

OSCILLOSCOPE TUBE with flat face, post deflection acceleration by means of a helical electrode, side-contacts, metal-backed screen and high sensitivity for high frequency and high writing-speed applications

SCREEN

Type	Fluorescence	Phophorescence	Persistence
DB13-78	Blue	Blue	Medium short
DH13-78	Green	Green	Medium short
DN13-78	Yellowish green	Yellowish green	Medium short

Useful screen diameter 108 mm

Useful scan at $V_{g7}/V_{g2}, g_4 = 6$

in the x direction 100 mm

in the y direction 40 mm

The useful scan may vertically be shifted max. 3 mm with respect to the geometric centre of the face plate ←

For further screen properties please refer to front of this section

HEATING

Indirect by A.C. or D.C.; parallel supply

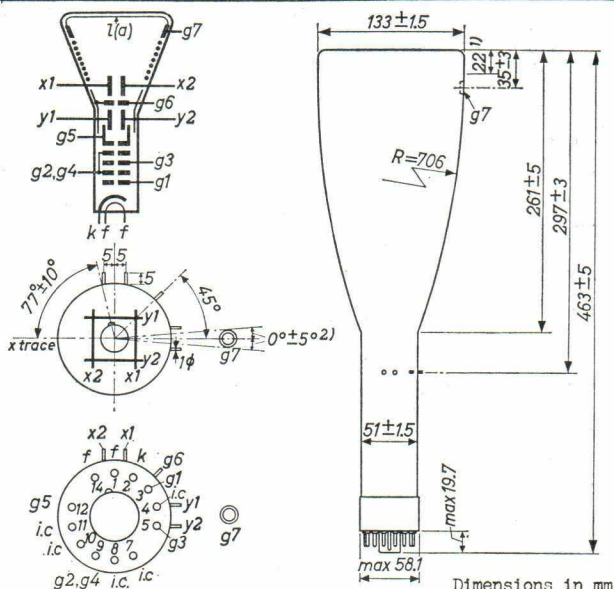
Heater voltage $V_f = 6.3 \text{ V}$
Heater current $I_f = 0.3 \text{ A}$

CAPACITANCES

Grid No.1 to all other electrodes	C_{g1}	= 6.0 pF	←
Cathode to all other electrodes	C_k	= 3.5 pF	
x ₁ plate to all other electrodes except x ₂ plate	C_{x1}	= 3.0 pF	
x ₂ plate to all other electrodes except x ₁ plate	C_{x2}	= 3.0 pF	
y ₁ plate to all other electrodes except y ₂ plate	C_{y1}	= 2.8 pF	
y ₂ plate to all other electrodes except y ₁ plate	C_{y2}	= 2.8 pF	
x ₁ plate to x ₂ plate	C_{x1-x2}	= 2.0 pF	
y ₁ plate to y ₂ plate	C_{y1-y2}	= 1.5 pF	

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Dimensions in mm

$g5$ = deflection plate shield

Base: DIHEPTAL 12 p

$g6$ = isolation shield

The post-accelerator helix is connected between $g7$ and $g6$

The resistance of the helix is min. 200 MΩ

MOUNTING POSITION: any

The tube should not be supported by the base alone

ACCESSORIES

Socket	5914/20
Connector for side contacts	55561
Mu-metal shield	55551
Post-accelerator contact connector	55563

NET WEIGHT 910 g **Shipping weight** 2300 g

1) Straight part of the bulb

2) Location of the recessed cavity button contact with respect to the x-trace

<u>FOCUSING</u>	electrostatic
<u>DEFLECTION</u>	double electrostatic
x plates	symmetrical
y plates	symmetrical
Angle between x and y traces $90^{\circ} \pm 1^{\circ}$	

LINE WIDTH, measured on a circle of 30 mm diameter

Post accelerator voltage	V_{g7}	=	10 kV
Grids No.2 and 4 voltage	$V_{g2,g4}$	=	1670 V
Beam current	I_b	=	0.5 μ A
Line width	l.w.	=	0.4 mm

OPERATING CHARACTERISTICS

Post accelerator voltage	V_{g7}	=	10 kV
Isolation shield voltage	V_{g6}	=	1670 ± 170 V ¹⁾
Deflection plate shield voltage	V_{g5}	=	1670 ± 85 V ¹⁾
Accelerator voltage	$V_{g2,g4}$	=	1670 ± 85 V ¹⁾
Focusing electrode voltage	V_{g3}	=	180 to 590 V
Grid No.1 voltage	V_{g1}	=	-50 to -80 V ²⁾
Deflection factor			
horizontal	M_x	=	27 to 33 V/cm
vertical	M_y	=	5.6 to 7.6 V/cm
Deviation of linearity of deflection		= max.	2 % ¹⁾³⁾
Pattern distortion		= max.	1.5 % ¹⁾⁴⁾
Undelected spot position	R	=	5 mm ⁵⁾

