such that a line between the longitudinal axis of the tube and the short pin is parallel to the direction of horizontal deflection.

To obtain high signal uniformity the magnetic fields of the deflection and focusing coils must be adjusted such that the electrons strike the faceplate perpendicularly across the whole area.

The polarity of the focusing coil should be such that a northseeking pole is attracted to the image end of the focusing coil. Connection to the faceplate is usually made by a suitable spring contact mounted in the coil assembly. The connecting cable of the pre-amplifier should be low capacitance.

The following must be observed when firing up the tube for the first time:

[1]) Set the grid 1 voltage negative, until the picture cutoff is reached. Then set the electrode voltages as indicated as operating voltages with a signal electrode voltage which is noted on the individual test sheet. The deflection power must be sufficient to cause the electron beam to scan a maximum area of the photoconductive layer.

[2]) After mounting a dimmed lens reduce the grid 1 voltage until the scanning beam recharges even the brightest spots of the picture. Then improve the picture sharpness with the aid of the focusing field strengh and varying the distance between camera and optics.

[3]) Adjust the alignment field so that the center oft the picture does not move as the grid 3 voltage is varied. After this adjustment it may be necessary to reset the horizontal and vertical centering.

[4]) Adjust the beam current by varying grid 1 voltage so that the brightest picture point is recharged. An unnecessary increase in beam current reduces the picture quality.

Dark Current

The dark current is as low as 1 nA, or below. No picture quality deterioration is caused by the increase of environmental temperature because the approximate dark current ist within 10 nA even at 60°C.

Target Voltage

Target voltage must be adjusted to the optimum value refering to the value noted on the individual test sheet. Increase the target voltage to some voltage when a negative after-image is apt to appear shifting an incident pattern and taking white back ground. If the target voltage is set to too high voltage white spots increase in the picture.

As shown in figures the signal-output current tends to saturate with the target voltage and therefore has a near constant sensitivity. The curve shows the dark current increase. When the dark current becomes extremely large, the picture quality goes wrong.

Photosensitivity and Light Transfer Characteristics

Figures shows the light transfer characteristics with the faceplate illumination using a standard tungsten lamp of 2854 K in colour temperature. Red, Green and Blue sensitivities are measured by interposing the optical filter between the tube and the tungsten lamp.

Lag

The build up-and decay-lag at different signal currents are shown in figures respectively. Improvement of lag, especially build up lag, is possible by employing the bias-light when taking a low light level scene and, consequently, low signal current. (See curve (b), (e) and (d) in figures). The intensity of the bias-light should be adjusted so as to take a output current of 20 nA or above.

There is no difference of the influence by spectral wavelength.

If the adjustment of optical lens system of color TV camera is made to have the same level of signal currents in each of the red, green and blue color channels, no differences of lag characteristic occur in the color channels, so that the tail or head of a moving white object does not have any special color, and attract little attention of the human eye. If the optical lens system is designed on the basis of the colour temperature of 6000 K the same level of signal output current will be obtained.

Signal Uniformity

Shading, which is usually observed in the conventional vidicon, is not seen. On account of the saturated signal current-voltage characteristics, signal output currents do not make so much difference throughout the scanning area, even if there is a landing error of electron beam causing a difference of electric fields across the photoconductive target between center and corner.

Flare

The color of the photoconductor is black without giving any harmful reflection of light from the surface of the photoconductor in the visible light region, therefore the stable black level can be obtained.

Beam Current Setting

The beam current is recommended to adjust to twice as much as the value to just discharge the highlight signal current on the typical operation data. Flowing more over the required beam current may decrease the amplitude response characteristics.

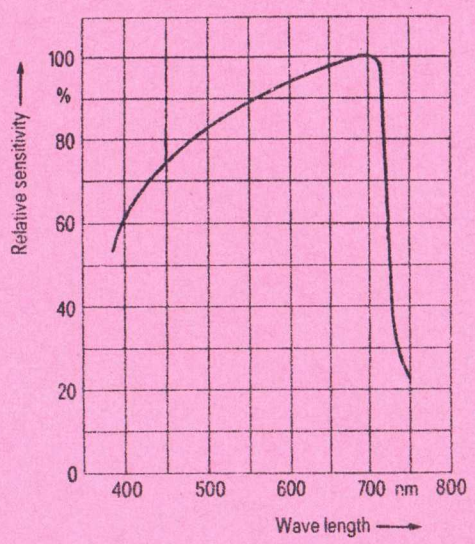
Burn-In Damage

At the optimum target voltage, damages caused by excess light, which is usually observed in the conventional vidicon, are seldom seen. When, however, after-image due to the incidence of strong bright spots are observed, operate the tube for a while with uniform illumination at the higher target voltage so as to fade off.

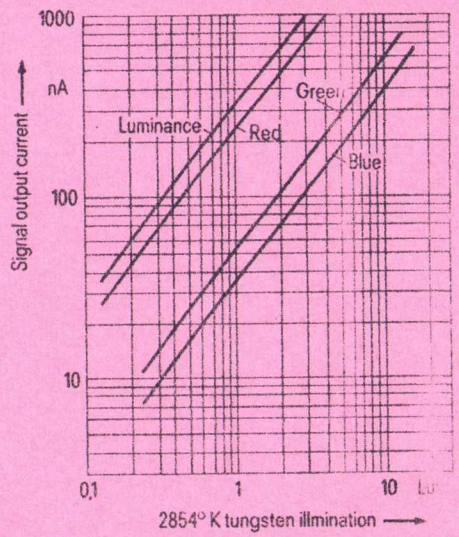
High Voltage Operation

Under the high voltage operation the amplitude response is improved. Figures shows amplitude response characteristics of the high voltage operation.

Typical spectral response characteristics

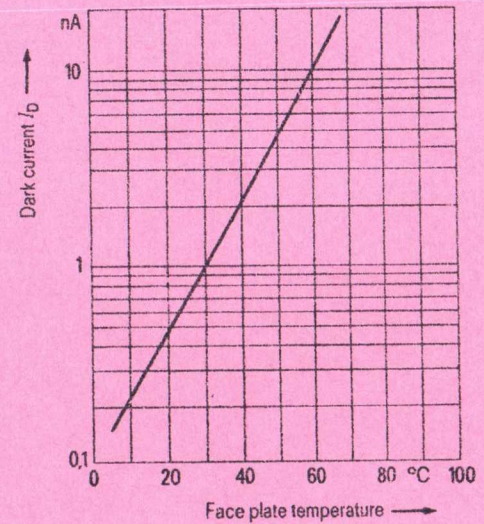


Typical light transfer characteristics

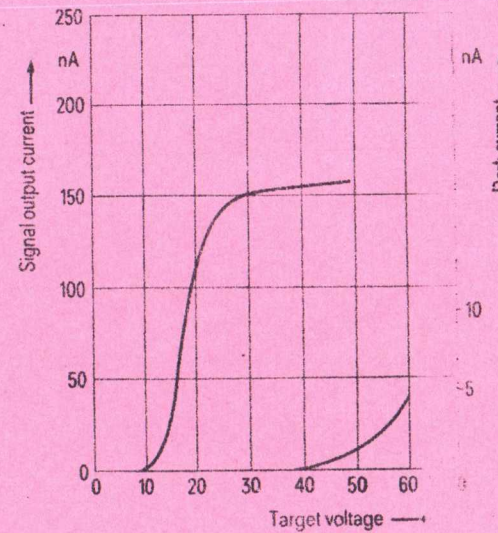


Luminance:	2854 K	no filter
Red:	Schott	OG – 2 3 m
Green:	Schott	VG – 9 1 n
Blue:	Schott	BG – 23 3 m

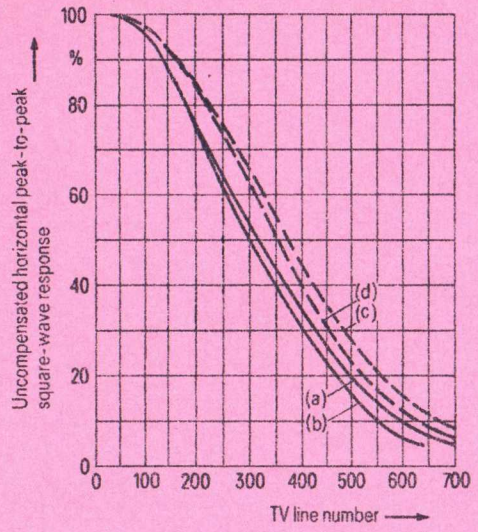
Typical dar current – Temperature characteristics



