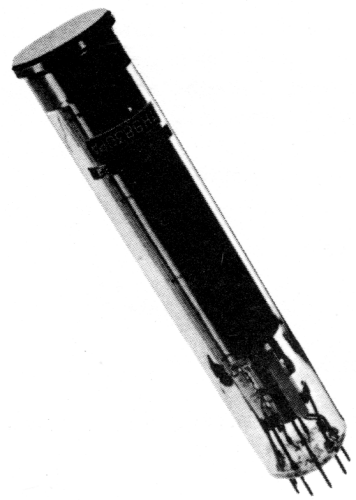
TH 9830
1½" VIDICON

- MAGNETIC FOCUS AND DEFLECTION
- HIGH RESOLUTION (1200 TV. LINES)
- LOW LAG
- FOR HIGH PERFORMANCE TV.CAMERA
- BROADCAST TV, TELECINE, DATA TRANSMISSION

TH 9830 is a 1 1/2" (38 mm) diameter magnetic focus, magnetic deflection Vidicon specially designed for high performance. Special features allowing for high resolution, possibility of large output current associated with the use of a low lag, high sensitivity photoconductive layer, make the tube suitable for broadcast service equipment or data transmission applications.



A scanned area of the photoconductive layer larger than that commonly used with 1" Vidicon makes possible to obtain higher electron-optical performances. Due to a new low lag photoconductive layer excellent quality of picture can be obtained within a large illumination range with good signal uniformity and appropriate "gamma" characteristics.

A field mesh with separate external connection allows good uniformity of signal and resolution on the entire scanned area. High voltage operation for this mesh improves limiting resolution and capability of large output current. Appropriate ratio voltages between this electrode and the wall electrode secures good signal uniformity and raster linearity by improving electronoptics and minimizes scanning power.

The sensitivity of the TH 9830 can be equivalent to photographic film having an ASA exposure index of 2000 (34/10 DIN, 41 Sch). Satisfactory quality picture with good resolution and acceptable signal to noise ratio can be obtained at illumination of 0.3 lux (0.03 fc) on the faceplate, 3 to 6 lux (0.3 to 0.6 fc) on the subject with an unity numerical aperture lens giving rise to a signal current of 0.1 μA at 0.1 μA dark current. For such illumination, higher signal current is obtained by increasing dark current up to 0.2 μA beyond which a signal saturation will occur.

A limiting resolution in excess of 1200 TV lines with a good resolution uniformity is obtained when the tube is operated with the electrode g4 voltage at 1400 V and g3 voltage at 900 V.

When operated with sufficient illumination on the target, TH 9830 can deliver an output signal in excess of 0.4 μA without loss of resolution and geometrical landing distortions. This characteristic makes the tube suitable for motion picture film cameras.

Full advantage of resolution and signal uniformity is achieved when deflecting and focusing components are properly designed and when the tube is correctly located inside. The thickness of the photoconductive layer is made very uniform and allows for constant output signal and constant dark current. When landing error due to imperfect scanning system is present, the voltage gradient across the photoconductive layer is not uniform and a signal variation is introduced (shading) which can be compensated by proper adjustment of the cathode, g1, g2 voltages.

Due to good design, high reliability is obtained all along tube life. Requirement for alignment field is reduced to a minimum by precise electron gun mounting. An extremely flat faceplate avoids all optical distortions and allows for the use of any good quality lens. Particle barriers adjacent to the field mesh allow these tubes to operate in any position.

One Watt power heater makes these Vidicons particularly suitable for transistorized equipment. The reduced heat dissipation improves the quality of pictures by lowering the faceplate temperature.

THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

GENERAL CHARACTERISTICS

Electrical

Heater	for unipotential cathode indirectly heated	
Heater :		
- voltage	6.3 ± 10 %	V
- current under 6.3 V	0.15	A
Minimum preheating time	60	s
Output capacitances :		
target to all other electrodes	8	pF
Spectral response	see drawing	
Focusing method	magnetic	
Deflection method	magnetic	

Mechanical

Base	Super DITETRAR, 8 Pins JEDEC N° E8-78
Socket (note 1)	ALDEN N° 208-SBS DC or equivalent
Deflection and focusing coils (note 2)	CLEVELAND ELECTRONICS n° 15 VFA 259 and n° 15 VY 258 or equivalent
Dimensions	see drawing
Photoconductive layer :	
- normal image on target	20.4 x 15.2 mm^2
- maximum useful diagonal diameter (4 x 3 aspect ratio)	25.4 mm
- orientation of quality rectangle (note 3)	horizontal scan parallel to a plane passing through the tube axis and short index pin
Maximum temperature of faceplate	70 °C
Mounting position	any
Net weight, approximate	100 g

