EMI ELECTRONICS LTD

Serving Science and Industry

VALVE DIVISION

EMI HIGH RESOLUTION VIDICON TYPE 9677

The EMI High Resolution Vidicon type 9677 has been designed for use in studio broadcast television cameras and in high quality industrial television cameras. The 9677 has the latest separate mesh electrode structure and a very uniform target layer. This has resulted in a vidicon with excellent signal uniformity over a wide range of target voltages and an exceptionally high resolution capability.

An important feature of the 9677 vidicon is its ability to operate at high beam currents and low target voltages without loss of picture quality.

The low heater wattage (0.6W) of the 9677 makes it very suitable for use in transistorised cameras and in cameras where heat dissipation must be kept to a minimum.

D A T A

GENERAL

Scanned Area	12.8mm x 9.6mm ($\frac{1}{2}$" x $\frac{3}{8}$")
Length	158.75 mm ± 3.30 mm (6.25" ± 0.130")
Max. Diameter	28.58 mm ± 0.20 mm (1.125" ± 0.008")
Bulb Diameter	25.91 mm ± 0.64 mm (1.020" ± 0.030")
Focusing Method	Magnetic
Deflection Method	Magnetic
Alignment Method	Magnetic
Orientation of Image	The horizontal scan should be parallel to a plane passing through the tube axis and the short index pin
Signal Electrode Capacitance to all other electrodes	4.5 pF
Spectral Response	See fig.2
Operating Position	Any (see note 1)
Socket	Small-Button Ditetrar 8 pin.

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CATHODE

The heater supply should be designed to give a nominal 6.3 V and should be kept within the limits 5.7 V to 6.9 V. Under no circumstances should the heater voltage be allowed to exceed 9.5 V, if this figure is likely to be exceeded on switching on a surge limiting device must be incorporated.

MAXIMUM RATINGS

(All potentials are relative to the cathode)

Modulator G1 negative bias	- 150 V
positive bias	0 V
Limiter G2	750 V
Wall anode G3	750 V
Mesh G 4	1,000 V
Signal Electrode Voltage	100 V
Dark Current	0.6μA
Target Illumination	10,000 lux
Target Temperature	70°C

These maximum ratings are limiting values above which the life of the tube may be impaired.

TYPICAL OPERATING CONDITIONS

Modulator G1	- 35 to - 75 V
Cut off Voltage	- 60 to -100 V
Limiter G 2	300 V
Wall Anode G 3	280 to 300 V
Mesh G 4	420 to 450 V
Minimum blackout pulses when applied to G 1	- 75 V
Minimum blackout pulses when applied to cathode	+ 10 V
Axial Magnetic Field	40 gauss
Adjustable transverse alignment field	± 4 gauss

The Company reserves the right to modify the designs and specifications without notice

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EMI Electronics Ltd Valve Division

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STUDIO OPERATION

Target Illumination (Highlights)	6 ft. C.
Signal Electrode Voltage	25 - 40 V
Dark Current	< 0.01μA
Signal Current	0.25μA to 0.3uA

INDUSTRIAL OPERATION

Target Illumination (Highlights)	2 ft. C.
Signal Electrode Voltage	30 - 60 V
Dark Current	0.01μA
Signal Current	0.2μA peak

FILM PICK-UP OPERATION

Average highlight for one frame	50 - 100 ft. C.
Signal Electrode Voltage	10 - 20 V
Dark Current	< 0.005μA
Signal Current	0.25 - 0.30μA

LEAKAGE SPECIFICATION

Between Pin No.	and Pin No.	Test Potential	Leakage Current
2,3,5,6,7,	1 and 8 (negative)	100 V	100μA Max.
1,3,5,6,7,8,	2 (negative)	150 V	15μA Max.
1,2,3,6,7,8,	5 (positive)	500 V	50μA Max.
1,2,3,5,7,8,	6 (positive)	500 V	5μA Max.
1,2,5,6,7,8, and signal plate	3 (positive)	500 V	5μA Max.