Typical signal output current as a fu[illegible]en of target voltage

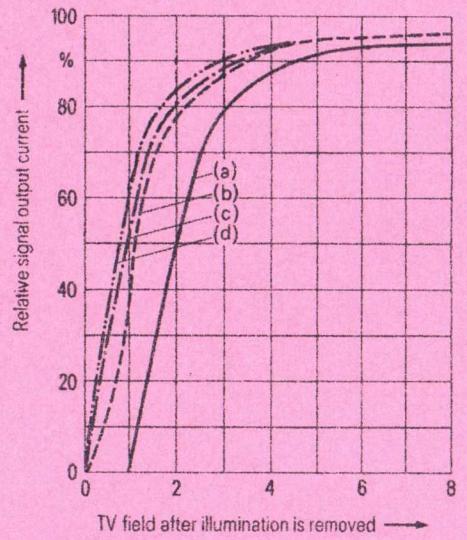


Typical uncompensated horizontal square wave response



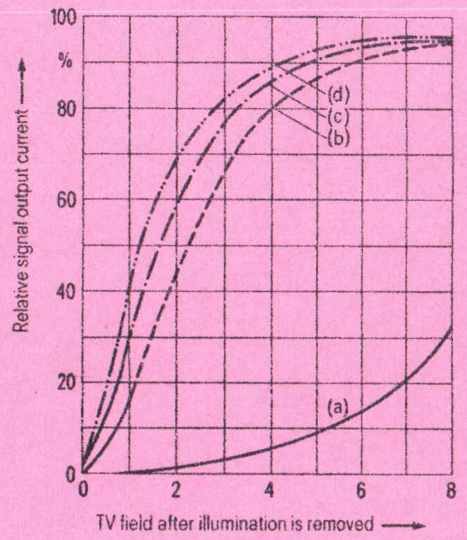
Signal output current: 300 nA
Standard Operation
(a) Beam current: 300 nA
(b) Beam current: 600 nA
High voltage operation
(c) Beam current: 300 nA
(d) Beam current: 600 nA

Typical build-up lag characteristics
(after 10sec of complete darkness)



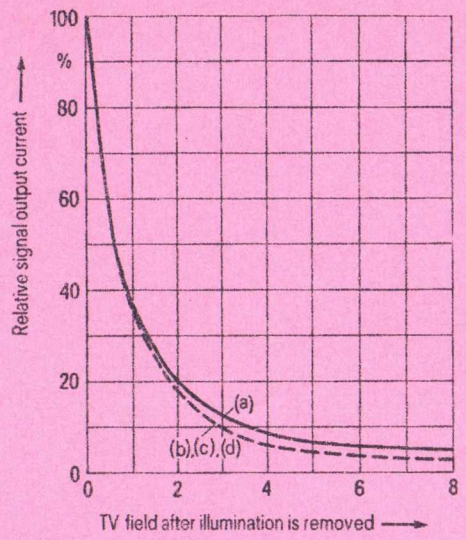
Signal output current: 300 nA
Beam current: 600 nA
Bias light: (Signal output current)
0 nA (a)
10 nA (b)
20 nA (c)
30 nA (d)

Typical build-up lag characteristics
(after 10sec of complete darkness)



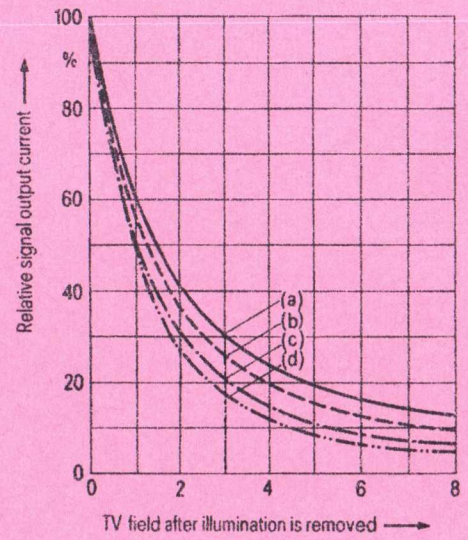
Signal output current: 50 nA
Beam current: 600 nA
Bias light: (Signal output current)
0 nA (a)
10 nA (b)
20 nA (c)
30 nA (d)

Typical decay – lag characteristics



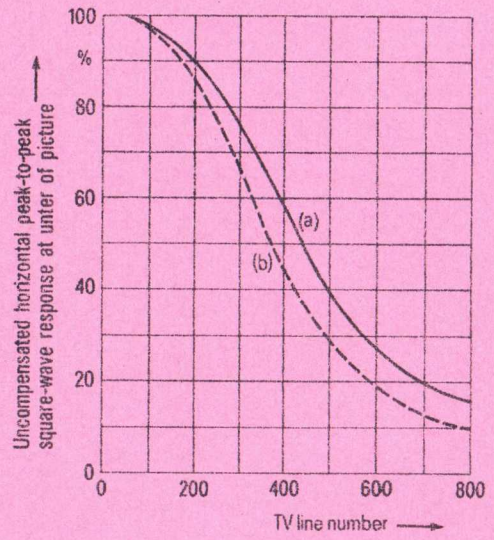
Signal output current: 300 nA
Beam current: 600 nA
Bias light: (Signal output current)
0 nA (a)
10 nA (b)
20 nA (c)
30 nA (d)

Typical decay – lag characteristics



Signal output current: 50 nA
Beam current: 600 nA
Bias light: (Signal output current)
0 nA (a)
10 nA (b)
20 nA (c)
30 nA (d)

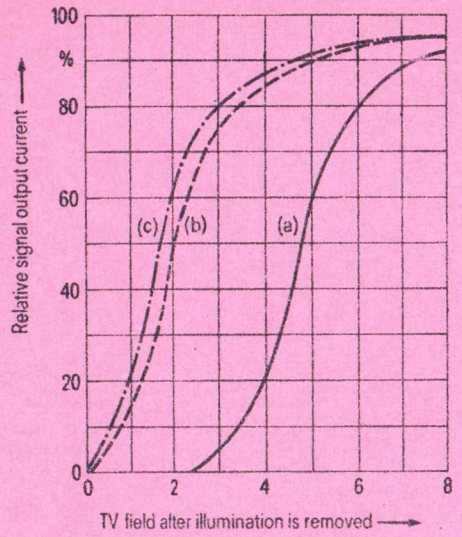
Typical horizontal square-wave response



Signal output current: 200 nA

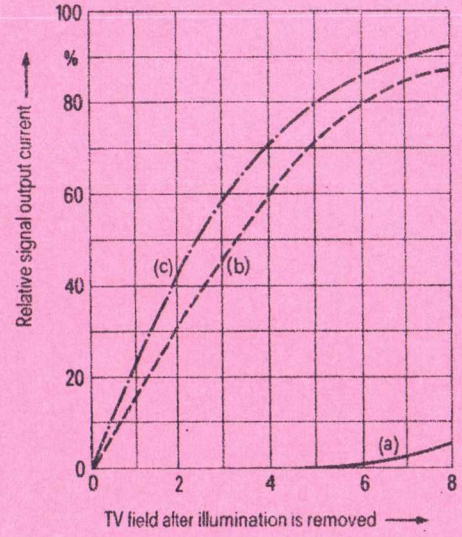
(a) Grid No. 3 Voltage 450 V
Grid No. 4 Voltage 750 V
(b) Grid No. 3 Voltage 300 V
Grid No. 4 Voltage 500 V

Typical build-up lag characteristics
(after 10sec of complete darkness)



