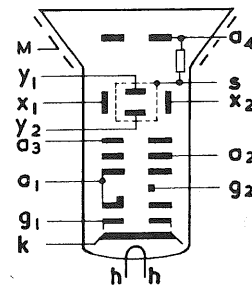


# Oscilloscope Tube

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	$C_{g1-all}$	8.0	pF
Grid 2 to all	$C_{g2-all}$	10	pF
Cathode to all	$C_{k-all}$	4.75	pF
x <sub>1</sub> plate to x <sub>2</sub> plate	$C_{x1-x2}$	2.75	pF
y <sub>1</sub> plate to y <sub>2</sub> plate	$C_{y1-y2}$	1.5	pF
x <sub>1</sub> plate to all, less x <sub>2</sub> plate	$C_{x1-all, less x2}$	6.0	pF
x <sub>2</sub> plate to all, less x <sub>1</sub> plate	$C_{x2-all, less x1}$	6.0	pF
y <sub>1</sub> plate to all, less y <sub>2</sub> plate	$C_{y1-all, less y2}$	6.5	pF
y <sub>2</sub> plate to all, less y <sub>1</sub> plate	$C_{y2-all, less y1}$	6.5	pF
x <sub>1</sub> , x <sub>2</sub> plates to y <sub>1</sub> , y <sub>2</sub> plates	$C_{x1,x2 -y1,y2}$	1.5	pF
Grid 1 & cathode to x <sub>1</sub> & x <sub>2</sub> plates	$C_{g1,k-x1,x2}$	0.9	pF
Grid 1 & cathode to y <sub>1</sub> & y <sub>2</sub> plates	$C_{g1,k-y1,y2}$	0.5	pF
Anode 4 to coating M (approx.)	$C_{a4-M}$	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 <sup>2</sup>
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 ±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  $\pm 50V$  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  $90^\circ \pm 1^\circ$ .

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.

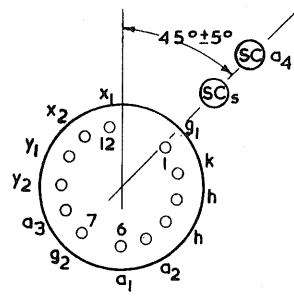
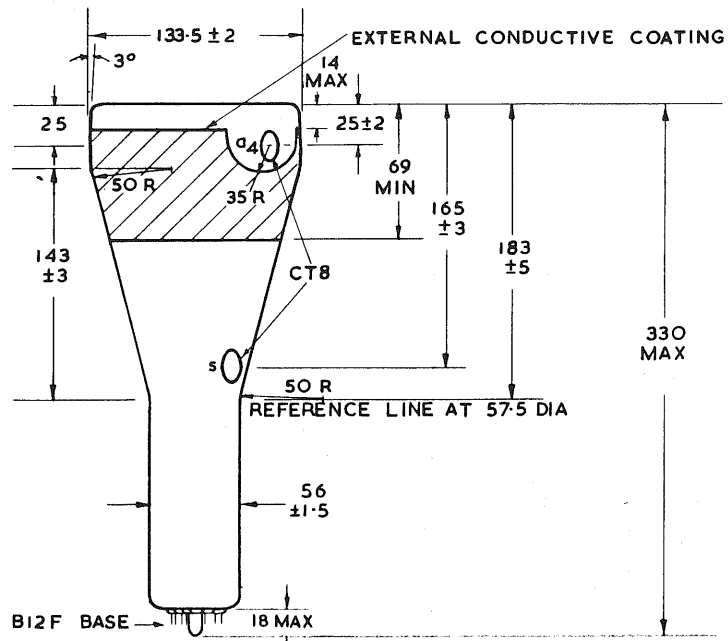
## SHIELDING

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

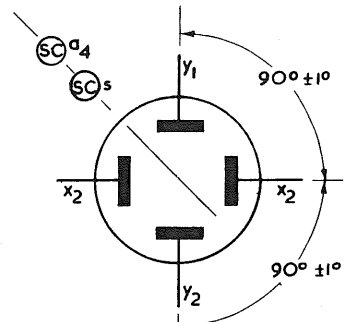
The primary object of the external conductive coating is as an electrostatic shield and in use this coating should be earthy.

**TUBE WEIGHT** (approximate) 1.0 kg (2.25 lb)

**MOUNTING POSITION** - unrestricted



VIEWED FROM PINS FREE END



VIEWED FROM SCREEN END  
PIN 6 AT BOTTOM

Not to be scaled

All dimensions in mm

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.