EDISWAN

31C81

CATHODE RAY TUBE–ALL ELECTROSTATIC 6″ DIA.
Post Deflection Acceleration
For High Precision Instruments

GENERAL

The 31C81 is a flat screen Cathode Ray Tube with post-deflection acceleration. It is suitable for high precision instruments.

RATING

Heater Voltage	V_h	6·3	V
Heater Current (approx)	I_h	0·5	A
Maximum Final Anode Voltage	$V_{a4(max)}$	8	kV
Minimum Final Anode Voltage	$V_{a4(min)}$	2	kV
Maximum Third Anode Voltage	$V_{a3(max)}$	4	kV
Minimum Third Anode Voltage	$V_{a3(min)}$	1	kV
Maximum Second Anode Voltage	$V_{a2(max)}$	2	kV
Maximum First Anode Voltage	$V_{a1(max)}$	2·5	kV
Minimum First Anode Voltage	$V_{a1(min)}$	1	kV
Maximum Negative Grid Voltage	$V_{g(max)}$	–200	V
Minimum Negative Grid Voltage (Cathode Hot)	$V_{g(min)}$	0*	V
Maximum Positive Grid Voltage (Cathode Cold)	$V_{g(max)}$	200	V
Maximum X1 Plate/X2 Plate Voltage	$V_{x1\text{-}x2(max)}$	1	kV
Maximum Y1 Plate/Y2 Plate Voltage	$V_{y1\text{-}y2(max)}$	1	kV
Maximum Heater/Cathode Voltage	$V_{h\text{-}k(max)}$	150	V
Maximum X Plate/Third Anode Resistance	$R_{x\text{-}a3(max)}$	5	MΩ
Maximum Y Plate/Third Anode Resistance	$R_{y\text{-}a3(max)}$	5	MΩ
Maximum Grid/Cathode Resistance	$R_{g\text{-}k(max)}$	2	MΩ
Minimum Heater/Cathode Resistance	$r_{h\text{-}k(min)}$	2†	MΩ
Minimum Grid/Cathode Resistance	$r_{g\text{-}k(min)}$	10	MΩ

* The Grid must not become positive with respect to cathode.

† Heater 100V Negative with respect to cathode.

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INTER-ELECTRODE CAPACITANCES (pF)

Cathode/All other electrodes	$C_{k\text{-all}}$	8
Grid/All other electrodes	$C_{g\text{-all}}$	17
X1 Deflecting Plate/X2 Deflecting Plate	$C_{x1\text{-}x2}$	2·5
Y1 Deflecting Plate/Y2 Deflecting Plate	$C_{y1\text{-}y2}$	3
X1 Deflecting Plate/All other electrodes except X2	$C_{x1\text{-all,less X2}}$	8
X2 Deflecting Plate/All other electrodes except X1	$C_{x2\text{-all,less X1}}$	8
Y1 Deflecting Plate/All other electrodes except Y2	$C_{y1\text{-all,less Y2}}$	7·5
Y2 Deflecting Plate/All other electrodes except Y1	$C_{y2\text{-all,less Y1}}$	7·5
Y1 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$C_{y1\text{-x1 or x2}}$	0·1
Y2 Deflecting Plate/X1 or X2 Deflecting Plate (approx.)	$C_{y2\text{-x1 or x2}}$	0·2

DEFLECTION DISTORTION

In any Cathode Ray Tube using a simple post-deflection accelerator, the application of the accelerating potential results in deflection distortion, which becomes more pronounced as the ratio of the V_{a4}/V_{a3} is increased. It is recommended that for work involving the measurement of relative deflection amplitudes directly on the tube face this ratio should not exceed 2 : 1.

ORIENTATION

Looking at the screen with the spigot key upward, a positive potential applied to X1 will deflect the spot to the left and a positive potential applied to Y1 will deflect the spot upward.

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MAGNETIC SHIELDING

The magnetic shield should be of high permeability material, of a thickness determined by the magnetic field at the tube position. The shield should be earthed. To obtain optimum results, equipment containing Cathode Ray Tubes should always be designed to minimise the magnetic field around the tubes, as magnetic shielding can never be completely effective. In addition to the more obvious deflection effects of alternating fields, steady magnetic fields from smoothing chokes, magnetised steel components, etc., can produce spot distortion or low gun efficiency.