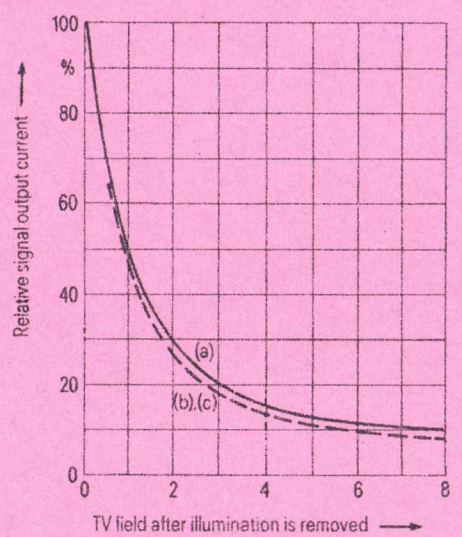
Signal Output Current: 100 nA
Beam Current: 400 nA
Bias Light: 0 nA (a)
20 nA (b)
30 nA (c)

Typical build-up lag characteristics
(after 10sec of complete darkness)



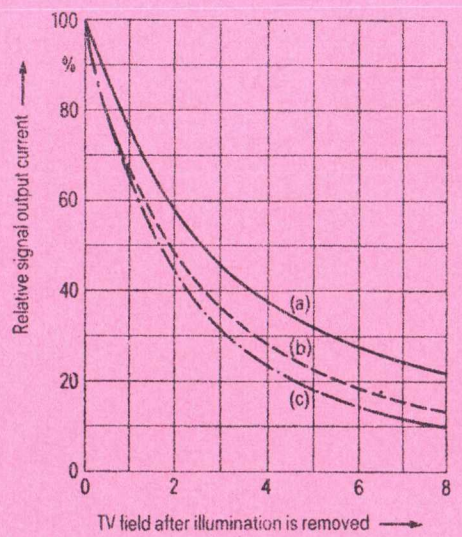
Signal Output Current: 50 nA
Beamt current: 400 nA
Bias Light (Signal output current):
0 nA (a)
20 nA (b)
30 nA (c)

Typical decay – lag characteristics



Signal output current: 200 nA
Beam current: 400 nA
Bias light: 0 nA (a)
20 nA (b)
30 nA (c)

Typical decay – lag characteristics



Signal output current: 50 nA
Beam current: 400 nA
Bias light: 0 nA (a)
20 nA (b)
30 nA (c)

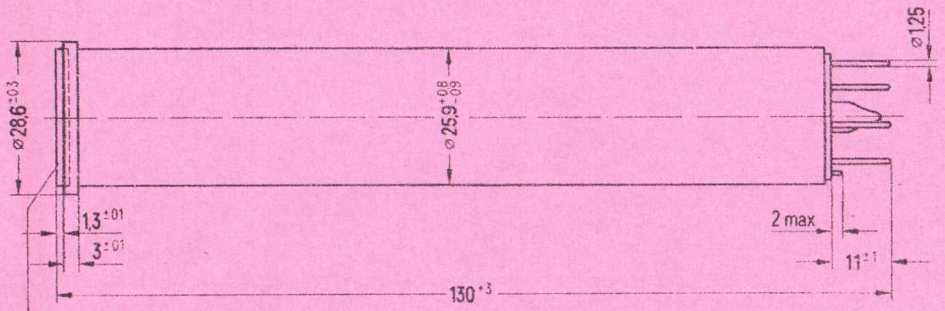
AL/1977/3
Annex PT
- 138 -

1"-Vidicon camera tube with cadmiumselenid-target

Vidicon camera tube with magnetic focus and deflection. Useful faceplatz 9,6 mm × 12,8 mm with a 3 : 4 aspect ratio. The seperate mesh electrode G4 improve modulations depth and uniform reolution of the tube. The γ-value of the photoconductive layer is approximately 1 and constant over a wide range of the signal output current. By high sensitivity the tube has a very good resistance by extreme illumination and features short lag, high modulation depth and very low dark current.

Depending on the tequired picture quality the following types are available.

XQ 1461 K	Live broadcast	type series
XQ 1462 K	General industrial TV applications, quality grade I	with very
XQ 1463 K	General industrial TV applications, quality grade II	low lag
XQ 1466 K	Live broadcast	type series
XQ 1467 K	General industrial TV applications, quality grade I	with
XQ 1468 K	General industrial TV applications, quality grade II	low lag



Dimensions in mm

Max. length:	1 mm
Max. diameter:	28,9 mm
Weight:	approx. 55 g

Order Numbers

Type	Order-No.	Type	Order-No.
XQ 1461 K	Q 72 – K 8010	XQ 1466 K	Q 72 – K 8011
XQ 1462 K	Q 72 – L 8010	XQ 1467 K	Q 72 – L 8011
XQ 1463 K	Q 72 – M 8010	XQ 1468 K	Q 72 – M 8011

1"-Vidicon camera tube with cadmiumselenid-target
FIBEROPTICS FACEPLATE

Image pick-up tubes with fiberoptics are applicable for coupling with image intensifiers. Owing to the use of fiberoptic faceplates a direct optical contact arises, hence causing only a minimum loss of light. In addition to that, considerable space saving was obtained by using the fiberoptical light coupling instead of an equivalent lens coupling system.

XQ 1461 F	General industrial TV applications	with very low lag
XQ 1466 F	General industrial TV applications	with low lag

Fiberoptics faceplate dimension

Fiber thickness	7 µm
Fiber faceplate diameter	26,25 mm ± 0,1 mm

Target defects

See XQ 1462 and XQ 1467. Defects which base on the fiberoptic faceplate should not desturbe appearance.

Type/Order number:	XQ 1461 F = Q 72 – F 8010
	XQ 1466 F = Q 72 – F 8011

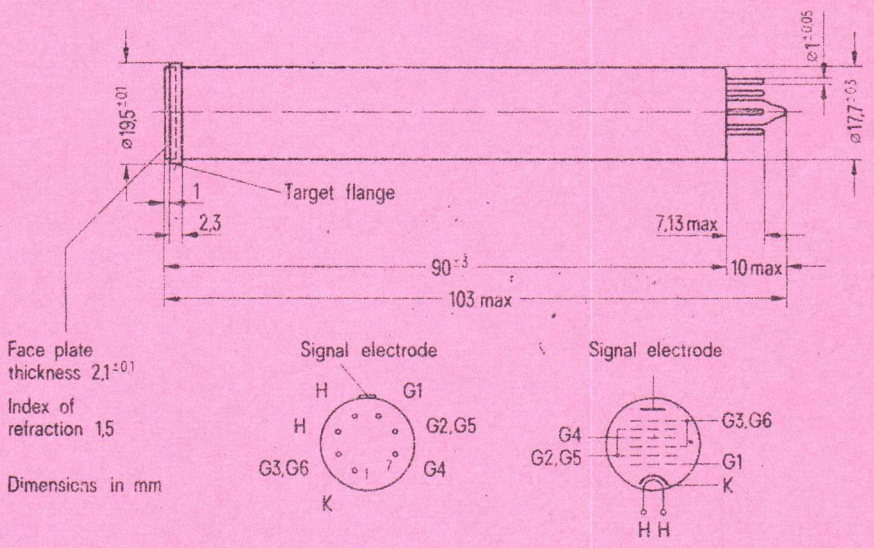
All the other electrical and mechanical data are equivalent to series XQ 1461 to XQ 1463.

2/3"-Vidicon camera tube with cadmiumselenid-target

Vidicon camera tube with electrostatic focus and magnetic deflection. Useful faceplate of 6,6 mm × 8,8 mm with a 3 : 4 aspect ratio. The seperate mesh electrode G6 improve modulations depth and uniform resolution of the tube. The γ-value of the photoconductive layer is approximately 1 and constant over a wide range of the signal output current. By high sensitivity the tube has a very good resistance by extreme illumination and features short lag, high modulation depth and very low dark current.