¹⁾²⁾³⁾⁴⁾⁵⁾ See page 4

- 1) In general the voltages on g_6 , g_5 , g_4 and the average potential of the deflection plates should be equal
Variation of the isolation shield voltage V_{g_6} (max. $\pm 10\%$ of V_{g_2, g_4}) serves to correct pincushion and barrel pattern distortion
Adjustment of the deflection plate shield voltage V_{g_5} (max. $\pm 5\%$ of V_{g_2, g_4}) provides improved linearity of vertical deflection
A small potential difference (max. $\pm 5\%$ of V_{g_2, g_4} , obtained by varying V_{g_2, g_4}) between the y plates and g_4 may be desirable for obtaining optimum sharpness.
- 2) For visual extinction of the focused spot
- 3) The sensitivity for a deflection of less than 75 % of the useful scan will not differ more than 2% from the sensitivity for a deflection of 25% of the useful scan
- 4) With a raster pattern the size of which is such that the widest points of the pattern just touch the sides of a rectangle of 100x40 mm, no points of the pattern sides will be within a concentric rectangle of 98x38.8 mm
- 5) With the tube shielded the spot will be within a circle of 5 mm radius, the circle being centered with respect to the tube face.
- 6) If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of the scan; a low impedance deflection plate drive is therefore desirable.
- 7) Values to be taken into account for the calculation of the V_{g_3} -potentiometer

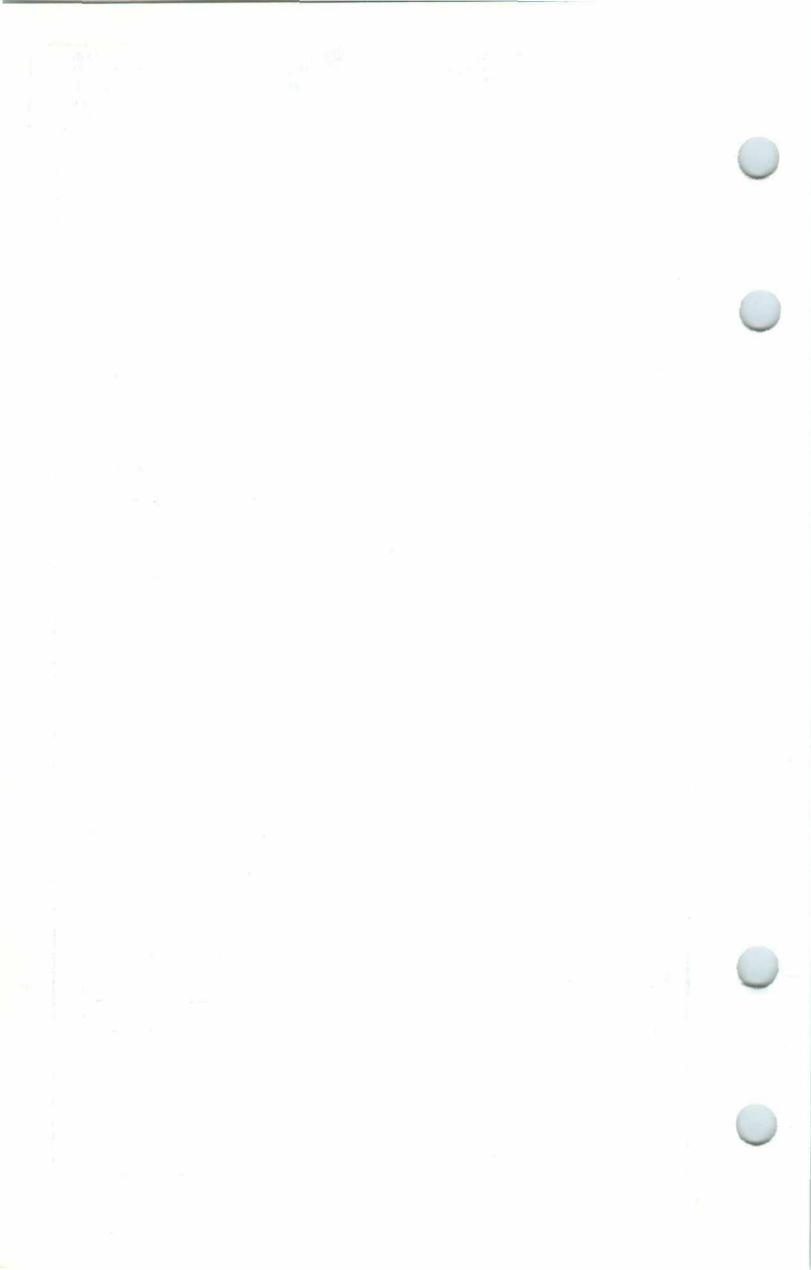
LIMITING VALUES (Design centre limits)

