

INSTRUMENT CATHODE-RAY TUBE

10 cm diameter flat faced double gun oscilloscope tube, post-deflection acceleration by means of a helical electrode and low interaction between traces. The tube features beam-blanking.

QUICK REFERENCE DATA

Final accelerator voltage	$V_{g8}(l)$	3000 V
Display area	horizontal full scan	
	vertical	7 cm
Deflection coefficient, horizontal	M_x	15 V/cm
	vertical	M_y 7 V/cm

SCREEN

	colour	persistence
E10-12GH	green	medium short
E10-12GM	yellowish green	long
E10-12GP	bluish green	medium short

Useful screen diameter min. 85 mm

Useful scan (each gun) at $V_{g8}(l)/V_{g5} = 3$

horizontal full scan

vertical min. 70 mm

The useful scan may vertically be shifted to a max. of 5 mm with respect to the geometric centre of the face plate.

HEATING

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

Heater voltage

Heater current

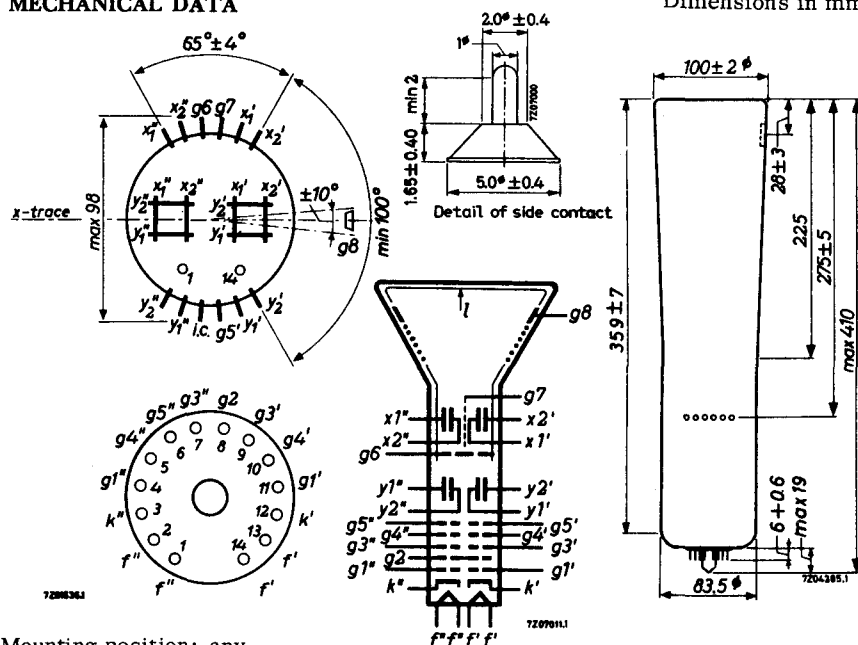
each gun

V_f 6.3 V

I_f 300 mA

MECHANICAL DATA

Dimensions in mm

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.

Base

14 pin all glass

Dimensions and connections

Overall length max. 410 mm

Face diameter max. 102 mm

Net weight

approx. 800 g

Accessories

Socket, supplied with tube type 55566

Final accelerator contact connector type 55563

Side contact connector type 55561

Mu-metal shield type 55545

CAPACITANCES (each gun)

x_1' to all elements except x_2'	$C_{x_1'}(x_2')$	4.5 pF
x_2' to all elements except x_1'	$C_{x_2'}(x_1')$	3 pF
x_1'' to all other elements except x_2''	$C_{x_1''}(x_2'')$	3 pF
x_2'' to all other elements except x_1''	$C_{x_2''}(x_1'')$	4.5 pF
y_1 to all other elements except y_2	$C_{y_1}(y_2)$	2 pF
y_2 to all other elements except y_1	$C_{y_2}(y_1)$	2 pF
x_1 to x_2	$C_{x_1 x_2}$	2 pF
y_1 to y_2	$C_{y_1 y_2}$	1.5 pF
Grid No.1 to all other elements	C_{g_1}	5.2 pF
Cathode to all other elements	C_k	5 pF

FOCUSING electrostatic**DEFLECTION** double electrostatic

x plates symmetrical

y plates symmetrical

Angle between x and y traces $90 \pm 1^\circ$ Angle between x-traces $\pm 0.8^\circ$ max. in the centre of the screen.Angle between y-traces $\pm 1^\circ$ max. in the centre of the screen.

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.

LINE WIDTH

Measured with the shrinking raster method in the centre of the screen.