DIMENSIONS

Maximum Overall Length	500mm
Maximum Screen Diameter	163mm
Maximum Neck Diameter	52mm

MOUNTING

The tube should not be supported by the base alone, but should preferably be held in a rubber-lined clamping ring at the screen end together with a similar clamp round the magnetic screen close to the base. The socket should have sufficient freedom of movement to accommodate the tube overall length tolerance and a small amount of lateral float to ensure good pin contact without straining the base.

SCREEN PHOSPHORS

Type	*Colour*	*Persistence*	*Application*
T1	Green	Medium	Visual
T3	Blue Actinic	Short	Photographic
T4	White	Medium Short	Visual/ Photographic
T6	Yellow Afterglow	Long	Visual
T7	Orange Afterglow	Very Long	Visual

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TYPICAL OPERATION

Final Anode Voltage	V_{a4}	4 kV
Third Anode Voltage	V_{a3}	2 kV
Second Anode Voltage	V_{a2}	350 V
First Anode Voltage	V_{a1}	2 kV
Grid Voltage	V_g	−60 V
Third Anode Current	I_{a3}	1 μA
Final Anode Current (=Screen Current)	I_{a4}	2 μA

The line width at $I_{screen} = 0{\cdot}5\mu A$ is 0·5 mm. measured on a circle of 50 mm. diameter.

CHARACTERISTICS

Second Anode Voltage (focus anode)	V_{a2}	350	V
Grid Bias Voltage for cut-off			
at $V_{a1} = 1kV$	V_g	−35	V
$V_{a1} = 2kV$	V_g	−70	V
$V_{a1} = 2{\cdot}5kV$	V_g	−87	V
X Plate Sensitivity ($V_{a4} = V_{a3}$)	S_x	$\frac{1170}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = V_{a3}$)	S_y	$\frac{860}{V_{a3}}$	mm/V
X Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_x	$\frac{940}{V_{a3}}$	mm/V
Y Plate Sensitivity ($V_{a4} = 2V_{a3}$)	S_y	$\frac{710}{V_{a3}}$	mm/V
Grid Voltage (drive) at $I_{a4} = 25\mu A$, $V_{a1} = 2kV$	V_g	<32	V

The Plate sensitivity for a deflection of less than 75% of the useful scan will not differ from that for 25% by more than 2%.

The undeflected spot will fall within a circle of 7 mm radius from the centre of the tube face.

The minimum useful screen area is a circle of 7 cm radius.

Orthogonality of deflection axes is $\pm$ 1°.

The edges of a raster with mean dimensions which are 75% of the useful scan will not deviate from the mean rectangle by more than $2\frac{1}{2}$%.

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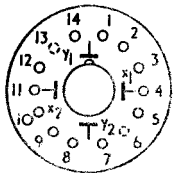
SIDE CONTACT—CT8

BASE—B14A (Diheptal)



Viewed from free end of pins

CONNECTIONS

Pin 1	Heater	h
Pin 2	Cathode	k
Pin 3	Grid	g
Pin 4	First Anode	a1
Pin 5	Second Anode	a2
Pin 6	No Pin	NP
Pin 7	Deflector Plate Y1	Y1
Pin 8	Deflector Plate Y2	Y2
Pin 9	Third Anode	a3
Pin 10	Deflector Plate X2	X2
Pin 11	Deflector Plate X1	X1
Pin 12	No Connection	NC
Pin 13	No Pin	NP
Pin 14	Heater	h
Cap	Final Anode	a4

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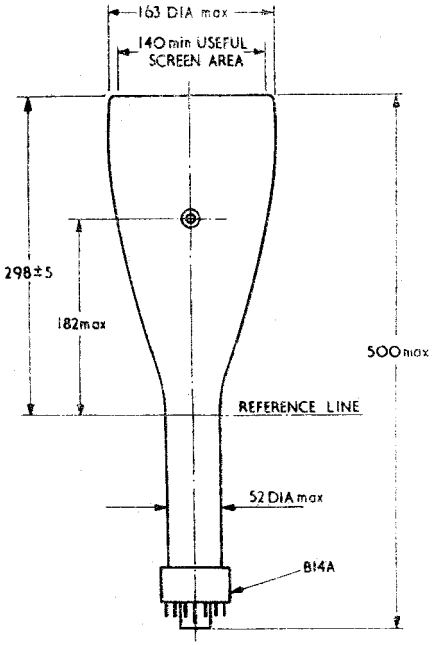

All Dimensions in mm.

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