

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	Phosphorescence	Persistence
D13-19BE	Blue	Blue	Medium short
D13-19GH	Green	Green	Medium short
D13-19GP	Green to bluish green	Green	Medium short

Useful screen diameter min. 108 mm

Useful scan at $V_{g7}/V_{g4} = 6$

in the x direction 100 mm

in the y direction 60 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

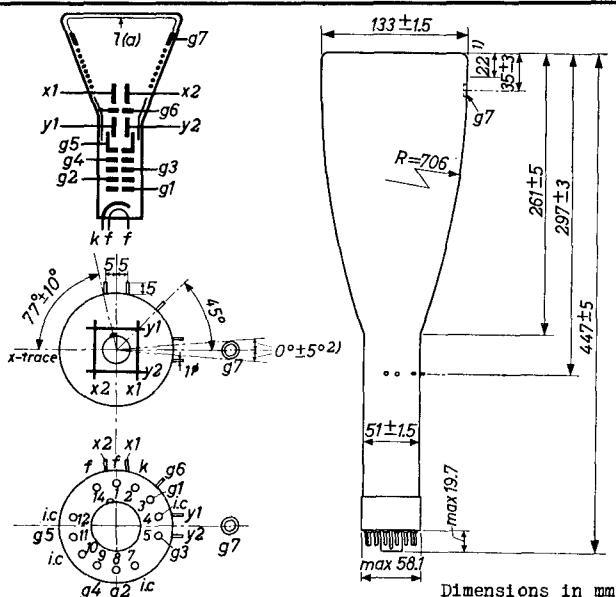
Indirect by A.C. or D.C.; parallel supply

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}	= 5.5 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}	= 3.0 pF
y_2 plate to all other electrodes except y_1 plate	C_{y2}	= 3.0 pF
x_1 plate to x_2 plate	C_{x1-x2}	= 1.9 pF
y_1 plate to y_2 plate	C_{y1-y2}	= 1.0 pF



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 200 to 1000 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

FOCUSING electrostatic

DEFLECTION double electrostatic

x plates symmetrical

y plates symmetrical

Angle between x and y traces $90^\circ \pm 1^\circ$

LINE WIDTH

Post accelerator voltage $V_{g7} = 10 \text{ kV}$

Grid No.4 voltage $V_{g4} = 1670 \text{ V}$

Grid No.2 voltage $V_{g2} = 1670 \text{ V}$

Beam current $I_f = 10 \text{ } \mu\text{A}$

Line width $l.w. = 0.4 \text{ mm}$

OPERATING CHARACTERISTICS

Post accelerator voltage $V_{g7} = 10 \text{ kV}$

Isolation shield voltage $V_{g6} = 1670 \pm 167 \text{ V } ^1)$

Deflection plate shield voltage $V_{g5} = 1670 \text{ V } ^1)$

Second accelerator voltage $V_{g4} = 1670 \pm 83 \text{ V } ^1)$

Focusing electrode voltage $V_{g3} = 320 \text{ to } 500 \text{ V}$

First accelerator voltage $V_{g2} = 1670 \text{ V}$

Grid No.1 voltage $V_{g1} = -53 \text{ to } -82 \text{ V } ^2)$

Deflection factor

horizontal $M_x = 27 \text{ to } 33 \text{ V/cm}$

vertical $M_y = 9.5 \text{ to } 12.4 \text{ V/cm}$

Deviation of linearity of deflection $= \text{max. } 2 \% ^1)^3)$

Pattern distortion see notes $^1)^4)$

$^1)^2)^3)^4)$ 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_4}) serves to correct pincushion and barrel pattern distortion

A small potential difference (max. $\pm 5\%$ of V_{g_4} , obtained by varying V_{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 (of both x and y plate pairs separately) 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) When, after alignment of the x trace with the horizontal centre line of the graticule, a horizontal or vertical trace is adjusted so that its geometric centre just touches one side of a rectangle of 100 mm x 60 mm which is concentric with the screen, no point of the centre of this trace will be within a concentric rectangle of 98 mm x 58.2 mm
- 5) 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
- 6) Values to be taken into account for the calculation of the V_{g_3} potentiometer

LIMITING VALUES (Absolute 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. 2200 V
Second accelerator voltage	V_{g4}	= max. 2200 V = min. 1000 V
Focusing electrode voltage	V_{g3}	= max. 1500 V
First accelerator voltage	V_{g2}	= max. 2200 V = min. 1000 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_{g4}	V_{g7}/V_{g4}	= max. 6
Peak voltage between second accelerator and any deflection plate	$V_{g4-x\ p}$ $V_{g4-y\ p}$	= max. 500 V = 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
First accelerator dissipation	W_{g2}	= max. 6 W
Screen dissipation	W_{ℓ}	= max. 3 mW/cm ²

CIRCUIT DESIGN VALUES

Focusing voltage	$V_{g3} =$	190 to 300 V	per kV of V_{g4}
Grid No.1 voltage ²⁾	$-V_{g1} =$	32 to 49 V	per kV of V_{g2}
Deflection factors at $V_{g7}/V_{g4} = 6$			
horizontal	$M_x =$	16 to 20 V/cm	per kV of V_{g4}
vertical	$M_y =$	5.7 to 7.4 V/cm	per kV of V_{g4}
Grid No.1 circuit resistance		$R_{g1} =$ max.	1.5 MΩ
Deflection plate resistance			See note ⁵⁾
Grid No.3 current		$I_{g3} =$	-15 to +10 μA ⁶⁾
Ratio V_{g7}/V_{g4}		$V_{g7}/V_{g4} =$	6

²⁾⁵⁾⁶⁾ See page 4



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