Depending on the tequired picture quality the following types are available:

XQ 1470	General industrial B/W-TV applications, quality grade I	type series with very low lag
XQ 1471	General industrial B/W-TV applications, quality grade II	
XQ 1472	General industrial B/W-TV applications, quality grade I	type series with low lag
XQ 1473	General industrial B/W-TV applications, quality grade II	



Max. length:	103 mm
Max. diameter:	19,6 mm
Weight:	approx. 27 g
Base:	7 pin miniatur (Jedec E7-91)
Socket:	Rö Fsg 1034 (for printed circuits) Rö Fsg 1033 (with solder tags)
Mounting and transport position:	any

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Heating

Heater voltage	6.3	V	①
Heater current	95	mA	
	indirect by ac or dc, series or parallel supply		

Characteristics

Inter-electrode capacitance	2		
Signal electrode to all other		pF	②
Spectral response	see diagram		
Maximum of the spectral response	see diagram		
Focusing method	magnetic		
Deflection method	magnetic		
Useful diameter of the photo conductive layer	11	mm	
Useful size of rectangular image (3 : 4 aspect ratio)	6,6 × 8,8	mm	

Maximum ratings (absolute values)
Full size scanning of the 6,6 mm × 8,8 mm area of the photoconductive layer must be assured.

Grid No. 1 voltage				
positive	max.	0	V	
negative	max.	−300	V	
Grid No. 2, 3, 5, voltage	max.	350	V	
Grid No. 4 voltage	max.	350	V	
Grid No. 6 voltage	max.	650	V	
Signal electrode voltage	max.	50	V	
Peak beam current	max.	600	nA	
Peak heater to cathode voltage				
Heater negative with respect to cathode	max.	125	V	
Heater positive with respect to cathode	max.	10	V	
Faceplate illumination	max.	1000	Lux	
Faceplate temperature	max.	−20 to +60	°C	③

Typical Operation (Faceplate temperature approx 25 to 35×C)

Scanned area		6,6 × 8,8	mm	
Grid No. 1 cutoff voltage		−45 to −100	V	
Grid No. 2, 5 voltage		300	V	
Grid No. 4 voltage		≈ 75	V	⑤
Grid No. 3, 6 voltage		500	V	
Blanking voltage applied to Grid No. 1	min.	80	V	
Blanking voltage applied to cathode	min.	20	V	
Signal electrode voltage		adjust	V	⑥
Dark current		0,5	nA	
"Gamma" of transfer characteristics		≈ 0,95		

	XQ 1470 XQ 1471	XQ 1472 XQ 1473		
Resolution				
at center of picture	550	550	TV lines	
at corner of picture	500	500	TV lines	
Signal output current	200	200	nA	
Signal uniformity	10	10	%	
Modulations depth at 5 MHz	25	25	%	⑦
Lag after 60 ms	7	10	%	⑧
Sensitivity	2600	2600	µA/lm	⑨
Faceplate illumination	1	1	Lux	
Signal output current (white)	150	150	nA	⑩
Signal output current (red)	110	110	nA	⑩
Signal output current (green)	26	26	nA	⑩
Signal output current (blue)	17	17	nA	⑩

Order Numbers

Type	Order-No.
XQ 1470	Q 72 – C 8022
XQ 1471	Q 72 – D 8022
XQ 1472	Q 72 – C 8023
XQ 1473	Q 72 – C 8023

Accessories	Order-No.
Sockets	
Rö Fsg 1033	Q 81 – X 133
Rö Fsg 1033	Q 81 – X 134
Deflection and focus assembly	
KV 19G	Q 3006 – X 5

Notes

① If the maximum variation of the heater voltage exceeds the absolute limits of ± 5% the operating performance of the tube will be impaired and its life shortened.

② This capacitance, which is effectively the output impedance of the tube (resistive component approx. 100 MΩ) increases when the tube is mounted in the deflecting-yoke and focusing coil assembly.

③ Additional air cooling or heat protection filter between optics and faceplate may be necessary.

④ Without blanking voltage on grid No. 1.

⑤ Optimum focusing of the electron beam is obtained by adjusting the grid No. 4 voltage.

⑥ Recommended signal electrode voltage is noted on the individual test sheet within the range of 20 to 50 volts. Switch off the signal electrode voltage automatic.

⑦ The modulation depth is measured at the picture center at 5 MHz in comparison with 0,5 MHz. The modulation depth depends on the signal output current, which is 200 nA.

⑧ Signal output current of 200 nA at 60 ms after illumination is removed.

⑨ At a color temperatur of 2854 K tungsten-filament lamp.

⑩ Unfiltered illumination incident on the faceplate is 1 lux. The optical filter interposed between the tube and a light source.
red = Schott OG2/3 mm, green = Schott VG9/1 mm, blue = Schott BG23/3 mm.

Target Defect Specification

General

This specification regards to target defects of vidicon camera tubes visible in the scanned area.

Glas defects of the face plate are not dealt with.

Test Conditions

The tube shall be best centred and focused according to the operating data and adjusting instructions.

The illumination (color temperature 2854 K shall be adjusted to a signal current of 200 nA (100% white signal).

The target voltage must be taken from the test sheet.

Temperatur of the face plate 30°C (± 2°).

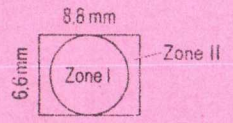
Monitor adjusted for a non-blooming white.

The video amplifier bandwidth shall be 5.5 MHz.

Target Zones

A uniformly illuminated field with an aspect ratio of 3 : 4 and a scanned area of 6.6 mm × 8.8 mm shall be displayed on the target of the vidicon camera tube.

According to the following drawing the scanned area is divided into the two zones I and II.



Target Defects Estimation

The target defect size is measured in percent of the picture hight. The equivalent numbers of raster lines in a 625 lines TV-system and in a 525 lines TV-system resp. are indicated for comparison purposes only.

Inspection for target defects to be performed with illuminated and nonilluminated target.

The minimum separation between two target defects must be greater than the diameter of the larger one, otherwise the combination is considered on the whole.

Target defects are not counted when their contrast expressed in % of picture white is less than 13% white spots, <28% black spots.

Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted when their contrast expressed in % of picture white is less than 13%.

To obtain optimum picture quality or to avoid moire effects the tube may be rotated.

Allowable number, size and position of target defects

Type			XQ 1470 XQ 1472		XQ 1471 XQ 1473		
Target defect size in percent of the picture hight 6.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II	Zone I	Zone II	
> 1.2	> 7	> 6	0	0	0	0	
> 0.8 to ≦ 1.2	> 5 to 7	4 to 6	0	2	1	2	
> 0.2 to ≦ 0.8	> 1 to 5	1 to 4	3	4	3	4	
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance				

Operating Considerations

The tube must be located in the coil assembly such that a line between the longitudinal axis of the tube and the short pin is parallel to the direction of horizontal deflection.

To obtain high signal uniformity the magnetic fields of the deflection must be adjusted such that the electrons strike the faceplate perpendicularly across the whole area.

Connection to the faceplate is usually made by a suitable spring contact mounted in the coil assembly. The connecting cable of the pre-amplifier should be low capacitance.

The following must be observed when firing up the tube for the first time:

[1]) Set the grid 1 voltage negative, until the picture cutoff is reached. Then set the electrode voltages as indicated as operating voltages with a signal electrode voltage which is noted on the individual test sheet. The deflection power must be sufficient to cause the electron beam to scan a maximum area of the photoconductive layer.

[2]) After mounting a dimmed lens reduce the grid 1 voltage until the scanning beam recharges even the brightest spots of the picture. Then improve the picture sharpness with the aid of the focusing field strengh and varying the distance between camera and optics.

[3]) Adjust the alignment grid-4-voltage. After this adjustment it may be necessary to reset the horizontal and vertical centering.

[4]) Adjust the beam current by varying grid 1 voltage so that the brightest picture point is recharged. An unnecessary increase in beam current reduces the picture quality.

Dark Current

The dark current is as low as 1 nA, or below. No picture quality deterioration is caused by the increase of environmental temperature because the approximate dark current ist within 10 nA even at 60°C.

Target Voltage

Target voltage must be adjusted to the optimum value refering to the value noted on the individual test sheet. Increase the target voltage to some voltage when a negative after-image is apt to appear shifting an incident pattern and taking white back ground. If the target voltage is set to too high voltage white spots increase in the picture.

As shown in figures the signal-output current tends to saturate with the target voltage and therefore has a near constant sensitivity. The curve shows the dark current increase. When the dark current becomes extremely large, the picture quality goes wrong.

Photosensitivity and Light Transfer Characteristics

Figures shows the light transfer characteristics with the faceplate illumination using a standard tungsten lamp of 2854 K in colour temperature. Red, Green and Blue sensitivities are measured by interposing the optical filter between the tube and the tungsten lamp.

