



ABRIDGED DATA

12-inch Diameter Radar Tubes. Two sets of scan coils may be fitted for display of alpha-numeric characters in processed radar systems. The scan angle permits the use of valve or transistor scan amplifiers.

Neck Diameter	1.378 inches (35mm)
Deflection Angle	50 Degrees
Deflection Method	Magnetic
Focus Method (<i>See Note 1</i>)	Magnetic
E.H.T. Voltage	15 kV

GENERAL DATA

Electrical and General

Cathode	Indirectly Heated, Oxide Coated
Heater Voltage (<i>See Note 2</i>)	6.3 V
Heater Current	0.3 ± 10% A
Faceplate	Clear
Screen (<i>See Note 3</i>)	Aluminised

Inter-electrode Capacitances:

Grid to all other electrodes, less than	8.0 pF
Cathode to all other electrodes, less than	8.0 pF

Mechanical

Overall Length	25.591 inches (650mm)	Max
Overall Diameter	12.087 inches (307mm)	Max
Neck Diameter	1.398 inches (35.5mm)	Max
Net Weight	12 pounds (5.4kg)	Approx
Base	B.S.448-B12A	
Anode 2 Cavity Cap	B.S.448-CT8	
Mounting Position	<i>See Note 4</i>	

ENGLISH ELECTRIC

MAXIMUM AND MINIMUM RATINGS

(Absolute Values)

(All voltages with respect to cathode)

	<i>Min</i>	<i>Max</i>	
Anode 2 Voltage	9.0	15.5	kV
Anode 1 Voltage	250	600	V
Grid Voltage, negative value (See Note 5) ..	—	250	V
Cathode Current (Mean)	—	300	μ A
Heater to Cathode Voltage (See Note 6):			
Cathode negative	—	150	V
Cathode positive	—	200	V
Peak Heater to Cathode Voltage:			
Cathode positive (See Note 7)	—	410	V
Grid to Cathode Resistance	—	1.5	M Ω
Grid to Cathode Impedance (at 50c/s)	—	0.5	M Ω
Heater to Cathode Resistance			See Note 8

TYPICAL OPERATING CONDITIONS

Anode 2 Voltage	15	kV
Anode 1 Voltage	300	V
Grid Voltage for cut-off	-30 to -90	V
Grid Drive for 50 μ A beam current	20 to 30	V

OPTIMUM BEAM FOCUSING

In order to obtain maximum brightness and minimum spot size, it is necessary to carry out the following procedure.

- (a) Stray magnetic fields should be minimised in the region of the gun structure by fitting a tubular mumetal shield over the neck.
- (b) The beam may be centred in the defining aperture by means of a small magnetic field located in the region of the grid and adjusted to give maximum brightness.
- (c) The magnetic axis of the focus coil should be aligned with the axis of the electron beam. This may be done either by adjusting the position of the focus coil (See Method 1), or by fitting additional deflection coils to adjust the position of the beam (See Method 2). In each case a.c. focusing (see page 3) may be used to identify the optimum alignment condition.

Method 1

Adjustment of the focus coil position

The mounting of the focus coil should be such that the coil can be moved in any direction, i.e. vertically, horizontally and tilted about either the vertical or horizontal axis. An a.c. current is passed through the focus coil and the position of the coil is adjusted until the optimum alignment is reached. (See note* below).

Method 2

Electromagnetic deflection of the beam

Two sets of alignment coils are fitted on the tube neck, between the beam defining aperture and the focus coil (See diagram, page 8). Each set of coils is capable of deflecting the beam slightly in both X and Y directions. The currents in the alignment coils are adjusted to give correct alignment of the beam. (See note* below).

**A.C. Focusing*

An alternating current is passed through the focus coil such that the positive and negative excursions of the current each produce a focused spot. Provided there is no current through the main deflection coils, the picture on the tube faceplate will consist of a defocused area and two focused spots. The optimum focusing condition is obtained when the two focused spots coincide at the centre of the defocused spot.