OPERATING CONDITIONS

Maximum ratings

Scanned area . . . 20.4 x 15.2 mm^2

Electrode g4 voltage (field electrode)	1500	V
Electrode g3 voltage (wall electrode)	1200	V
Electrode g2 voltage (accelerator)	700	V
Electrode g1 voltage (electrode for picture cut-off) :		
negative bias value	300	V
positive bias value	0	V
Peak heater cathode voltage :		
heater negative with respect to cathode	125	V
heater positive with respect to cathode	10	V
Target voltage	125	V
Dark current	0.20	µA
Peak target current (note 4)	0.60	µA
Faceplate illumination	10000	lux
or	1000	f.c.

Typical operation

Scanned area	*20. 4 x 15. 2*	*mm^2*
Temperature of faceplate (note 5)	*25*	*°C*

Electrode g4 voltage	1400	V
Electrode g3 voltage	800 to 1000	V
Electrode g2 voltage	300	V
Electrode g1 voltage (note 6)	−45 to −125	V
Field strength at center of focusing coil	46	Gauss
Field strength at center of alignment coil	0 to 4	Gauss
Average "Gamma" for target illumination between 1 to 100 lux (0. 1 to 10 f.c.) (note 7)	0. 65	
Minimum blanking peak to peak voltage :		
applied to electrode g1	−75	V
applied to cathode (note 8)	+20	V
Limiting resolution at center of picture	1200	TV lines
Modulation transfer function		
- for 450 TV lines at the center of picture (5.76 MHz - 625 CCIR Standard) (note 9)	60	%
- for 750 TV lines (9.6 MHz - 625 CCIR Standard)	25	%

1 - HIGH SIGNAL OUTPUT CURRENT OPERATION
(for telecine operating)

Dark current i_o	0. 008	μA
Target voltage for i_o = 0.008 μA (note 10)	12 to 35	V
Faceplate illumination (2854° K)(note 11)	100	lux
	or 10	f.c.
Signal output current min.	0. 40	μA
Lag : (note 12)		
maximum	18	%
average	15	%

2 - AVERAGE SENSITIVITY OPERATION
(for live-scene pick-up TV)

Dark current i_o	0. 02	μA
Target voltage for i_o = 0.02 μA (note 10)	20 to 50	V
Faceplate illumination (2854° K) (note 11)	10	lux
	or 1	f.c.
Signal output current min.	0. 30	μA
Corresponding sensitivity	100	μA/lm
Lag : (note 12)		
maximum	20	%
average	17	%

3 - HIGH SENSITIVITY OPERATION

Dark current i_o	0. 10	μA
Target voltage for i_o = 0.10 μA (note 10)	30 to 65	V
Faceplate illumination (2854° K) (note 11)	1	lux
	or 0. 1	f.c.
Target illumination for 0.05 μA output current	0. 05 to 0. 1	lux
	or 0. 005 to 0. 01	f.c.
Signal output current min.	0. 20	μA
Corresponding sensitivity	700	μA/lm
Lag : (note 12)		
maximum	25	%
average	20	%

NOTES

1 - ALDEN PRODUCTS COMPANY
9140 North Main Street - BROCKTON 64 (Massachusett)

2 - CLEVELAND ELECTRONIC INC.
1974 East 61st Street - CLEVELAND (Ohio)

3 - It is necessary to assure correct positioning of the tube inside the coils. An immediate test consists in observing the fine mesh grid the wires of which should be inclined 45° with respect to scanning. Then again the front end of the deflecting yoke should be positionned 20 mm from the tube faceplate.

4 - Output current is defined as total current in load resistance connected to target electrode : signal current + dark current, dark current being the current left when illumination is subtracted.

Video amplifiers must be designed properly to handle peak output current of 0.60 μA to avoid amplifier overload and picture distortion.

5 - All these characteristics are provided for a temperature of faceplate of 25° C, the temperature range recommended is within 25 to 35° C. The rise of faceplate temperature is a function of ambient temperature, heat dissipation of ambient devices and of the tube itself. Consequently, 10° C of faceplate temperature rise implies a dark current multiplied by a factor of 2.

6 - Without blanking pulses applied on electrode g1.