OPERATING NOTES

1. Resolution

For optimum resolution and beam landing at a given wall anode voltage the mesh should be kept at approximately 1.5 times the wall anode voltage. Under these conditions the percentage modulation at 5Mc/s on a 625 line system is double that of a normal vidicon and the scanning current has only to be increased by approximately 20%. From fig.3 it can be seen than an appreciable increase in depth of modulation can be obtained when the mesh is only a few volts positive to the wall anode and under these conditions negligible increase in scanning current is required.

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The resolution can be further increased by increasing the wall anode voltage and the corresponding mesh voltage, but this will require additional focus current and scan power (see fig.4). To operate the 9677 in a standard camera the mesh should be connected to the limiter by joining pin 3 (mesh) to pin 5 (limiter) provided the limiter is positive with respect to the wall anode.

On no account should the mesh be operated at a lower voltage than the wall anode since, under these conditions, an ion spot may be observed.

The increased vertical resolution obtained with a 9677 vidicon will give an obvious increase in picture sharpness compared with a standard tube since the relatively poor vertical resolution of a standard tube cannot be corrected by aperture correction.

The increased horizontal resolution of the 9677 compared with the standard tube (see fig.4) enables aperture correction in the head amplifier to be reduced, with corresponding increase in signal to noise ratio. If the 9677 is being fitted into a standard camera and the aperture correction is not reduced, high frequency "ringing" may occur.

2. Beam

The setting of the beam current in the 9677 is less critical than with a standard vidicon provided the mesh is positive with respect to the wall anode. The 9677 can be over-beamed without loss of resolution, thus the beam can be preset to discharge the peak highlights, no further adjustment being required.

Beam landing is considerably improved as the mesh voltage is increased to the optimum of 1.5 times the wall anode voltage. Under these conditions the "porthole effect" which occurs at low target voltages is eliminated.

Rotation of the picture when the wall anode is varied about electrical focus is considerably reduced when the mesh is at least 20 volts or more positive with respect to the wall anode.

3. Sensitivity

The uniform target layer of the 9677 ensures that when the target voltage is increased the dark current and sensitivity increase uniformly over the target area.

The dark current should not, however, be allowed to exceed 0.6uA or a burnt-in picture may result.

4. Scanned Area

The tube should be operated with the target area 12.8 mm x 9.6 mm ($\frac{1}{2}$" x $\frac{3}{8}$") completely scanned to obtain the best signal to noise ratio and resolution. Small changes in sensitivity and dark current occur in the scanned area over a long period of time so that it is important to use the same scanned area throughout the life of the tube.

5. Operating Position

When the 9677 is operated vertically with its face downwards care should be taken to avoid undue mechanical shock whilst the tube is in this position.