Lag

The build up-and decay-lag at different signal currents are shown in figures respectively. Improvement of lag, especially build up lag, is possible by employing the bias-light when taking a low light level scene and, consequently, low signal current. (See curve (b), (e) and (d) in figures). The intensity of the bias-light should be adjusted so as to take a output current of 20 nA or above.

There is no difference of the influence by spectral wavelength.

If the adjustment of optical lens system of color TV camera is made to have the same level of signal currents in each of the red, green and blue color channels, no differences of lag characteristic occur in the color channels, so that the tail or head of a moving white object does not have any special color, and attract little attention of the human eye. If the optical lens system is designed on the basis of the colour temperature of 6000 K the same level of signal output current will be obtained.

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Shading, which is usually observed in the conventional vidicon, is not seen. On account of the saturated signal current-voltage characteristics, signal output currents do not make so much difference throughout the scanning area, even if there is a landing error of electron beam causing a difference of electric fields across the photoconductive target between center and corner.

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The color of the photoconductor is black without giving any harmful reflection of light from the surface of the photoconductor in the visible light region, therefore the stable black level can be obtained.

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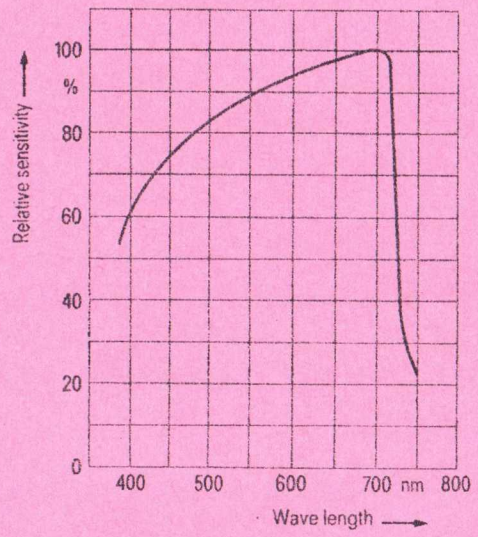
The beam current is recommended to adjust to twice as much as the value to just discharge the highlight signal current on the typical operation data. Flowing more over the required beam current may decrease the amplitude response characteristics.

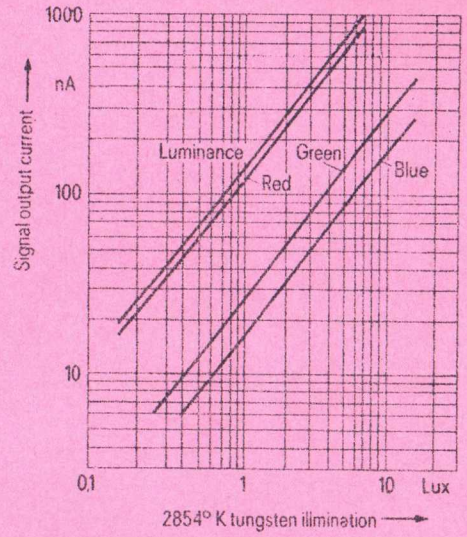
Burn-In Damage

At the optimum target voltage, damages caused by excess light, which is usually observed in the conventional vidicon, are seldom seen. When, however, after-image due to the incidence of strong bright spots are observed, operate the tube for a while with uniform illumination at the higher target voltage so as to fade off.

Typical spectral response characteristics

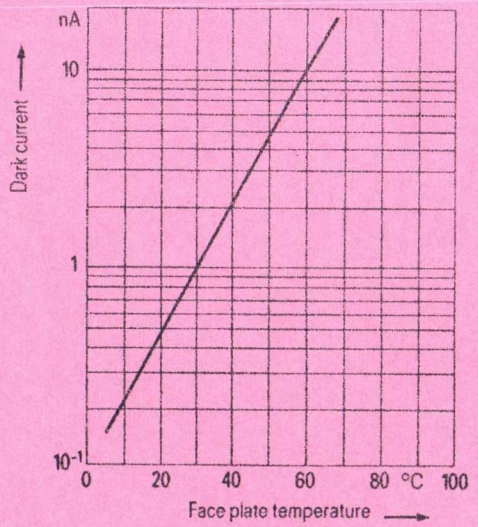


Typical light transfer characteristics

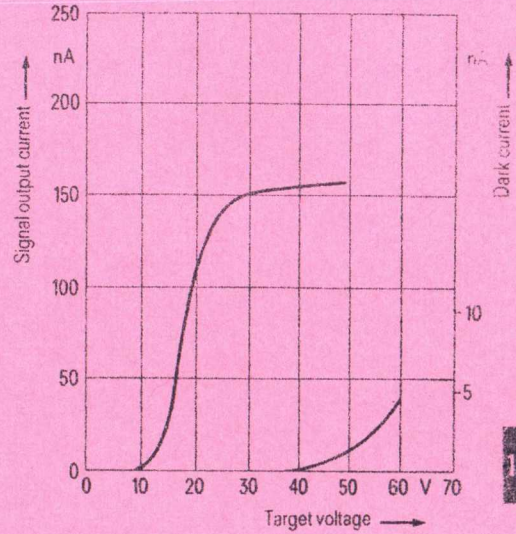


Luminance:	2854 K	no filter
Red:	Schott	OG – 2 3 mm
Green:	Schott	VG – 9 1 mm
Blue:	Schott	BG – 23 3 mm

Typical dark current – Temperature characteristics



Typical signal output current as a function of target voltage



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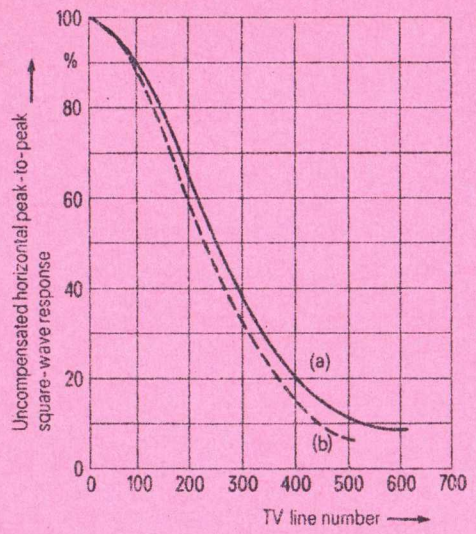
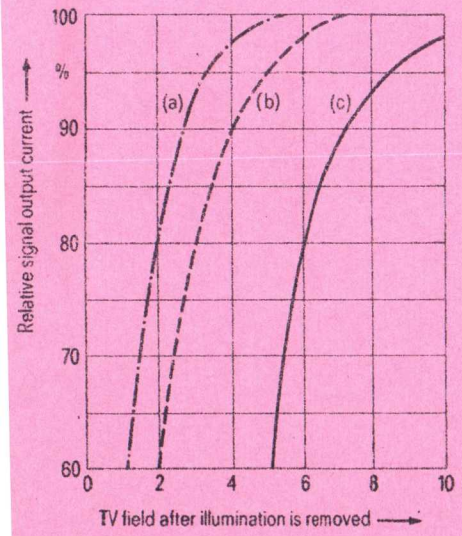
Typical uncompensated horizontal square wave response



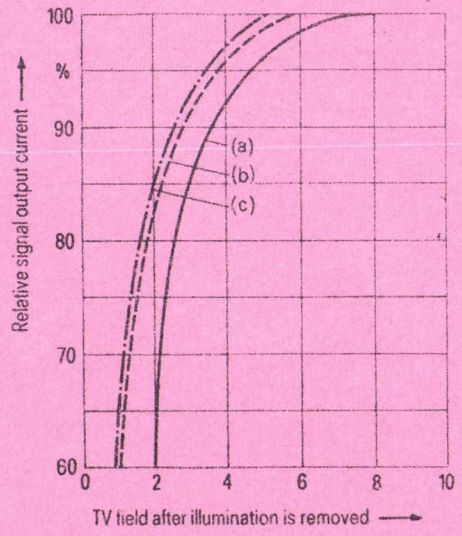
Signal Output Current: 200 nA
Beam Current: 200 nA (a)
400 nA (b)