7 - Average "Gamma" should be defined as the slope of the rectilinear part of transfert characteristics in log coordinates.

8 - Practically, limiting resolution corresponds to the resolution measured with twin bar test card with a modulation ratio of about 7 %.

9 - In the case of 625 lines CCIR standard, line duration being 52 μs, 450 TV lines correspond to a frequency of 5.76 MHz and 750 TV lines correspond to 9.6 MHz. In the case of 819 lines French standard,line duration being 40 μs, 450 TV lines correspond to 7.5 MHz and 750 TV lines to 12.5 MHz.

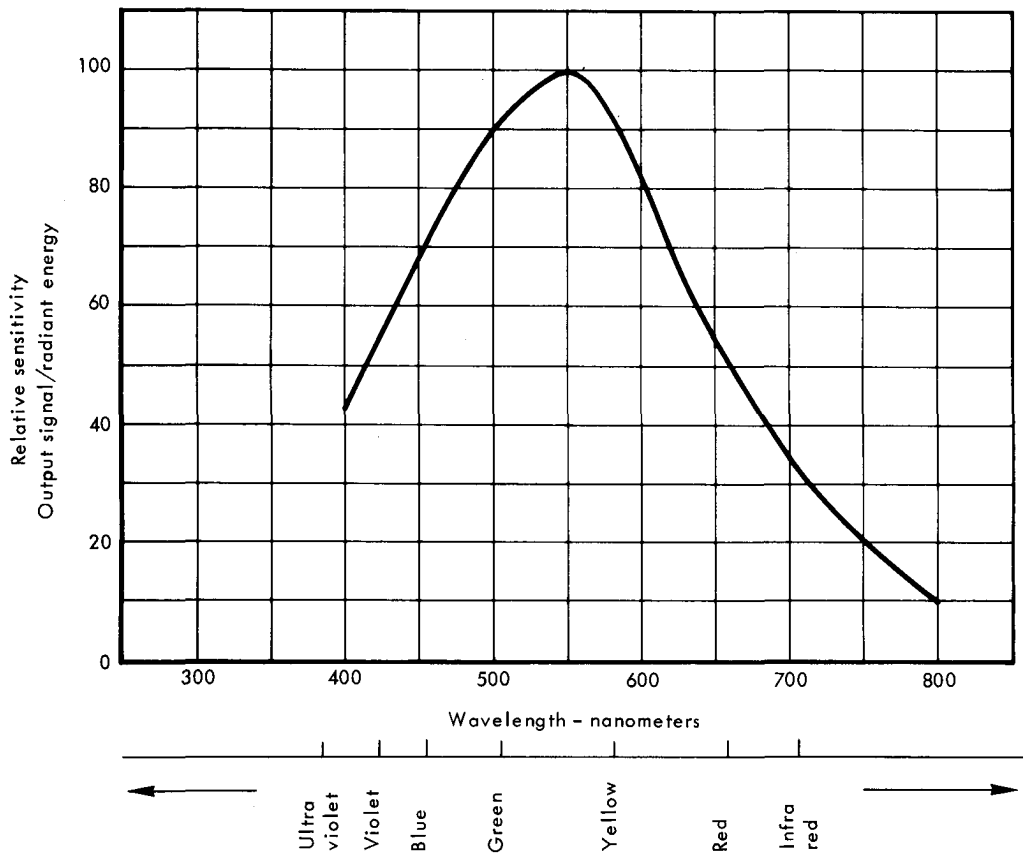
10 - Indicated range of each type of service serves only to illustrate the operating target voltage range normally encountered. The target voltage for each Vidicon must be adjusted to that value which gives the desired operating dark current.

11 - All the above mentioned illuminations assume a 2854° K incandescent tungsten source.

12 - Lag is defined as the ratio of residual output current measured 60 milliseconds after light excitation being subtracted to the initial output current ; this value assumes 50 fields/second scanning rate.