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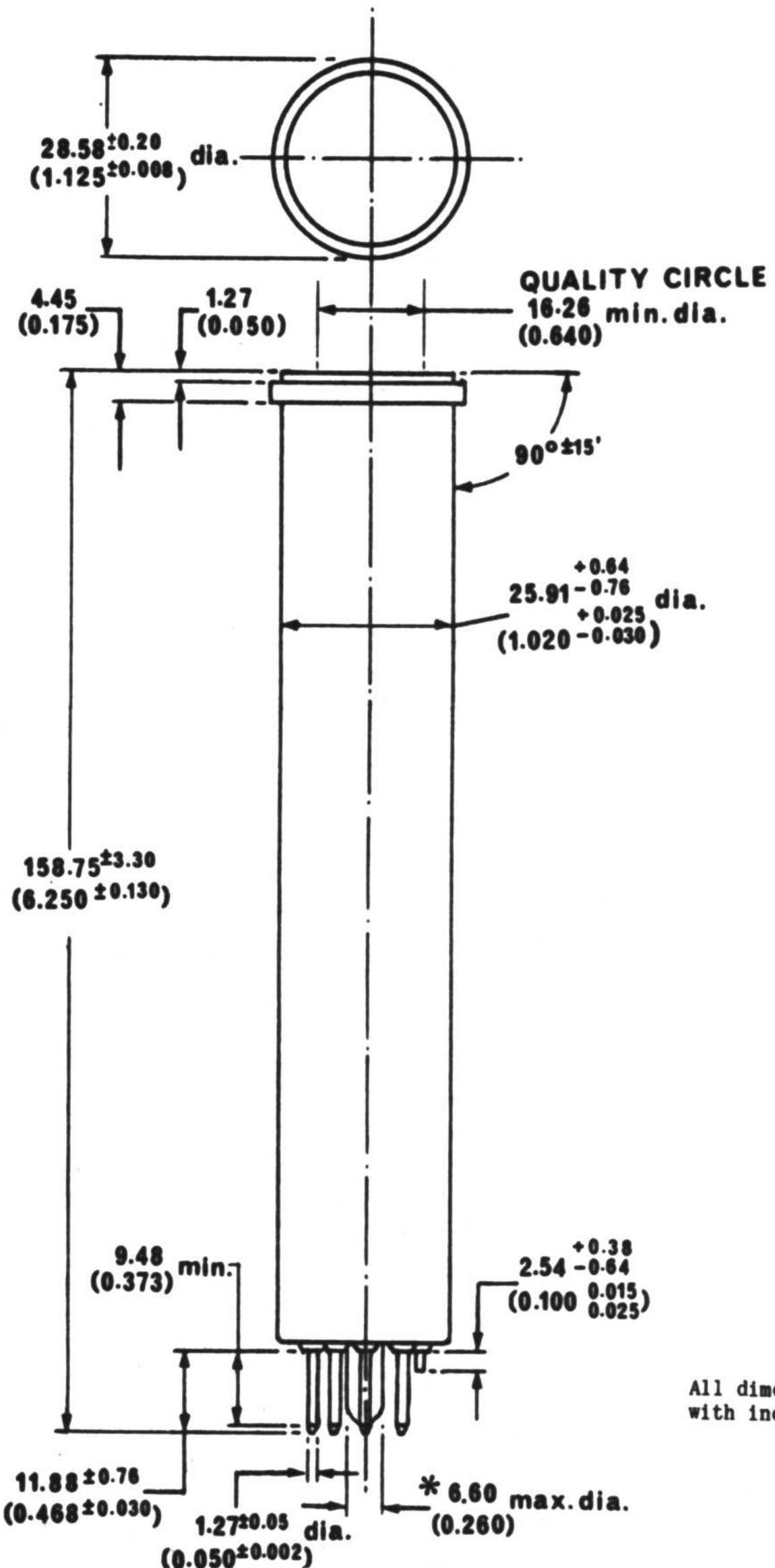
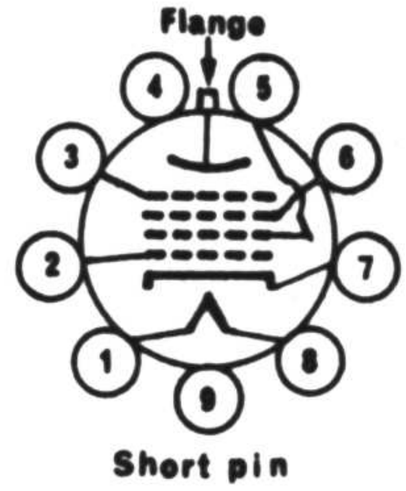
EMI VIDICON CAMERA TUBE TYPE R9677





BASE 8HL
SMALL BUTTON DITETRAR

Pin No.	Connections
1	Heater
2	Modulator G_1
3	Mesh G_4
4	Do not use
5	Limiter G_2
6	Wall anode G_5
7	Cathode
8	Heater
Flange	Signal electrode
Short pin	Do not use

All dimensions are in millimetres
with inches shown in parentheses.