NOTES

1. The focus coil should be positioned so that the focusing field is entirely on the screen side of the beam defining aperture. When using a focus coil having a short air gap, the centre of the air gap should be approximately 220mm from the reference plane.
2. The heater is suitable for series or parallel operation. In series operation the surge heater voltage must not exceed $9.5V_{r.m.s.}$ when the supply is switched on and a current limiting device may be necessary in the circuit to ensure that this voltage is not exceeded.
3. Tubes in the T953 series have screens with the following characteristics.

Type	EEV Screen	Equivalent	Fluorescent Colour	Persistence
T953S	S*	—	Yellowish-orange	Long
T953Y	Y*	P33	Orange	Long
T953Z	Z*	P26	Orange	Very Long

*This is a fluoride screen which is sensitive to burn and should not be operated with slow moving spots.

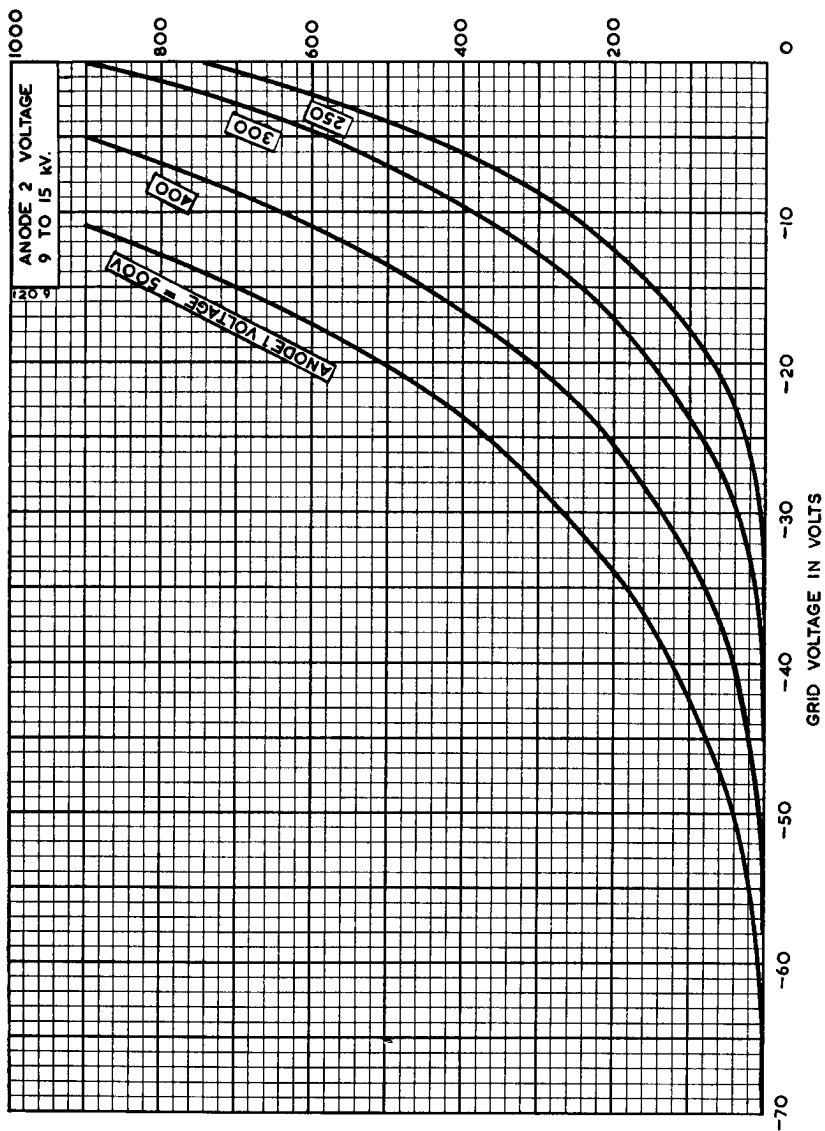
The tube can be manufactured with alternative screens, and customers' enquiries are invited.