Typical build-up lag characteristics



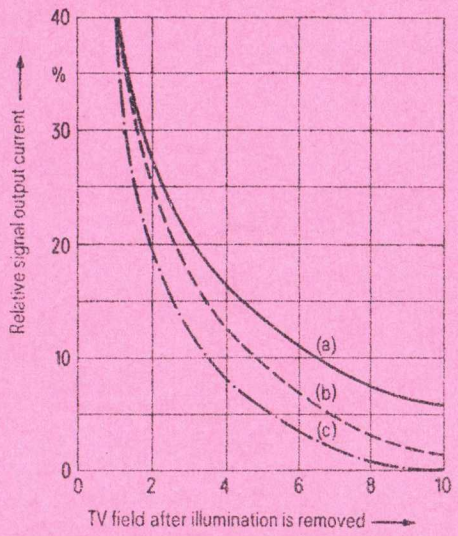
Signal output current: 50 nA
Beam current: 600 nA
Bias light (output current): 0 nA (a)
10 nA (b)
20 nA (c)

Typical build-up lag characteristics



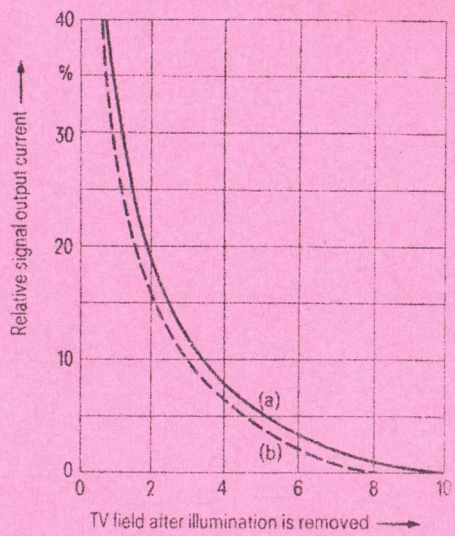
Signal output current: 200 nA
Beam current: 600 nA
Bias light (output current): 0 nA (a)
10 nA (b)
20 nA (c)

Typical decay – lag characteristics



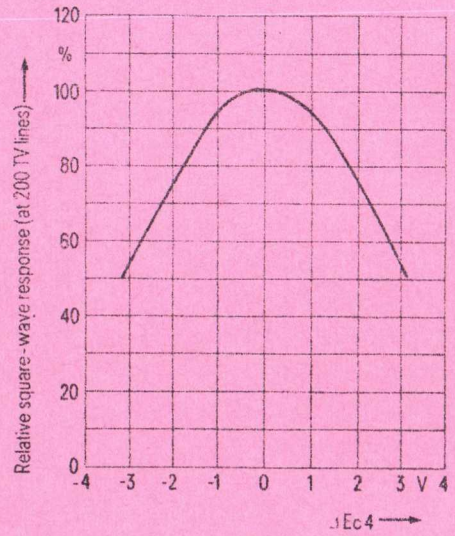
Signal output current: 50 nA
Beam current: 600 nA
Bias light (output current): 0 nA (a)
10 nA (b)
20 nA (c)

Typical decay – lag characteristics



Signal output current: 200 nA
Beam current: 600 nA
Bias light (output current): 0 nA (a)
10 nA (b)

Relative square-wave response vs. Beam-focus electrode voltage variation



Signal output current: 20[illegible] A
Beam current: 40[illegible] A

AL/1977/3
Annex PT
- 145 -

16

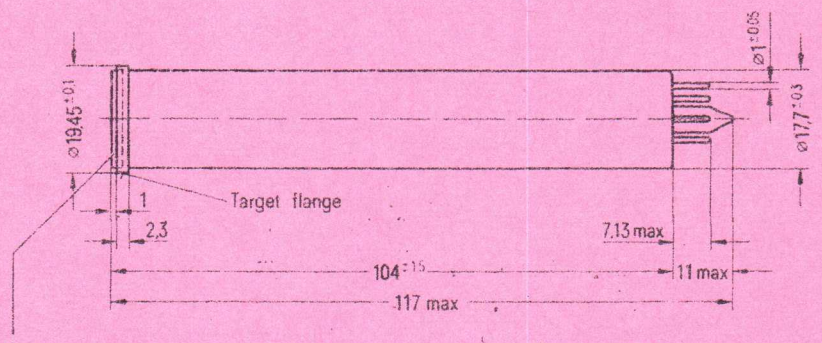
2/3"-Vidicon camera tube with cadmiumselenid-target

Vidicon camera tube with electrostatic focus and magnetic deflection. Useful faceplate of 6,6 mm × 8,8 mm with a 3 : 4 aspect ratio. The seperate mesh electrode G6 improve modulations depth and uniform resolution of the tube. The γ-value of the photoconductive layer is approximately 1 and constant over a wide range of the signal output current. By high sensitivity the tube has a very good resistance by extreme illumination and features short lag, high modulation depth and very low dark current.

Depending on the required picture quality the following types are available:

XQ 1480 Live broadcast color-cameras
XQ 1481 General industrial color-camera TV applications, quality grade I
XQ 1482 General industrial color-camera TV applications, quality grade II
XQ 1483 Live broadcast, color-cameras, high resolution, grade I
XQ 1484 Live broadcast, color-cameras, high resolution, grade II

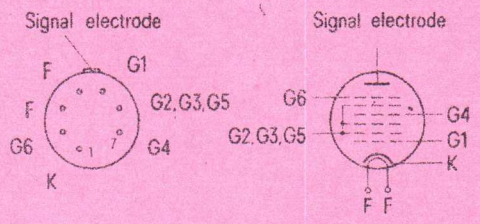
type series with very low lag



Face plate thickness 2,1 ±0,1

Index of refraction 1,5

Dimensions in mm



Max. length:	117 mm
Max. diameter:	19,6 mm
Weight:	approx. 27 g
Base:	7 pin miniatur (Jedec E7-91)
Socket:	Rö Fsg 1034 (for printed circuits) Rö Fsg 1033 (with solder tags)
Mounting and transport position:	any

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g

voltage	6.3	V	①
current	95	mA	
	indirect by ac or dc, series or parallel supply		

teristics

ectrode capacitance			
electrode to all other	2	pF	②
l response	see diagram		
um of the spectral response	see diagram		
g method	magnetic		
ion method	magnetic		
diameter of the onductive layer	11	mm	
size of rectangular image (spect ratio)	6,6 × 8,8	mm	

um ratings (absolute values)

e scanning of the 6.6 mm × 8.8 mm area of the photoconductive layer must be l.

). 1 voltage			
itive	max	0	V
ative	max.	–300	V
). 2, 3, 5 voltage	max.	350	V
). 4 voltage	max.	350	V
). 6 voltage	max.	650	V
electrode voltage	max.	50	V
eam current	max.	900	nA
eater to cathode voltage			
ter negative			
respect to cathode	max.	125	V
ter positive			
respect to cathode	max.	10	V
te illumination	max.	1000	Lux
te temperatur	max.	–20 to +60	°C ③

Typical operation (Faceplate temperature approx. 25 to 35°C)

Scanned area			6,6 × 8,8	mm
Grid No. 1 cutoff voltage			–45 to –100	V
Grid No. 2, 3, 5 voltage			300	V
Grid No. 4 voltage			≈ 70	V ⑤
Grid No. 6 voltage			500	V
Blanking voltage applied to Grid No. 1		min.	80	V
Blanking voltage applied to cathode		min.	20	V
Signal electrode voltage			adjust	V ⑥
Dark current			0,5	nA
"Gamma" of transfer characteristics			≈ 0,95	

	XQ 1480 XQ 1481 XQ 1482	XQ 1483 XQ 1484	
Resolution			
at center of picture	550	550	TV lines
at corner of picture	500	500	TV lines
Signal output current	300	300	nA
Signal uniformity	10	10	%
Modulations depth at 5 MHz	25	35	% ⑦
Lag after 60 ms	6	6	% ⑧
Sensitivity	2600	2600	µA/lm ⑨
Faceplate illumination	1	1	Lux
Signal output current (white)	150	150	nA
Signal output current (red)	110	110	nA ⑩
Signal output current (green)	26	26	nA ⑪
Signal output current (blue)	17	17	nA ⑫

Order Numbers

Type	Order-No.
XQ 1480	Q 72 – B 8024
XQ 1481	Q 72 – C 8024
XQ 1482	Q 72 – D 8024
XQ 1483	Q 72 – B 8025
XQ 1484	Q 72 – C 8025

Accessories	Order-No.
Sockets	
Rö Fsg 1033	Q 81 – X 133
Rö Fsg 1033	Q 81 – X 134
Deflection and focus assembly KV 17 D	Q 3006 – X 15

Notes

① If the maximum variation of the heater voltage exceeds the absolute limits of ± 5% the operating performance of the tube will be impaired and its life shortened.