*) Seal-off must not extend beyond pins

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FIGURE 1

EMI VIDICON CAMERA TUBE TYPE 9677

RELATIVE SPECTRAL RESPONSE

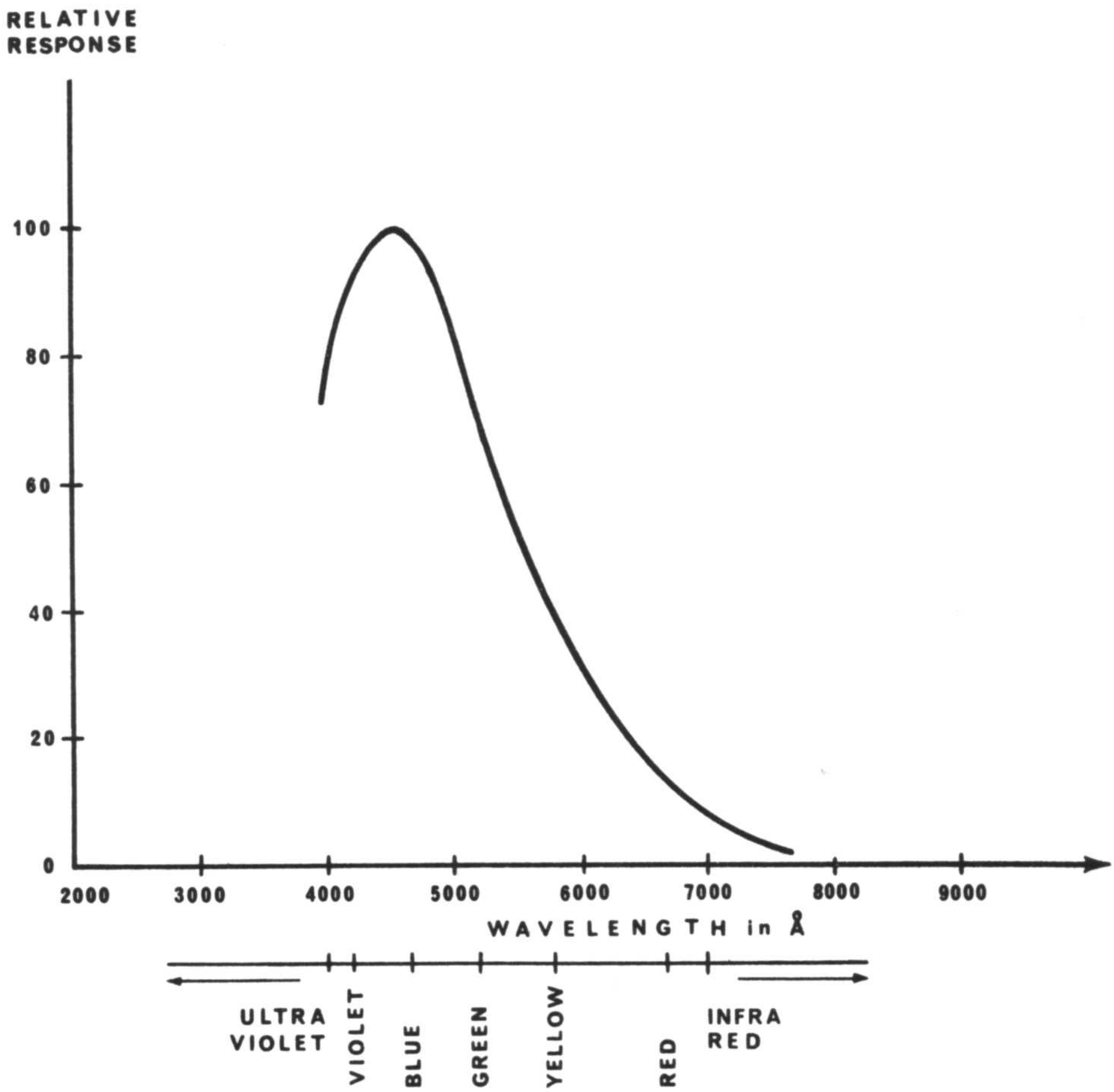

FIGURE **2**