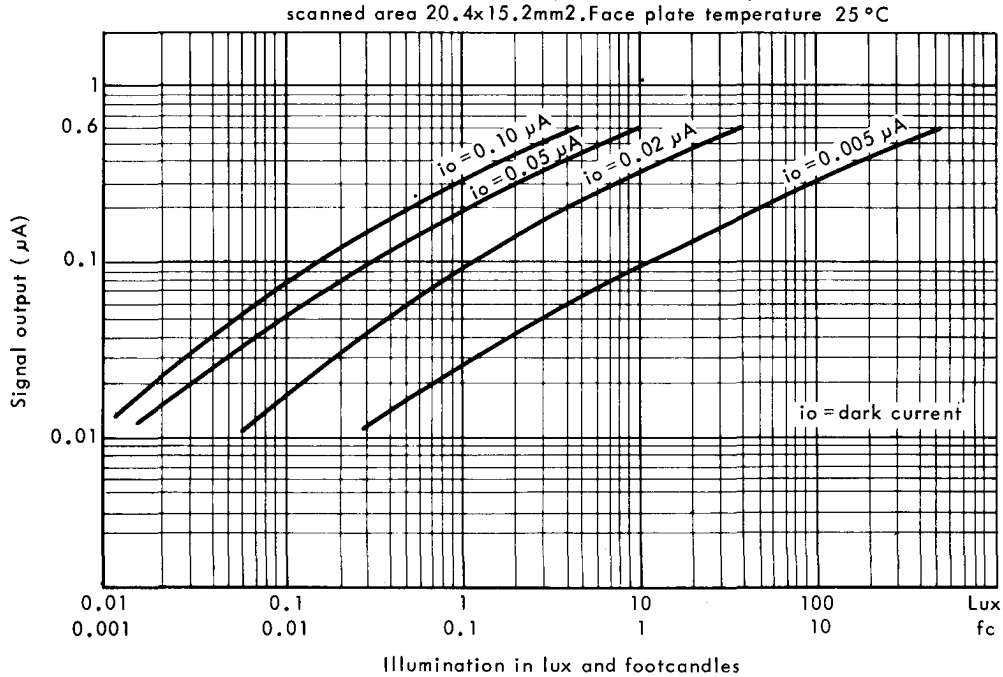
TYPICAL SPECTRAL SENSITIVITY CHARACTERISTICS

For equal values of signal output current at all wavelengths
(0.02 µA signal output and 0.02 µA dark current for scanned area of 20.4x 15.2 mm2)



SIGNAL OUTPUT

Illumination uniform over photoconductive layer
scanned area 20.4x15.2mm2.Face plate temperature 25 °C



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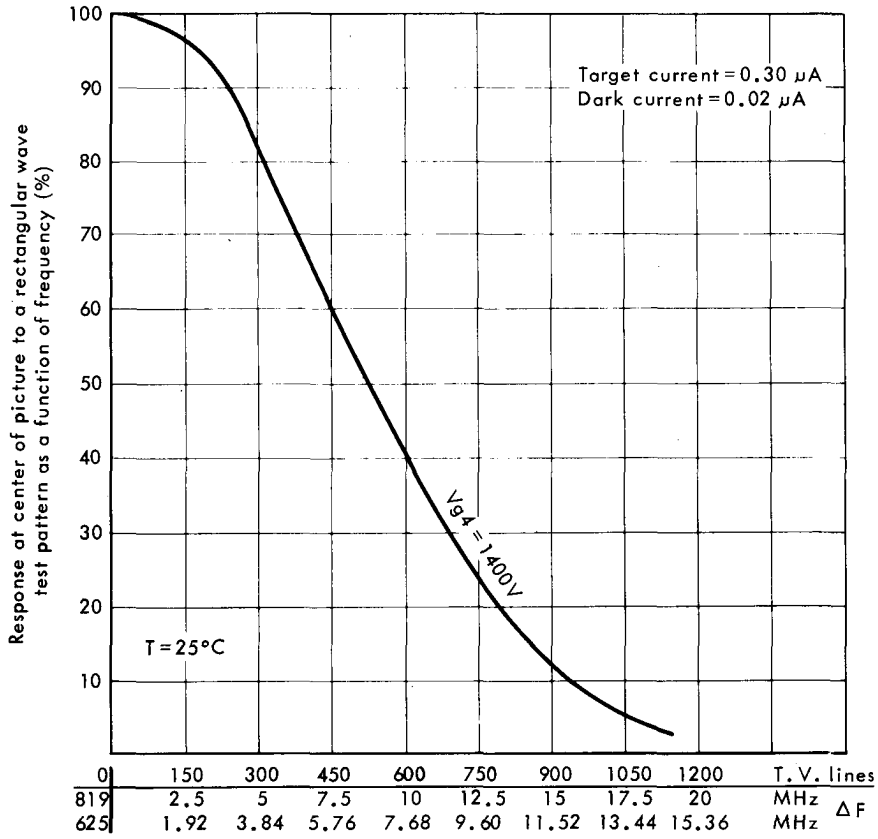
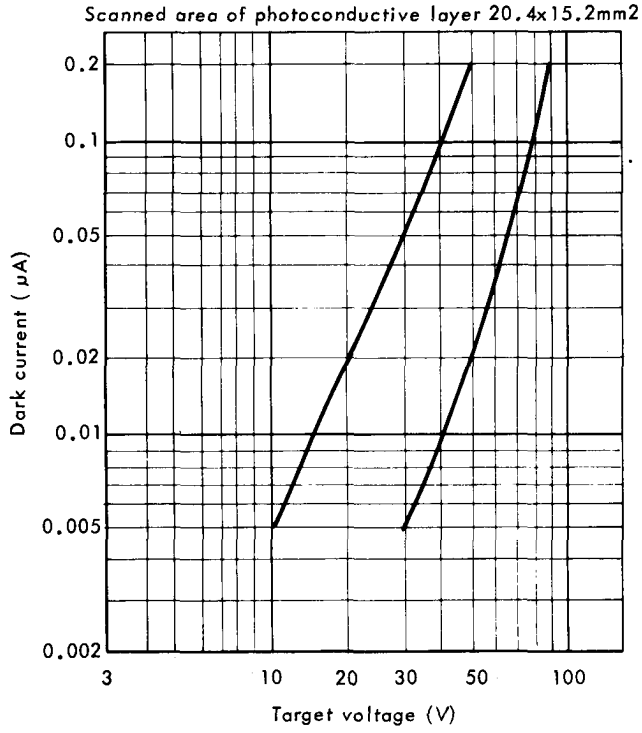
GROUPEMENT TUBES ELECTRONIQUES