Final accelerator voltage	$V_{g_8}(l)$	3000 V
Astigmatism control electrode voltage	V_{g_5}	1000 V ³⁾
First accelerator voltage	V_{g_2}	1000 V
Beam current	$I_{g_8}(l)$	10 μ A
Line width	l. w.	0.50 mm

HELIXPost deflection accelerator helix resistance: min. 100 M Ω

3) See page 6.

TYPICAL OPERATING CONDITIONS(each gun)

Final accelerator voltage	$V_{g8}(\ell)$	3000	V
Inter-gun shield voltage	V_{g7}	1000 ± 100	V ¹⁾
Geometry control electrode voltage	V_{g6}	1000 ± 100	V ^{1) 2)}
Astigmatism control electrode voltage	V_{g5}	1000 ± 100	V ³⁾
Focusing electrode voltage	V_{g4}	180 to 380	V
Deflection blanking electrode voltage	V_{g3}	1000	V
Deflection blanking control voltage for beam blanking of a current $I_{g9}(\ell) = 10 \mu\text{A}$	ΔV_{g3}	max. 40	V
First accelerator voltage	V_{g2}	1000	V
Control grid voltage for visual extinction of focused spot	V_{g1}	-25 to -90	V
→ Deflection coefficient, horizontal	M_x	12 to 18	V/cm
vertical	M_y	6 to 8	V/cm
Deviation of linearity of deflection		max. 2.5	% ⁴⁾
Geometry distortion		See note 5	
Interaction factor		$2 \cdot 10^{-3}$	mm/Vdc ⁶⁾
Tracking error		1.5	mm ⁷⁾

¹⁾²⁾³⁾⁴⁾⁵⁾⁶⁾⁷⁾ See page 6

LIMITING VALUES (each gun, if applicable) (Absolute max. rating system)

Final accelerator voltage	$V_{g8}(\ell)$	max.	3300 V
		min.	2700 V
Intergun shield voltage	V_{g7}	max.	1200 V
Geometry control electrode voltage	V_{g6}	max.	1200 V
Astigmatism control electrode voltage	V_{g5}	max.	1200 V
		min.	800 V
Focusing electrode voltage	V_{g4}	max.	1200 V
Beam blanking electrode voltage	V_{g3}	max.	1200 V
First accelerator voltage	V_{g2}	max.	1200 V
		min.	200 V
Control grid voltage,			
negative	$-V_{g1}$	max.	200 V
positive	V_{g1}	max.	0 V
positive peak	V_{g1p}	max.	2 V
Cathode to heater voltage,			
cathode positive	V_{kf}	max.	200 V
cathode negative	$-V_{kf}$	max.	125 V
Average cathode current	I_k	max.	300 μ A
Screen dissipation	W_ℓ	max.	3 mW/cm ²
Ratio $V_{g8}(\ell)/V_{g5}$	$V_{g8}(\ell)/V_{g5}$	max.	3

CIRCUIT DESIGN VALUES (each gun, if applicable)

Focusing voltage	V_{g4}	180 to 380	V/kV of V_{g2}
Control grid voltage for visual cut-off focused spot	V_{g1}	25 to -90	V/kV of V_{g2}
Deflection coefficient $V_{g8(l)}/V_{g5} = 3$			
horizontal	M_x	10 to 20	V/cm per kV of V_{g5}
vertical	M_y	6 to 8	V/cm per kV of V_{g5}
Focusing electrode current	I_{g4}	-15 to +10	μA
Control grid circuit resistance	R_{g1}	max. 1.5	$M\Omega$

- 1) This tube is designed for optimum performance when operating at the ratio $V_{g8(l)}/V_{g5} = 3$. Operation at other ratio may result in changes in deflection uniformity and geometry distortion. The geometry control electrode voltage and the intergunshield voltage should be adjusted for optimum performance. For any necessary adjustment its potential will be within the stated range.
- 2) This voltage should be equal to the mean x- and y plates potential.
- 3) The astigmatism control electrode voltage should be adjusted for optimum spot shape. For any necessary adjustment its potential will be within the stated range.
- 4) 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.
- 5) A graticule consisting of concentric rectangles of 60 mm x 60 mm and 57 mm x 57 mm is aligned with electrical x axis of the tube. The edges of a raster will fall between these rectangles with optimum potentials applied.
- 6) The deflection of one beam when balanced dc voltage are applied to the deflection plates of the other beam, will not be greater than the indicated value.
- 7) With 50 mm vertical traces superimposed at the tube face centre and deflected horizontally ± 4 cm by voltages proportional to the relative deflection factors, horizontal separation of the corresponding points of the traces shall not be greater than the indicated value.