ENGLISH ELECTRIC

4. The tube may be mounted in any position except vertically with the screen downwards and the axis of the tube making an angle of less than 20° with the vertical.
5. The d.c. value of grid bias must not be allowed to become positive with respect to the cathode except during the period immediately after switching the equipment on or off when it may be allowed to rise to $+1V$. The maximum positive grid excursion may reach $2V$ and at this voltage the grid current may be expected to be approximately $2mA$.
6. To avoid excessive hum, the a.c. component of the heater to cathode voltage should be as low as possible, preferably less than $20V_{r.m.s.}$
7. During a warming-up period not exceeding 45 seconds.
8. When the heater is in a series chain or earthed, the impedance between the cathode and earth at $50c/s$ must not exceed $100k\Omega$. When the heater is supplied from a separate transformer, the heater to cathode resistance must not exceed $1M\Omega$.

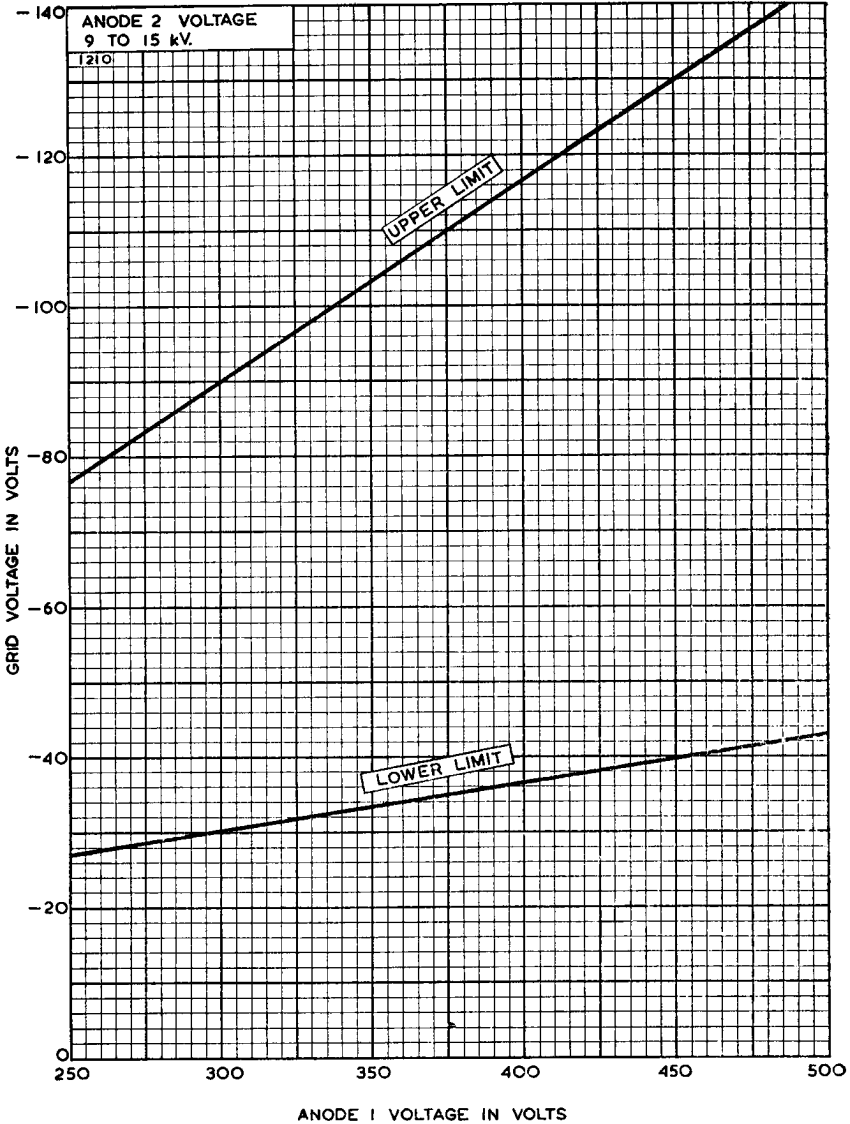


GRID VOLTAGE CHARACTERISTICS ANODE 2 CURRENT IN MICROAMPERES





