

INSTRUMENT CATHODE-RAY TUBE

13 cm diameter flat faced monoaccelerator oscilloscope tube primarily intended for use in inexpensive oscilloscopes and read-out devices.

QUICK REFERENCE DATA

Accelerator voltage	$V_{g2, g4, g5(l)}$	2000 V
Display area		100 x 80 mm ²
Deflection coefficient, horizontal	M_x	31.3 V/cm
vertical	M_y	14.4 V/cm

SCREEN

	colour	persistence
D13-480GH	green	medium short
D13-480GM	yellowish green	long

Useful screen diameter min. 114 mm

Useful scan

horizontal min. 100 mm

vertical min. 80 mm

The useful scan may be shifted vertically to a max. of 6 mm with respect to the geometric centre of the faceplate.

HEATING: Indirect by AC or DC; parallel supply

Heater voltage V_f 6.3 V

Heater current I_f 300 mA

MECHANICAL DATA

Dimensions in mm

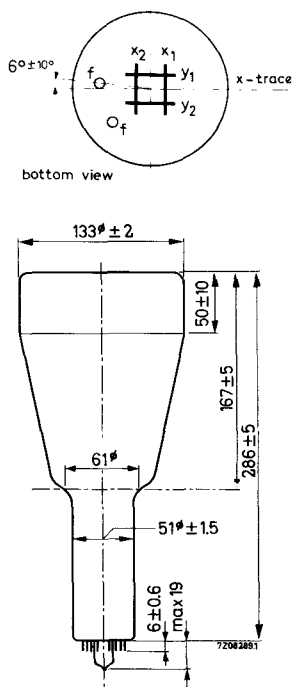


Fig. 1 Outlines.

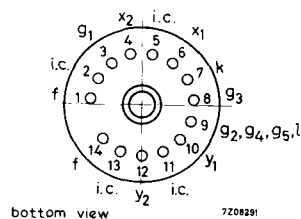


Fig. 2 Pin arrangement.

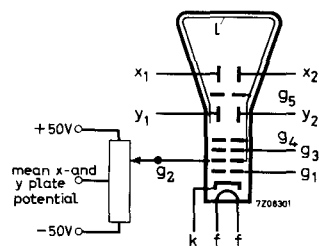


Fig. 3 Electrode configuration.

Mounting position: any

The tube should not be supported by the base alone and under no circumstances should the socket be allowed to support the tube.

Dimensions and connections

See also outline drawing

Overall length max. 310 mm

Face diameter max. 135 mm

Base 14 pin all glass

Net weight approx. 650 g

Accessories

Socket (supplied with tube) type 55566

Mu-metal shield type 55580

CAPACITANCES

x_1 to all other elements except x_2	$C_{x1(x2)}$	4	pF
x_2 to all other elements except x_1	$C_{x2(x1)}$	4	pF
y_1 to all other elements except y_2	$C_{y1(y2)}$	3.5	pF
y_2 to all other elements except y_1	$C_{y2(y1)}$	3	pF
x_1 to x_2	C_{x1x2}	1.6	pF
y_1 to y_2	C_{y1y2}	1.1	pF
Control grid to all other elements	C_{g1}	5.5	pF
Cathode to all other elements	C_k	4	pF

FOCUSING electrostatic**DEFLECTION** double electrostatic

x plates symmetrical

y plates symmetrical

If use is made of the full deflection capabilities of the tube the deflection plates will intercept part of the electron beam, hence a low impedance deflection plate drive is desirable.

Angle between x and y traces

 $90 \pm 1^\circ$ **LINE WIDTH**

Measured with the shrinking raster method in the centre of the screen under typical operating conditions, adjusted for optimum spot size at a beam current $I_l = 10 \mu A$. (1)

Line width	l. w.	0.30	mm
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As the construction of this tube does not permit a direct measurement of the beam current, this current should be determined as follows:

a) under typical operating conditions, apply a small raster display (no overscan), adjust V_{g1} for a beam current of approx. $10 \mu A$ and adjust V_{g3} and $V_{g2, g4, g5, l}$ for optimum spot quality at the centre of the screen.

b) under these conditions, but no raster, the deflection plate voltages should be changed to

$V_{y1} = V_{y2} = 2000 \text{ V}$; $V_{x1} = 1300 \text{ V}$; $V_{x2} = 1700 \text{ V}$, thus directing the total beam current to x_2 .

Measure the current on x_2 and adjust V_{g1} for $I_{x2} = 10 \mu A$ (being the beam current I_l)

c) set again for the conditions under a), without touching the V_{g1} control. Now a raster display with a true $10 \mu A$ screen current is achieved.

d) focus optimally in the centre of the screen (do not adjust the astigmatism control) and measure the line width.

TYPICAL OPERATING CONDITIONS see note 3

Accelerator voltage	$V_{g_2, g_4, g_5, \ell}$	2000	V	
Astigmatism control voltage	$\Delta V_{g_2, g_4, g_5, \ell}$	± 50	V	see note 1
Focusing electrode voltage	V_{g_3}	220 to 370	V	
Control grid voltage for visual extinction of focused spot	V_{g_1}	max. -65	V	
Grid drive for 10 μ A screen current		approx. 10	V	
Deflection coefficient, horizontal	M_x	31.3	V/cm	
		max. 33	V/cm	
vertical	M_y	14.4	V/cm	
		max. 15.5	V/cm	
Deviation of linearity of deflection		max. 1	%	see note 2
Geometry distortion		see note 4		
Useful scan, horizontal		min. 100	mm	
vertical		min. 80	mm	

LIMITING VALUES (Absolute max. rating system)

Accelerator voltage	$V_{g_2, g_4, g_5, \ell}$	max. 2200	V
		min. 1500	V
Focusing electrode voltage	V_{g_3}	max. 2200	V
Control grid voltage, negative	$-V_{g_1}$	max. 200	V
		min. 0	V
Cathode to heater voltage	V_{kf}	max. 125	V
	$-V_{kf}$	max. 125	V
Grid drive, average		max. 20	V
Screen dissipation	W_{ℓ}	max. 3	mW/cm ²
Control grid circuit resistance	R_{g1}	max. 1	M Ω

Notes

1. All that will be necessary when putting the tube into operation is to adjust the astigmatism control voltage once for optimum spot shape in the screen centre. The control voltage will always be in the range stated, provided the mean x and certainly the mean y plate potential was made equal to $V_{g_2, g_4, g_5, \ell}$ with zero astigmatism correction.
2. The sensitivity at a deflection of less than 75% of the useful scan will not differ from the sensitivity at a deflection of 25% of the useful scan by more than the indicated value.
3. The mean x and certainly the mean y plate potential should be equal to $V_{g_2, g_4, g_5, \ell}$ with astigmatism adjustment set to zero.
4. A graticule, consisting of concentric rectangles of 70 mm x 85 mm and 68.8 mm x 83 mm as aligned with the electrical x-axis of the tube. The edges of a raster will fall between these rectangles.