5516, E

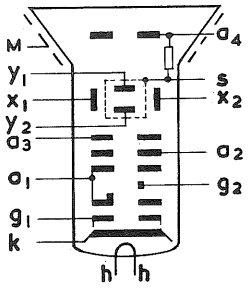
Oscilloscope Tube

SE5F/..

GENERAL

This short 13 cm diameter flat-faced tube with electrostatic focusing and deflection is designed for general purpose applications. It has a large screen area coupled with good performance and the added facility of beam blanking at anode potential which avoids d.c. coupling to the grid.

Heater voltage	V_h	6.3	V
Heater current	I_h	0.3	A



ABSOLUTE RATINGS

		Max	Min	
Fourth anode voltage	V_{a4}	5.0	1.5	kV
Third anode voltage	V_{a3}	2.5	0.6	kV
Second anode voltage	V_{a2}	500	0	V
First anode voltage	V_{a1}	2.5	0.7	kV
Negative grid voltage	$-V_{g1}$	300	1.0	V
Beam blanking voltage	V_{g2}	2.5	0.5	kV
Peak x plate to third anode voltage	$v_{x-a3(pk)}$	500	-	V
Peak y plate to third anode voltage	$v_{y-a3(pk)}$	500	-	V
Peak heater to cathode voltage	$v_{h-k(pk)max}$	250	-	V
x plate to third anode resistance	R_{x-a3}	5.0	-	MΩ
y plate to third anode resistance	R_{y-a3}	100	-	kΩ
Control grid to cathode resistance	R_{g1-k}	1.5	-	MΩ
Second anode current	I_{a2}	10	-	μA
P.D.A. ratio (V_{a4}/V_{a3} nom.)		2 : 1		
Helix resistance		-	15	MΩ

All voltages referred to cathode unless otherwise stated.

PHOSPHOR SCREEN

This type is usually supplied with GH phosphor (SE5F/GH) giving a green trace of medium short persistence. Other phosphor screens can be made available to special order.

Note : Prior to 1972 this tube was produced without external conductive coating. ←

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INTER-ELECTRODE CAPACITANCES

Grid 1 to all	$c_{g1\text{-all}}$	8.0	pF
Grid 2 to all	$c_{g2\text{-all}}$	10	pF
Cathode to all	$c_{k\text{-all}}$	4.75	pF
x_1 plate to x_2 plate	$c_{x1\text{-}x2}$	2.75	pF
y_1 plate to y_2 plate	$c_{y1\text{-}y2}$	1.5	pF
x_1 plate to all, less x_2 plate	$c_{x1\text{-all, less x2}}$	6.0	pF
x_2 plate to all, less x_1 plate	$c_{x2\text{-all, less x1}}$	6.0	pF
y_1 plate to all, less y_2 plate	$c_{y1\text{-all, less y2}}$	6.5	pF
y2 plate to all, less y_1 plate	$c_{y2\text{-all, less y1}}$	6.5	pF
x_1, x_2 plates to y_1, y_2 plates	$c_{x1,x2\text{ -}y1,y2}$	1.5	pF ←
Grid 1 & cathode to x_1 & x_2 plates	$c_{g1,k\text{-}x1,x2}$	0.9	pF
Grid 1 & cathode to y_1 & y_2 plates	$c_{g1,k\text{-}y1,y2}$	0.5	pF
Anode 4 to coating M (approx.)	$c_{a4\text{-}M}$	400	pF ←

TYPICAL OPERATION - Voltages with respect to cathode

Fourth anode voltage	V_{a4}	2.0	3.0	4.0	kV
Mean deflector plate potential		1000	1500	2000	V
Third anode voltage for optimum astigmatism correction	V_{a3}	1000*	1500*	2000*	V
Second anode voltage for optimum focus	V_{a2}	50 to 200	75 to 250	80 to 360	V
First anode voltage	V_{a1}	1000	1500	2000	V
Shield voltage for optimum raster shape	V_s	1000*	1500*	2000*	V
Beam blanking voltage for cut-off	V_{g2}	950†	1430†	1900†	V
Control grid voltage for cut-off	V_{g1}	-30 to -55	-45 to -80	-56 to -100	V
x deflection coefficient	D_x	18.6 to 23.5	28 to 35	37 to 47	V/cm
y deflection coefficient	D_y	7.4 to 10	11 to 15	14.5 to 20	V/cm
Minimum screen area (corners cut-off)		8 x 10	8 x 10	8 x 10	cm^2
Line width at centre at 10 μA beam current measured by microscope		0.6	0.5	0.4	mm

* The required voltage will not differ from the quoted value by more than $\pm$50V.