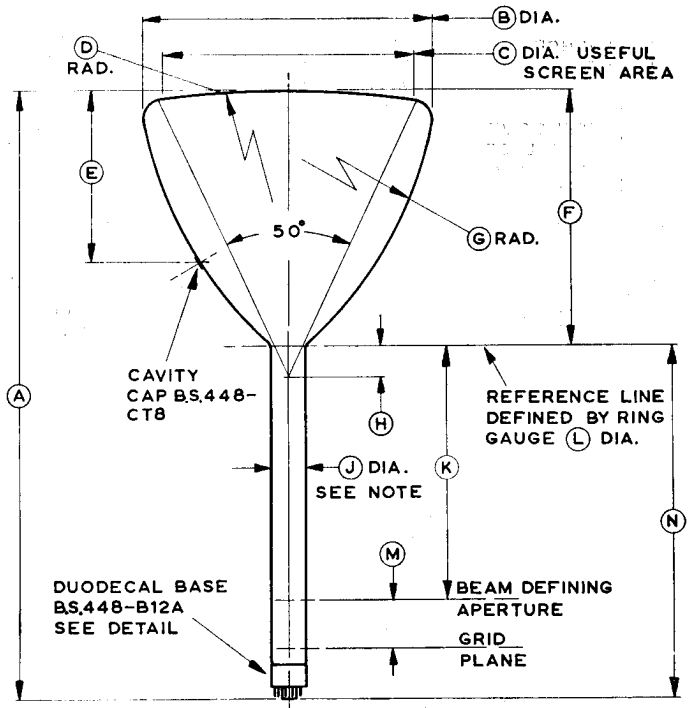
GRID VOLTAGE CUT-OFF LIMITS





OUTLINE

1211



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	25.32 ± 0.28	643.0 ± 7.0	H	1.260 Max	32.0 Max
B	12.008 + 0.079 - 0.098	305.0 + 2.0 - 2.5	J	1.378 + 0.020 - 0.039	35.0 + 0.5 - 1.0
C	10.43 Min	265.0 Min	K	10.630	270
D	39.37	1000.0	L	1.417	36.00
E	7.087 ± 0.197	180.0 ± 5.0	M	1.969	50.00
F	10.71 ± 0.14	272.0 ± 3.5	N	14.606	371
G	16.77	426.0			

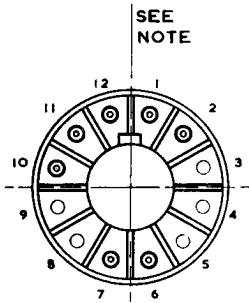
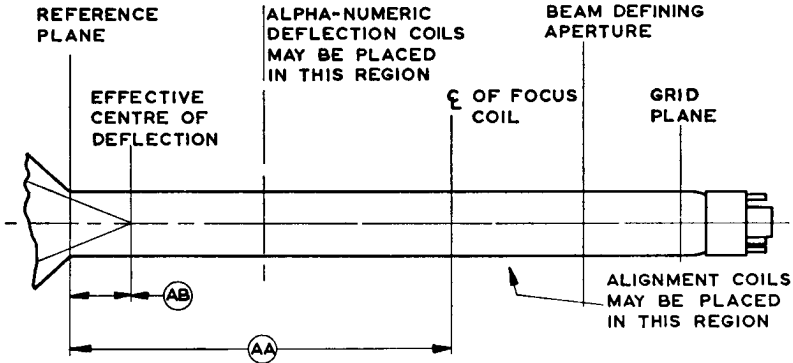
Inch dimensions have been derived from millimetres.

Note A ring gauge 1.417 inches (36.0mm) diameter by 3.937 inches (100mm) long will pass over base and neck to reference plane.



1203

OUTLINE DETAILS



Ref.	Inches	Millimetres
AA	8.661	220.0
AB	1.260 Max	32.00 Max

Inch dimensions have been derived from millimetres.

Note The anode cavity cap will be in line with the base key to within 15°.

Pin	Element	Pin	Element
1	Heater	8	Omitted
2	Grid	9	Omitted
3	Omitted	10	Anode 1
4	Omitted	11	Cathode
5	Omitted	12	Heater
6	Internal Connection	CAP	Anode 2
7	Internal Connection		