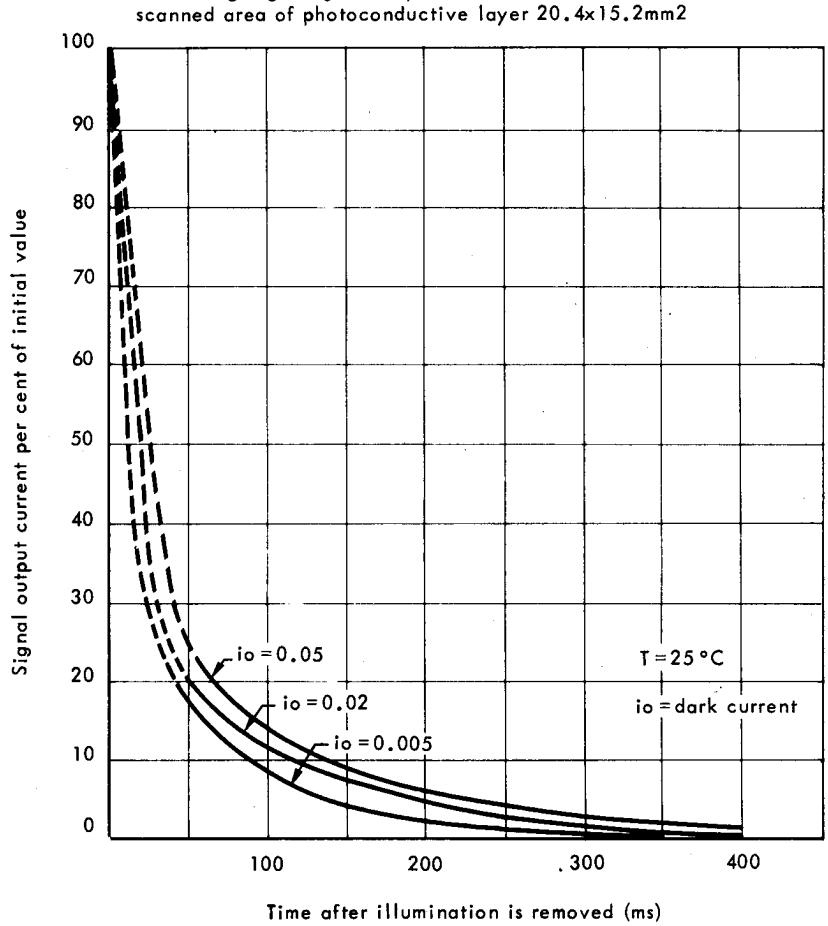
RANGE OF DARK CURRENT

Scanned area of photoconductive layer 20.4x15.2mm2



TYPICAL PERSISTENCE CHARACTERISTICS

Initial highlight signal output of 0.30 μA
scanned area of photoconductive layer 20.4x15.2mm2