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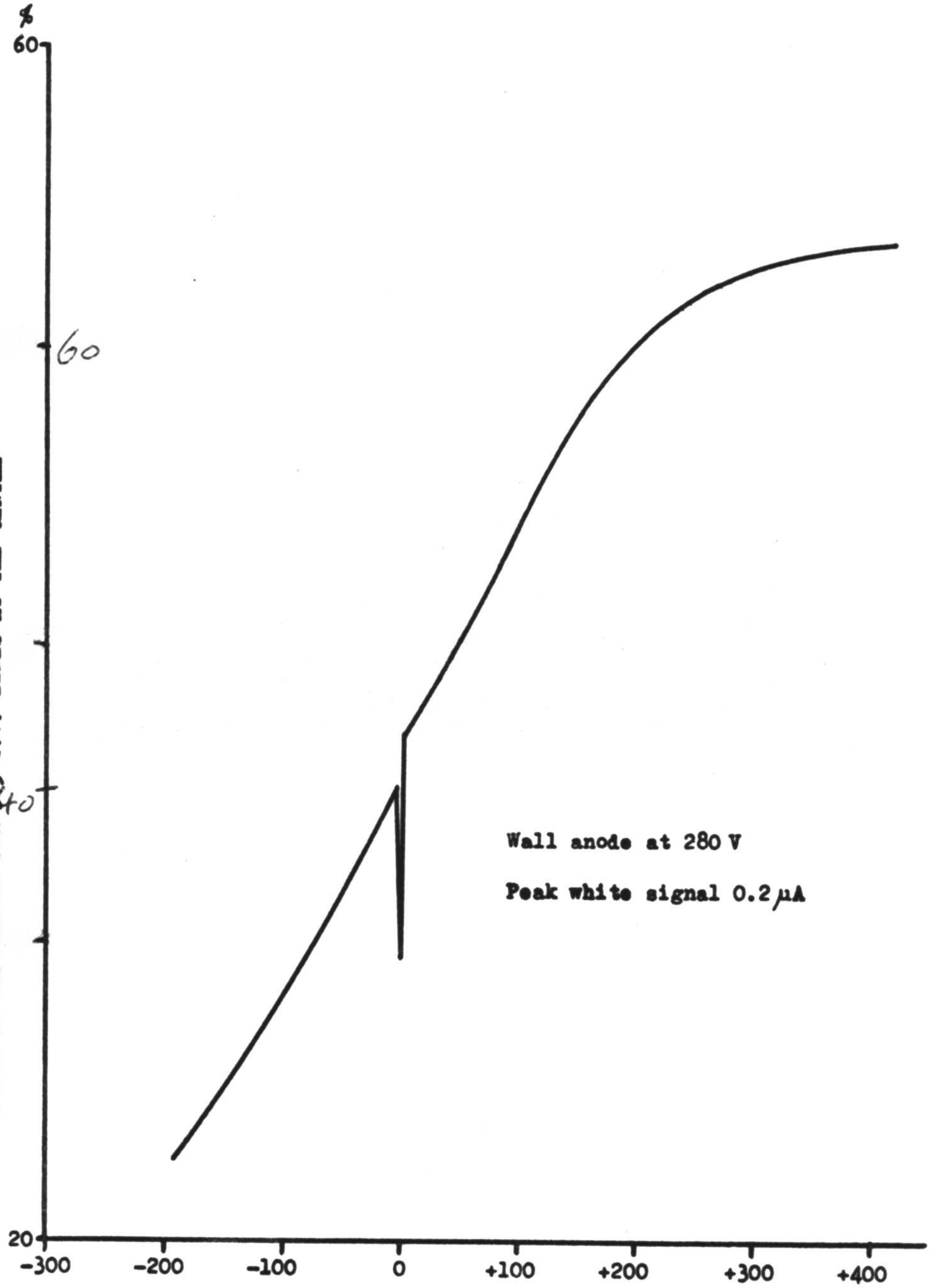
%
60
60
40
20
DEPTH OF MODULATION FOR 375 T.V. LINES AT THE CENTRE
Wall anode at 280 V
Peak white signal 0.2 μA
-300
-200
-100
0
+100
+200
+300
+400
MESH POTENTIAL RELATIVE TO WALL ANODE IN VOLTS