② This capacitance, which is effectively the output impedance of the tube (resistive component approx. 100 MΩ) increases when the tube is mounted in the deflecting-yoke and focusing coil assembly.

③ Additional air cooling or heat protection filter between optics and faceplate may be necessary.

④ Without blanking voltage on grid No. 1.

⑤ Optimum focusing of the electron beam is obtained by adjusting the grid No. 4 voltage.

⑥ Recommended signal electrode voltage is noted on the individual test sheet within the range of 20 to 50 volts. Switch off the signal electrode voltage automatic.

⑦ The modulation depth is measured at the picture center at 5 MHz in comparison with 0,5 MHz. The modulation depth depends on the signal output current, which is 300 nA.

⑧ Signal output current of 200 nA at 60 ms after illumination is removed.

⑨ At a color temperatur of 2854 K tungsten-filament lamp.

⑩ Unfiltered illumination incident on the faceplate is 1 lux. The optical filter interposed between the tube and a light source.
red = Schott OG2/3 mm, green = Schott VG9/1 mm, blue = Schott BG23/3 mm.

Target Defect Specification

General

This specification regards to target defects of vidicon camera tubes visible in the scanned area.

Glas defects of the face plate are not dealt with.

Test Conditions

The tube shall be best centred and focused according to the operating data and adjusting instructions.

The illumination (color temperature 2854 K shall be adjusted to a signal current of 200 nA (100% white signal).

The target voltage must be taken from the test sheet.

Temperatur of the face plate 30°C (± 2°).

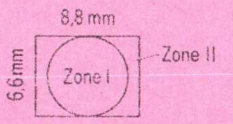
Monitor adjusted for a non-blooming white.

The video amplifier bandwidth shall be 5.5 MHz.

Target Zones

A uniformly illuminated field with an aspect ratio of 3 : 4 and a scanned area of 6.6 mm × 8.8 mm shall be displayed on the target of the vidicon camera tube.

According to the following drawing the scanned area is divided into the two zones I and II.



Target Defects Estimation

The target defect size is measured in percent of the picture hight. The equivalent numbers of raster lines in a 625 lines TV-system and in a 525 lines TV-system resp are indicated for comparison purposes only.

Inspection for target defects to be performed with illuminated and nonilluminated target.

The minimum separation between two target defects must be greater than the diameter of the larger one, otherwise the combination is considered on the whole.

Target defects are not counted when their contrast expressed in % of picture white is less than 13% white spots, <28% black spots.

Blurred spots, streaks, stripes, mesh defects and mottled or grainy background are only permitted when their contrast expressed in % of picture white is less than 13%.

To obtain optimum picture quality or to avoid moire effects the tube may be rotated.

Allowable number, size and position of target defects

Type			XQ 1480 XQ 1483		XQ 1481 XQ 1484	
Target defect size in percent of the picture height 1.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II	Zone I	Zone II
> 0.8	> 5	> 4	0	0	0	0
> 0.6 to ≦ 0.8	> 4 to 5	3 to 4	0	0	0	2
> 0.2 to ≦ 0.6	> 1 to 4	1 to 3	2	3	3	4
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance			

Type			XQ 1482	
Target defect size in percent of the picture height 1.6 mm = 100%	Target defects size in TV lines 625 lines system	Target defects size in TV lines 525 lines system	Maximum allowable number of target defects Zone I	Zone II
> 1.2	> 7	> 6	0	0
> 0.8 to ≦ 1.2	> 5 to 7	4 to 6	1	2
> 0.2 to ≦ 0.8	> 1 to 5	1 to 4	3	4
≦ 0.2	≦ 1	< 1	are not considered unless concentration causes a smudge appearance	

Target defects outside the scanned area will not be counted.

Operating Considerations

The tube must be located in the coil assembly such that a line between the longitudinal axis of the tube and the short pin is parallel to the direction of horizontal deflection.

To obtain high signal uniformity the magnetic fields of the deflection must be adjusted such that the electrons strike the faceplate perpendicularly across the whole area.

Connection to the faceplate is usually made by a suitable spring contact mounted in the coil assembly. The connecting cable of the pre-amplifier should be low capacitance.

The following must be observed when firing up the tube for the first time:

[1]) Set the grid 1 voltage negative, until the picture cutoff is reached. Then set the electrode voltages as indicated as operating voltages with a signal electrode voltage which is noted on the individual test sheet. The deflection power must be sufficient to cause the electron beam to scan a maximum area of the photoconductive layer.

[2]) After mounting a dimmed lens reduce the grid 1 voltage until the scanning beam recharges even the brightest spots of the picture. Then improve the picture sharpness with the aid of the focusing field strengh and varying the distance between camera and optics.

[3]) Adjust the alignment grid-4-voltage. After this adjustment it may be necessary to reset the horizontal and vertical centering.

[4]) Adjust the beam current by varying grid 1 voltage so that the brightest picture point is recharged. An unnecessary increase in beam current reduces the picture quality.

Dark Current

The dark current is as low as 1 nA, or below. No picture quality deterioration is caused by the increase of environmental temperature because the approximate dark current ist within 10 nA even at 60°C.

Target Voltage

Target voltage must be adjusted to the optimum value refering to the value noted on the individual test sheet. Increase the target voltage to some voltage when a negative after-image is apt to appear shifting an incident pattern and taking white back ground. If the target voltage is set to too high voltage white spots increase in the picture.

As shown in figures the signal-output current tends to saturate with the target voltage and therefore has a near constant sensitivity. The curve shows the dark current increase. When the dark current becomes extremely large, the picture quality goes wrong.

Photosensitivity and Light Transfer Characteristics

Figures shows the light transfer characteristics with the faceplate illumination using a standard tungsten lamp of 2854 K in colour temperature. Red, Green and Blue sensitivities are measured by interposing the optical filter between the tube and the tungsten lamp.

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			Zone		Zone	
	625 lines system	525 lines system	I	II	I	II
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> 0.6 to ≦ 0.8	> 4 to 5	3 to 4	0	0	0	2
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			Zone	
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If the adjustment of optical lens system of color TV camera is made to have the same level of signal currents in each of the red, green and blue color channels, no differences of lag characteristic occur in the color channels, so that the tail or head of a moving white object does not have any special color, and attract little attention of the human eye. If the optical lens system is designed on the basis of the colour temperature of 6000 K the same level of signal output current will be obtained.

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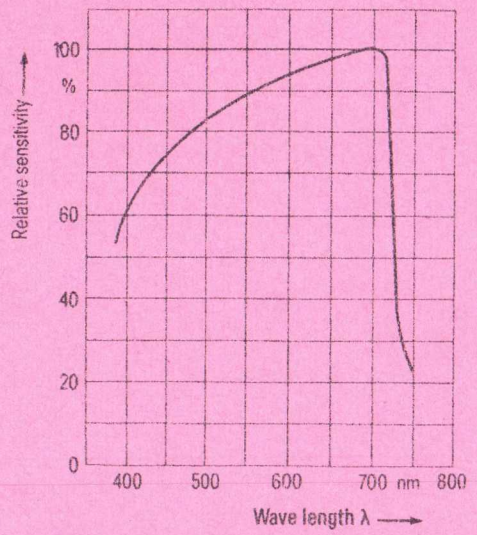
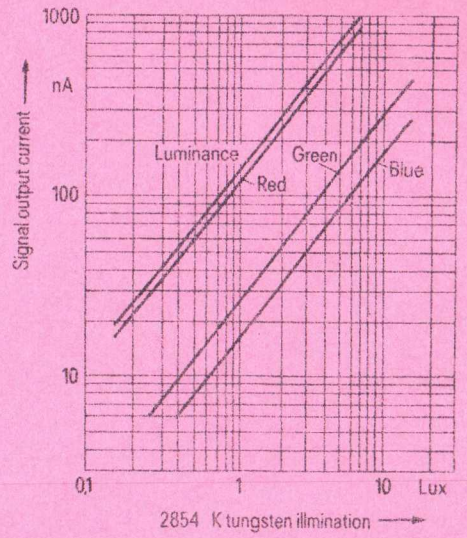
At the optimum target voltage, damages caused by excess light, which is usually observed in the conventional vidicon, are seldom seen. When, however, after-image due to the incidence of strong bright spots are observed, operate the tube for a while with uniform illumination at the higher target voltage so as to fade off.