Post accelerator voltage	V_{g7}	= max. 12 kV = min. 6 kV
Isolation shield voltage	V_{g6}	= max. 2200 V
Deflection plate shield voltage	V_{g5}	= max. 2100 V
Accelerator voltage	$V_{g2, g4}$	= max. 2100 V = min. 1000 V
Focusing electrode voltage	V_{g3}	= max. 1500 V
Grid No.1 voltage negative	$-V_{g1}$	= max. 200 V
positive	$+V_{g1}$	= max. 0 V
peak positive	$+V_{g1 p}$	= max. 2 V
Ratio $V_{g7}/V_{g2, g4}$	$V_{g7}/V_{g2, g4}$	= max. 6
Peak voltage between accelerators and any deflection plate	$V_{g2, g4-x p}$	= max. 500 V
	$V_{g2, g4-y p}$	= max. 500 V
Voltage between cathode and heater		
cathode positive	$V_{kf(k pos)}$	= max. 200 V
cathode negative	$V_{kf(k neg)}$	= max. 125 V
Accelerator dissipation	$W_{g2, g4}$	= max. 6 W
Screen dissipation	W_{ϕ}	= max. 3 mW/cm ²

CIRCUIT DESIGN VALUES

Focusing voltage	$V_{g3} = 110$ to 355 V	per kV of $V_{g2, g4}$
Grid No.1 voltage 2)	$-V_{g1} = 30$ to 48 V	per kV of $V_{g2, g4}$
Deflection factors at $V_{g7}/V_{g2, g4} = 6$		
horizontal	$M_x = 16$ to 20 V/cm	per kV of $V_{g2, g4}$
vertical	$M_y = 3.4$ to 4.6 V/cm	per kV of $V_{g2, g4}$
Grid No.1 circuit resistance	$R_{g1} = \text{max.}$	1.5 M Ω
Deflection plate resistance	$R_x = R_y = \text{max.}$	1 M Ω 6)
Grid No.3 current	$I_{g3} = -15$ to +10 μA	7)

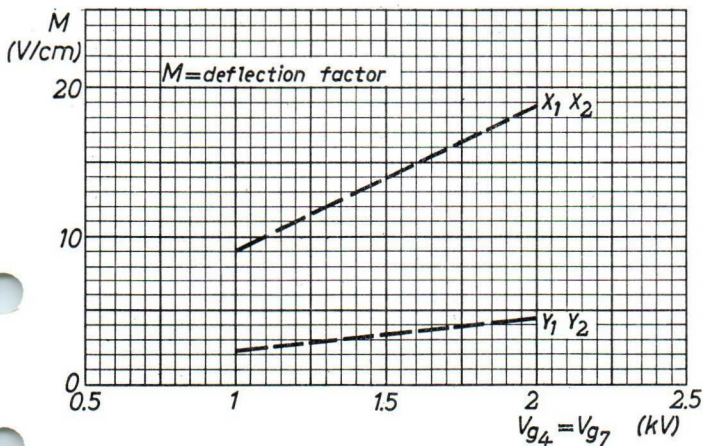
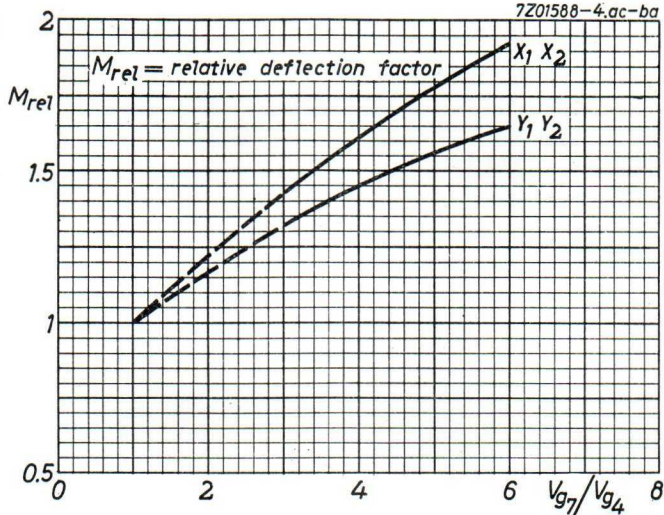
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