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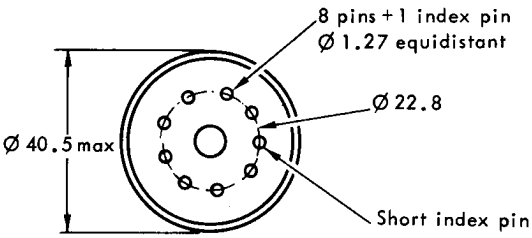
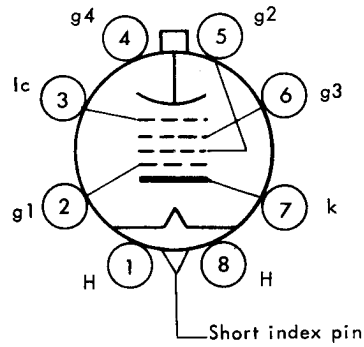
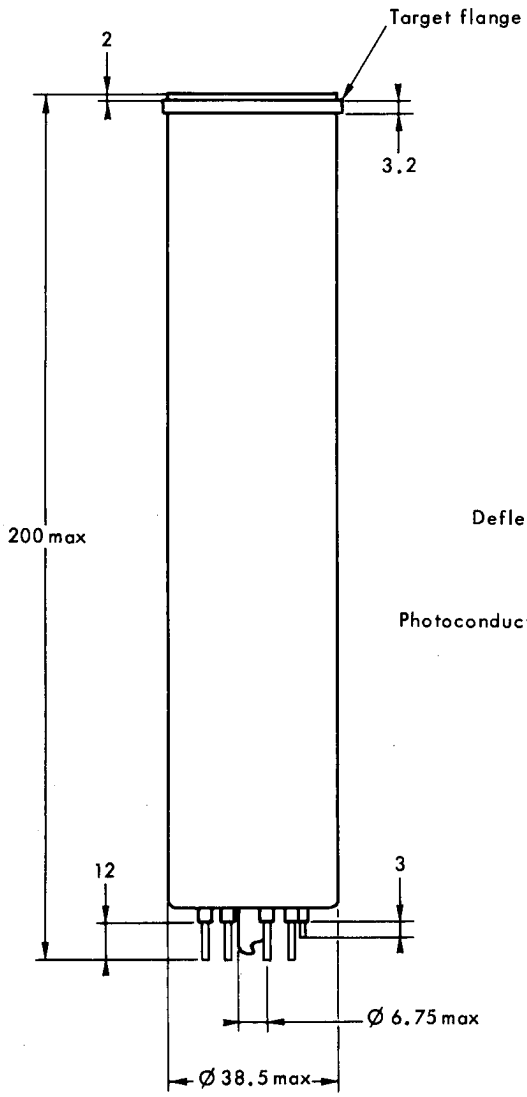
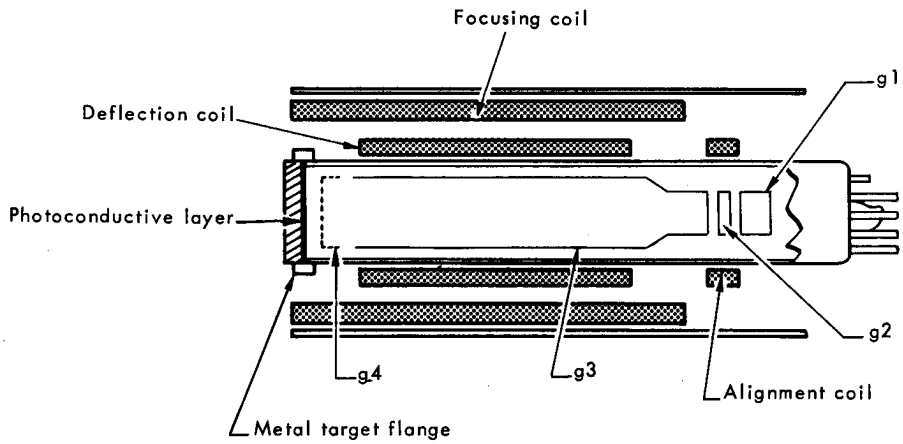
OUTLINE DRAWING







1 - Heater
2 - Electrode g1
3 - Internal connection
4 - Electrode g4
5 - Electrode g2
6 - Electrode g3
7 - Cathode
8 - Heater
Flange : Target



Dimensions in mm.