Typical spectral response characteristics

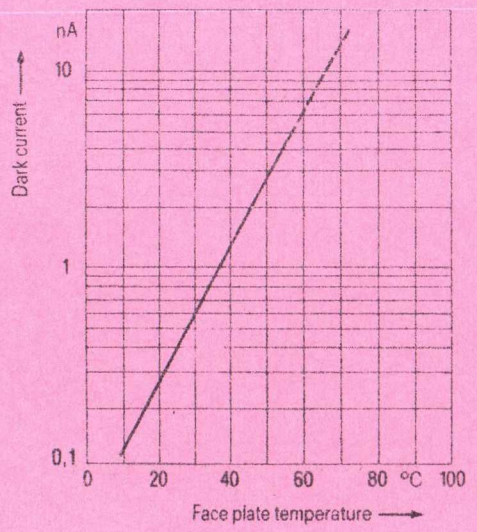


Typical light transfer characteristics

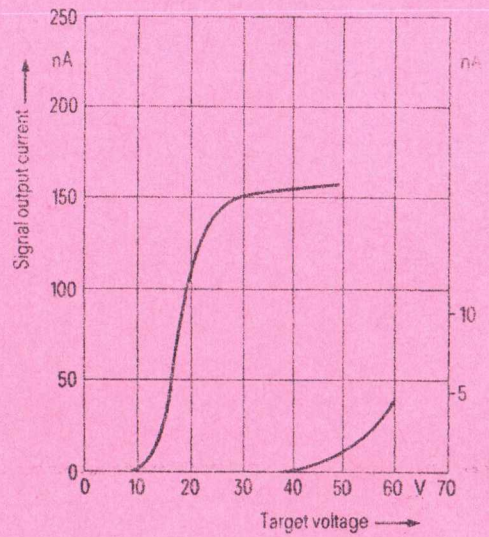


Luminance:	2854 K	no filter
Red:	Schott	OG – 2 3 mm
Green:	Schott	VG – 9 1 mm
Blue:	Schott	BG – 23 3 mm

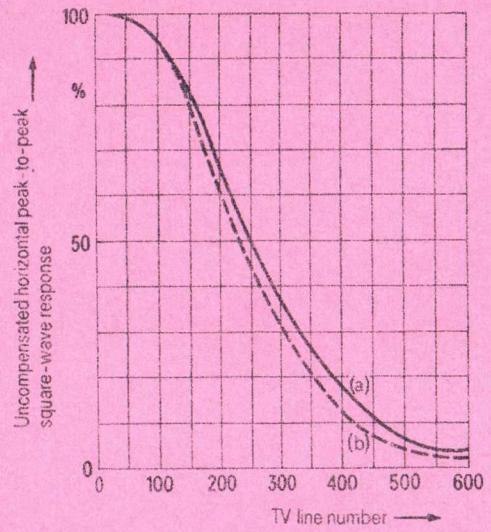
Typical dark current – Temperature characteristics



Typical signal output current as a function of target voltage

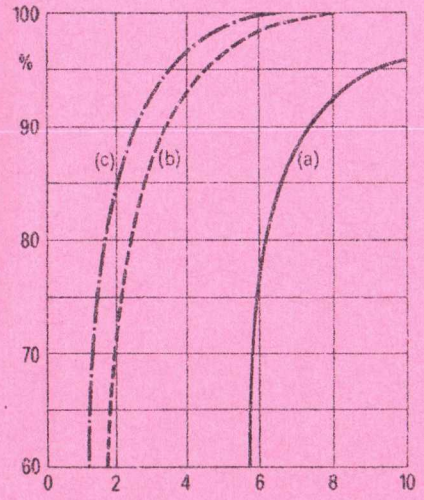


Typical horizontal square-wave response



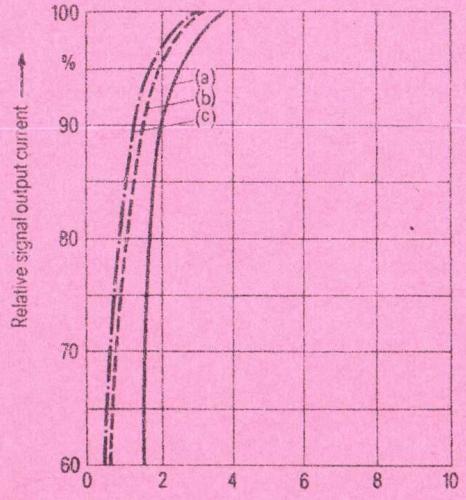
Signal output current: 300 nA
Beam current: 300 nA (a)
600 nA (b)

Typical build-up lag characteristics



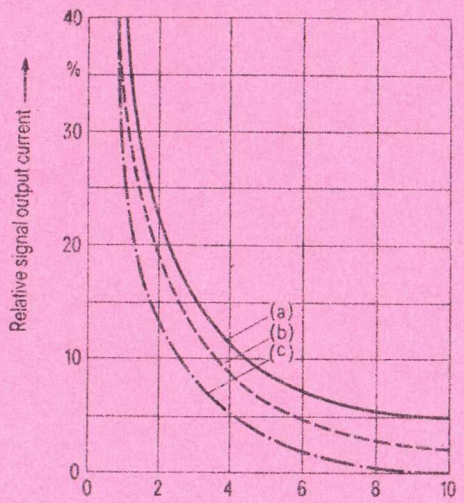
Signal output current: 50 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

Typical build-up lag characteristics



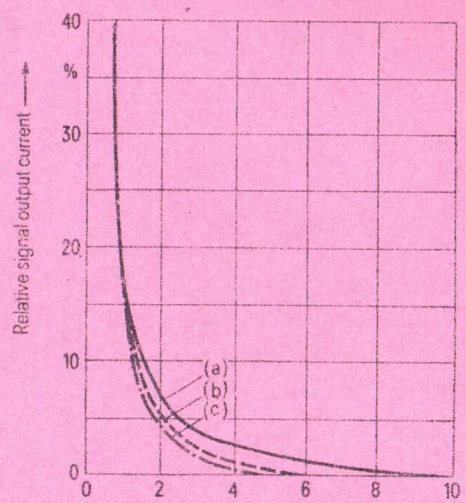
Signal output current: 300 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

Typical decay – lag characteristics



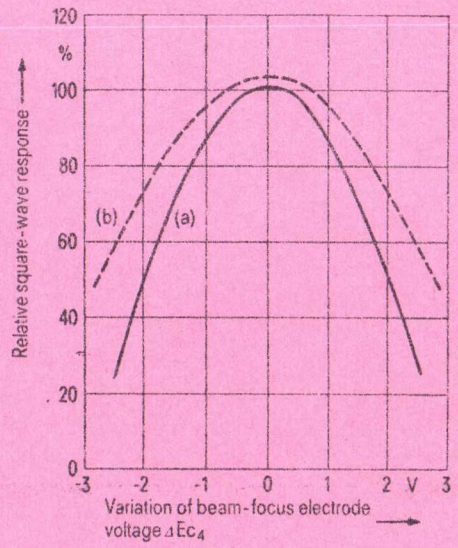
Signal output current: 50 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

Typical decay – lag characteristics



Signal output current: 300 nA
Beam current: 600 nA
Bias light: 0 nA (a)
10 nA (b)
20 nA (c)

Typical relative square-wave response vs. beam-focus electrode voltage variation



Test Pattern: 200 TV lines
Signal output current 1 sig = 200 nA
Beam current (a) 200 nA
(b) 600 nA