† The beam is unblanked when $V_{g2} = V_{a1}$. This grid 2 electrode should not be used as a brilliance control.

RASTER DISTORTION AND ALIGNMENT

The following data applies for the typical operation conditions.

The undeflected spot will fall in a circle of 6 mm radius about the centre of the tube face.

Raster distortion: the edges of a test raster will fall between two concentric rectangles 10 cm x 6 cm and 9.80 cm x 5.88 cm.

Raster geometry can be adjusted by varying the interplate shield voltage (V_S) with respect to the mean deflector plate potential. The interplate shield voltage (V_S) for optimum raster shape will be within ± 50V of the mean deflector plate potential, though differing from the third anode voltage (V_{a3}). It is essential to ensure that the correct raster shape has been achieved by this means before adjusting for optimum focus.

For an 8 cm x 10 cm raster the corners will be cut to 120 mm minimum diameter.

Rectangularity of X and Y axes is 90° ± 1°.

Both X and Y plates are designed for symmetrical operation. Should the tube be required to operate asymmetrically, some degradation of focus and trace geometry will result.

It is preferable that the mean x and y plate potentials are equal otherwise some deterioration in performance will occur. Under no circumstances should the mean y plate potential differ from the mean x plate potential by more than 50V.

The Y plate mean potential should not be allowed to become greater than that of the X or severe deflection defocusing will result.

The deflector system is designed to intercept part of the beam, so that low impedance deflector plate drive is desirable.

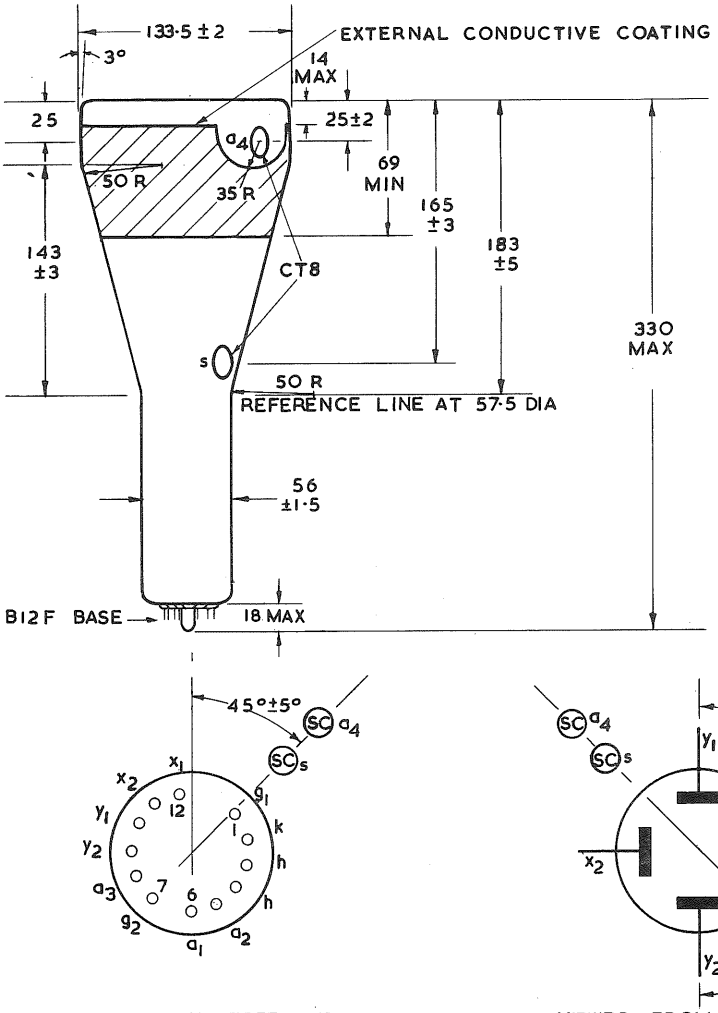
SHIELDING

Adequate magnetic shielding is required. In addition due attention should be paid to the position of the tube relative to transformers and chokes.

The primary object of the external conductive coating is as an electrostatic shield and and in use this coating should be earthy.

TUBE WEIGHT (approximate) 1.0 kg (2.25 lb)

MOUNTING POSITION - unrestricted



All dimensions in mm

Not to be scaled

It is advisable to support the tube near the screen and at a second point on the neck near the base. The tube should not be subjected to any stress from the use of clamps and should not be suspended by the base.

Connecting leads should not be soldered directly to the tube pins.