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FIG. 3

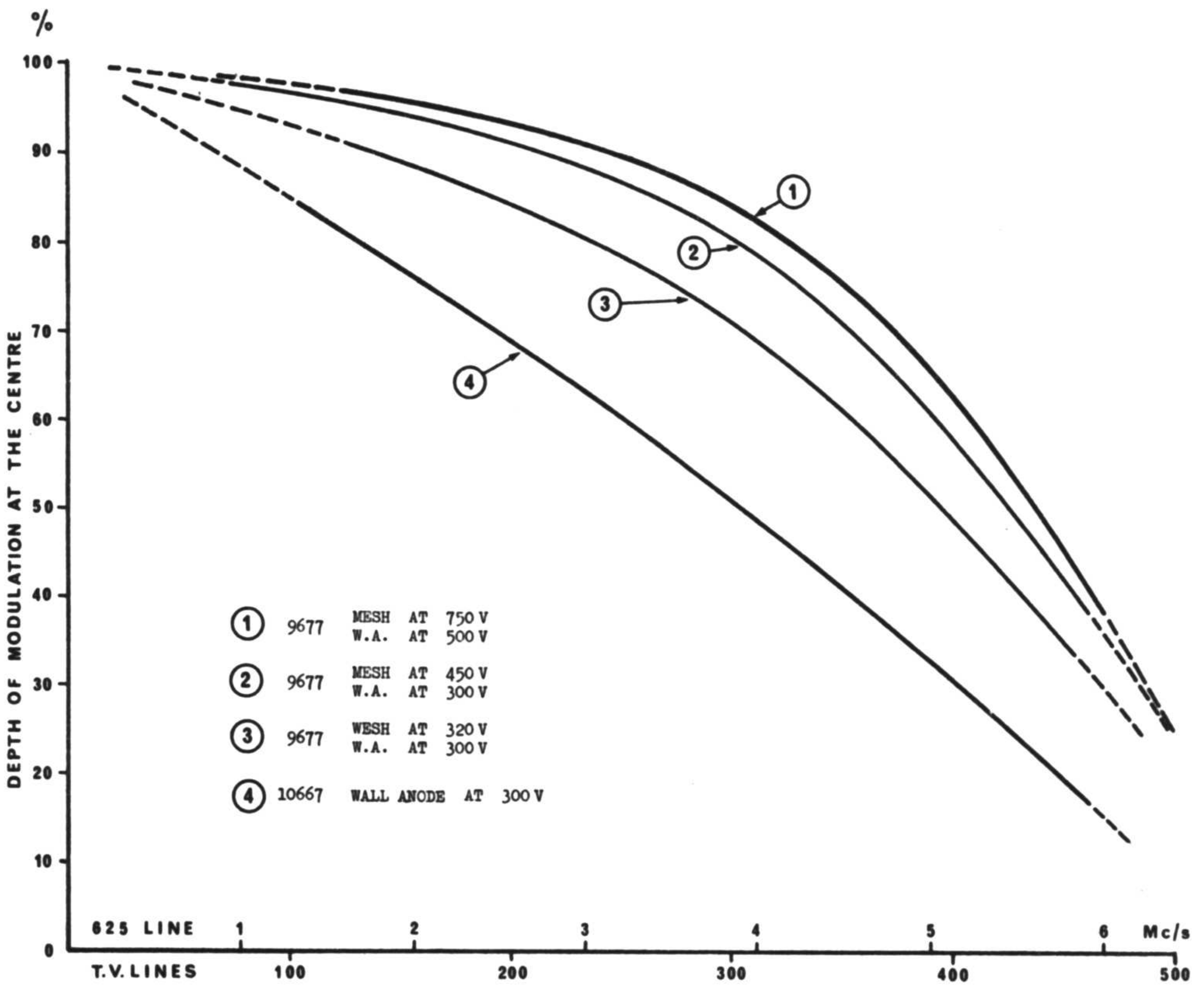

FIG. 4.